THE

MYSTERIES OF HUMAN NATURE

EXPLAINED BY A NEW SYSTEM OF

NERVOUS PHYSIOLOGY:

TO WHICH IS ADDED,

A REVIEW OF THE ERRORS OF SPIRITUALISM, AND INSTRUCTIONS FOR DEVELOPING OR RESISTING THE INFLUENCE BY WHICH SUBJECTS AND MEDIUMS ARE MADE.

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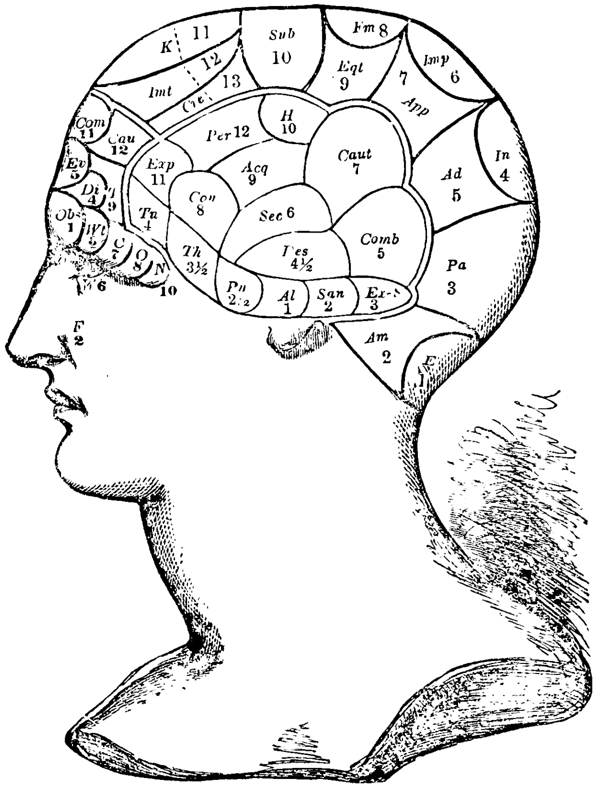
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PHRENO-BUST.

EXPLANATION OF FRONTISPIECE.

THE THREE CLASSES OF ORGANS ARE ARRANGED AND NUMBERED ACCORDING TO THE ORDER OF THEIR SUCCESSIVE CREATION.

DIRECTIVES.

1, *Observation.*
2, *Flavor.*
3, *Weight.*
4, *Direction.*
5, *Eventuality.*
6, *Words.*
7, *Color.*
8, *Order.*
9, *Time.*
10, *Number.*
11, *Comparison.*
12, *Causality.*

IPSEAL IMPULSIVES.

1, *Alimentiveness.*
2, *Sanativeness.*
2½, *Pneumativeness.*
3, *Ex-sanativeness.*
3½, *Thermativeness.*
4 *Tune.*
4½, *Destructiveness.*
5, *Combativeness.*
6, *Secretiveness.*
7, *Cautiousness.*
8, *Constructiveness.*
9, *Acquisitiveness.*
10, *Hope.*
11, *Experimentiveness.*
12, *Perfectiveness.*

SOCIAL IMPULSIVES.

1, *Equi-motiveness.*
2, *Amativeness.*
3, *Parentiveness.*
4, *Inhabitiveness.*
5, *Adhesiveness.*
6, *Imperativeness.*
7, *Approbativeness.*
8, *Firmness.*
9, *Equity.*
10, *Submissiveness.*
11, *Kindness.*
12, *Imitativeness.*
13, *Credenciveness.*

THE front of the head is occupied by the Directives, arranged in the order indicated by the numerals, from 1 to 12. The side of the head is occupied by the Ipseals, which are indicated by another series of numerals, from 1 to 12. The back and upper part is occupied by the social organs, as indicated by the numerals, from 1 to 13. The three classes are separated by double lines.

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PREFACE.

TWENTY years ago, having made the discovery that the brain is divided, and its organs arranged, in the manner represented in the frontispiece, I published "A New System of Phrenology," the principal novelty of which consisted in the tripartite division of the brain. Since that time, I have been constantly engaged in the study of phreno-nervous physiology. Standing aloof, as far as possible, from all associations which are calculated to prejudice the mind, insensibly, against any particular conclusions to which facts naturally tend, I have endeavored to cultivate the disposition, and acquire the ability, to form an impartial and independent judgment concerning matters which relate to the great mysteries of our nature.

I understand the history of science too well to expect, that the principles announced in this work will receive the immediate approbation of any sect, party, or clique. The revolution proposed in physiology and phrenology is too radical and sweeping, and the concessions required of those who hold present opinions are too great, to be made at once, however desirable they may appear to a few advanced and unprejudiced minds.

That I have committed some errors of fact, as well as of judgment, there can be little doubt; but it is a consolation to believe, that there will be no lack of friendly critics to point them out, and prevent them from doing any serious injury.

It is due to my relative, *Dr. Francis S. Grimes*, to state, that all the original designs were made, and drawn on the engraver's blocks, by him; and I am, also, indebted to his skill for much valuable assistance in making the necessary anatomical investigations, to determine doubtful points in regard to the nervous structure of animals.

The section upon spiritualism and credo-mania is added as a natural sequel to the work; for it seems to be absolutely necessary to correct the prevailing error into which persons of all classes have fallen, by placing too much confidence in testimony apparently credible. This monstrous error can be overcome, not by conceding, as *Prof. Bush* and *Rev. Mr. Mahan* do, that it is half truth; but by following the example of *Profs. Faraday, Lee*, and *Page*—grasping it with the iron hand of experimental science, and thrusting the terrible spear of Ithuriel through its reptile head. It was while doing this, that I was so fortunate as to discover the principles of phreno-physiology, which form such a prominent feature in this treatise.

In her ordinary and normal operations, Nature conceals her mightiest powers from human observation. It was amid the tempestuous howling of the insane atmosphere, that Franklin detected the real character of the electric thunderbolt, which, according to the ancient system of Grecian mythology, was a spiritual manifestation; and it was in an equally disordered condition of the mental nervous organism, that I ascertained the true character of that wonderful influence which the body and mind mutually exert upon each other.

J. STANLEY GRIMES,

LANSINGBURGH, RENS. Co., N. Y., FEBRUARY 10th, 1857.

GLOSSARY.

A priori, Beforehand.

Apparatus, A combination of instruments for a special purpose.

Abnormal, Out of the common course, irregular.

Adipose, Fat.

Aconscious, Without consciousness.

Assimilation, The changes which substances undergo in a living body, to become similar to its organisms.

Analogue, or analogous, A part that performs a similar office to another, though, otherwise, essentially different in form and character.

Anatomical, Relating to the *structure* of organs; while the term, physiology, is applied to the *offices*, or *functions*, which they perform.

Articulates, Animals with joints, but no proper vertebral columns, or backbones, including worms, insects, crabfish, and lobsters.

Afferent, A term lately applied to a nerve which conveys impressions to a centre. When the centre is the seat of consciousness, the afferent nerve may be called a nerve of sensation, or a sensory nerve; but when the centre is aconscious, we require the word afferent, or centripetal.

Brain, A term vaguely applied to the central nervous masses in the head

Cardiac, Relating to the heart.

Comatose, Sleepy.

Cetacea, Animals that breathe the air, and nourish their young with milk, but, otherwise, are like fishes, such as the whale and porpoise

Crus, A leg; a fanciful term applied to the fibres that connect the oblongata with the brain.

Crura Cerebri, Legs of the brain.

Corpo-Neurine, Small masses of nerve substance abounding in corpuscles, or vesicles, but not fibrous.

Cerebrum, The whole brain excepting the cerebellum, submenta, and oblongata.

Cervical, Relating to the neck.

Consciousness, Mind, or sensation, perception, and feeling.

Decussation, The crossing of fibres from one half of the body or head to the other, to insure equilibrium of position, and harmony of action. The fibres that cross are called *commissures*.

Differentiation, A separate development from a main branch, or root.

Digestion, Strictly, it merely signifies the dissolving of solid food in the stomach; but it is generally used to include all the processes which food undergoes in being formed into blood.

Economy and *economization*, A method, or arrangement, by which there is a saving of time, nutritive material, heat, motion, or labor. In this sense, it has never heretofore been applied to physiology; but I have used it, because our language furnishes no other proper term. Economy, strictly, signifies the law of the house, or of the establishment, as, when we say, "the animal economy," or "the economy of nature," we mean the law by which the operations are performed, without any reference to frugality or saving.

Efferent, Motor, or centrifugal; a nerve of motion.

Fornix, Literally, a vault or arch, fancifully applied to a distinct set of fibres in the brain.

Glosso-pharyngeal, Relating to the tongue and pharynx, or throat.

Ganglion, A knot, or swelling, on a nerve, caused by a mass of corpo-neurine.

Gelatine, Resembling jelly.

Gastric, Relating to the stomach

Hypo-glossal, Under the tongue.

Hypo-gastric, Under the stomach.

Homologue, or homologous, That which is essentially the same, or equivalent, though modified and disguised.

Ipseals, Organs that are related to self only, as a solitary being, in contradistinction to the *social* organs that relate to sex, offspring, and society.

Invertebrates, Animals without back-bone, including all animals excepting fishes, reptiles, birds, and mammals.

Mammals, Animals that nourish their young with milk.

Mammillary, Bodies resembling breasts.

Niger, or *Locus niger*, A black, or dark, mass of corpo-neurine in the crura cerebri.

Normal, According to established rule.

Mollusks, Soft animals, many of which, as the oyster, nautilus, and snail, have hard shells, but no joints nor vertebra.

Moderating ganglia and nerves are those which moderate the excessive action of the mental impulses upon the vital organs.

Phrene is from the Greek, and now signifies *the mind.* Some of the ancients thought that the mind was in the diaphragm, or diaphrene.

Pneumo-gastric, Lungs and stomach.

Pre-vertebral, Before the back-bone.

Proto-zoic, First created animals.

Proto-conscious, First, or lowest, degree of consciousness, a term employed, in this treatise, to the nerves of sensation.

Pro-vital, For the maintenance of vitality.

Prelimination, A preparatory process, or act.

Potentive ganglion, Corpo-neurine which generates or continues the power of sensation.

Plexus, A complicated net-work of nerves which meet to exchange fibres.

Peduncle, A stem, with a root, or foot.

Respiration, Strictly, signifies the mechanical process of inhaling and exhaling air; but it is used to signify the chemical process by which oxygen unites with the blood or the tissues, to produce motion, or heat.

Radiates, Animals, such as the polypus and starfish, that consist, principally, of a stomach and mouth, with feelers, or limbs, radiating, like branches, from the mouth.

Reptiles, Vertebrate animals that breathe the air, but have imperfect organs of respiration.

Somniferous, Sleep-producing.

Supermental, Relating to the cerebral, or highest mental, organs.

Specialization, The application of separate and distinct parts, or organs, to special purposes, instead of one general organ being used for a variety of purposes.

Submental, A new term applied to all the organs of the brain beneath the cerebrum, and above the oblongata.

Stimulus, Any thing which excites an organ to action.

Sleep, The economical suspension of the voluntary powers, while the vital continue in a state of activity.

Striatum, Literally, signifies something striped, or striated. Gall and Spurzheim considered it as the nourisher of the fibres of the anterior lobe. Modern physiologists regard it as the source of voluntary motion: I regard it as the submental ganglion of the external senses, from which voluntary movements are reflected. The lateral part of the striatum is the *claustrum*, the submental organ related to the stomach and lungs.

Tenio, Tape-like.

Thalamus, Literally, a bed in the brain, from which it was formerly supposed, that the optic nerve was derived. Gall and Spurzheim considered it as a ganglion that nourishes the fibres of the posterior lobe. Dr. Carpenter regards it as the seat of common sensation: I have endeavoured to show, that it is the submental organ of the parental impulse.

Torpid state, A term to use instead of *sleep*, when speaking of the condition of animals whose vital functions are suspended in consequence of cold or the absence of stimulus.

Ultra-vital organs are those that are *beyond* the central vital organs, but are dependent upon them for nutrition: such are the head and limbs, the reproductive organs, and all voluntary nerves and muscles.

Verm, Worm; *vermiform*, worm-like.

Vertebrate, An animal with a back-bone, and a spinal cord in it.

Vi-motor nerves, Nerves that communicate motion to the arteries and vital viscera.

Viscera, plural of *viscus*, is a term applied to organs that are contained in cavities, and particularly to the contents of the head, thorax, and abdomen.

Vital Viscera, The organs contained in the thorax and abdomen, which are concerned in the manufacture and circulation of blood.

NERVOUS PHYSIOLOGY.

SECTION I.

THE ORGANIC LAWS OF CREATION APPLIED TO MAN.

The manifestations of the mind which are denominated the mysteries of human nature, result from the operation of the organic laws of God, with which mankind have hitherto been unacquainted. The object of this work is to announce the discovery of some of those laws, to illustrate them, and to call the attention of the intellectual portion of the public to their importance.

I will here state generally the substance of the principal discoveries, in a few brief propositions.

1. All organization proceeds, first, by expansion; second, by concentration; third, by a special development, which promotes economy. This law applies to the constitution of worlds, of plants, of animals, and man, and to each system of organs in man.

2. The organs of man, both of body and mind, are anatomically arranged in the progressive order of geological creation; and this work points out that order, and demonstrates that arrangement, thus constituting a new science of Progressive Phreno-physiology.

3. The conscious principle, or mind, is in man and all animals located at the point where the nerves of sensation from the stomach meet the nerves of sensation from the mouth; the purpose of the stomach nerves being to impel to action, and of the mouth nerves to guide the actions to external objects.

4. The nerves of sensation from the stomach are the roots and first created representatives of the Impulsive organs, which constitute, in man, the posterior or larger part of the brain. The nerves of sensation from the mouth are the roots and first created representatives of the Directive or intellectual organs, which constitute the forehead.

5. The Directives regulate voluntary actions; the Im pulsives regulate the action of the bloodvessels and nutritive viscera; and some of the Impulsives cause expansion and others contraction of the bloodvessels.

6. There are special centers, called ganglia, on all the nerves of sensation, which receive restraining influences from the stomach and its auxiliaries, to produce sleep; and there are other ganglia on the nerves of impulsive motion, to produce functional moderation, when health and economy require it.

7. The nerve substance is composed of fibres that conduct impressions, and of gray masses that give continuity to nervous and cerebral functions.

The elucidation of these propositions will, in the course of this work, demonstrate the necessity of regarding phrenology and physiology as "one and inseparable." It will also be seen, that a knowledge of phreno-physiology is absolutely necessary to enable the physician to practice his profession with success. The magic power of the mind, in modifying the diseases of the body, has always been known; but, until now, the nature of the connection by means of which the mind and body in turn tyranize over each other has been unsuspected. Those who have admitted the truth of phrenology, and even those who have done the most to adapt it to practical purposes, have had, hitherto, no idea of the depth and richness of the soil which they were cultivating. They have considered most deeply the relations of phrenology to character; but they knew not its intimate relation to health of body and health of mind. They had no suspicion, that some portions of the brain tend to expand the arteries and extend the circulation, while other parts tend to the contraction and concentration of the vital powers. Still less have they supposed that a few simple words can be so adapted to the condition of the brain as to make one of its organs the instrument by means of which the whole mind and body can be affected for good or for evil. Mesmerism has not, hitherto, been understood, because it has not been examined from this point of view, as a mere phenomenon of phreno-physiology, combined with nervous debility: yet this is the actual truth. And modern spiritualism is but mesmerism, combined with a species of religion, so wild as to differ but little from superstition, and so vague and unsettled as to be unworthy of criticism, yet capable of terrible mischief, when acting upon a debilitated brain. I am greatly mistaken, if this work will not tend to merge the truths of phrenology and mesmerism into physiology, as the great fountain of organic law, to which all kindred facts must be brought, after being cleansed of their incidental absurdities. The domain of physiology, thus extended, as it were, by annexation, like our own noble country, will have its capabilities of usefulness increased a thousand fold; embracing, as it will, a great variety of important details that are now excluded from its limits, and left to wander, like nomadic tribes, beyond the jurisdiction of acknowledged law.

Before entering upon the consideration of the nervous organism in particular, I propose, in this section, to make a few general remarks upon the great principles and laws which relate to the whole material and organic creation. I think that it will be interesting to all my readers, if I succeed in showing that the nerves and the brain are subject to the same general laws that govern all other material, and especially all organized, bodies. Let us, then, proceed to consider some of

THE ORGANIC LAWS.

All physiologists, at the present time, recognize the principle first announced by Von Baer, that the progress of organization is from the general to the special. Those parts of a plant or an animal which are possessed in common by the greatest number are said to be the most *general;* while those that are confined to a more limited number are denominated *special.* It is found that the lowest and simplest animals and plants possess the organs that are the most general; and what is commonly called "elevation in the scale of organization" consists in adding a new organ for a new purpose, or in having the more simple organ divided, and a new one created by the division, which performs a somewhat different function. This is called a differentiation, or specialization: thus, the lower plants produce no flowers; the higher plants have all the organs that the lowest have, and a special apparatus, in addition, for producing flowers. So, also, among animals, the mammals have all the essential parts possessed by lower animals, and a special apparatus, in addition, for nourishing their young with milk.

Animals are said to be formed on different plans. Thus, the radiates are formed upon one plan; the mollusks, upon another; the articulates, upon still another; and the vertebrates, upon a plan different from either. These plans are called *types*, or models.

There are certain fundamental, or primary parts, which an animal must possess, to be entitled to rank under one of these names. To be a vertebrate, an animal must have the back-bone formed after the general model, or type, of vertebrate animals: thus, an eel is a vertebrate. The vertebrate plan is susceptible of being greatly varied from the simple form in which it presents itself in the eel, by receiving additions for special purposes, until we have it presented in the form of the shark, the frog, the bird, the mouse, the monkey, and finally the man. Differentiation, therefore, is a modification of the type for a special purpose.

All the modern learned treatises upon comparative anatomy and physiology are based upon the organic laws of general type and special grade; and it must be admitted to be an immense advance upon former methods of considering the subject. By its guidance, Owen, Agassiz, and others, have been making rapid strides toward a conquest of the kingdoms of animated nature.

In the course of my investigations, I have discovered that there is a more general law which does not seem to have been hitherto perceived; and that is, that *all organizations proceed, first, by expansion; second, by concentration; third, by specialization;* and that the tendency of the first is to acquire material, and of the second and third, to economize. The history of nature is but an illustration of this law. A brief form, by which to express the essential principle involved, is, that *economy is the object of all organic elevation.* The scale of organization, therefore, is but a succession of modifications, each of which results in a more economical method of proceeding.

According to this principle, the lowest organism in any natural series is administered with the least economy, and the highest with the greatest; and the changes and modifications which take place, in advancing from the lower to the higher grade, consist, in every instance, of, first, economic centralization, and second, of economic differentiation, or modification.

Let us briefly review the natural history of creation, as at present understood, and apply the great economic law just announced to geology, astronomy, and physiology: we shall thus be prepared to appreciate the novel views of the nervous organism presented in the subsequent sections of this work.

The science of geology is but an imperfect history of the expansion and concentration of the earth to its present condition. What are called the geological epochs, are but a succession of catastrophes produced by the process of concentration. The igneous rocks, the mountains, oceans, and rivers, can all be traced to this cause. The gradual cooling of the earth caused the concentration of the material that formed its crust; and the subsequent falling in of that crust produced the oceans, with their corresponding boundaries, from sloping shores to mountain ranges. The concentration of hydrogen and oxygen formed water, and the action of water formed the stratified rocks.

The combinations of the materials of the rocks, with those of the atmosphere and the water, formed the first soils, in which grew the first vegetables; upon these vegetables the first created animals fed; simple, low creatures, as they were, and differing, but in the slightest possible degree from plants, yet these animals contained the fundamental elements of the human constitution, from which all the higher parts were afterwards developed. Here let us make a brief digression.

The most eminent naturalists are decidedly opposed to the doctrine, that the higher animals are modifications of the lower, in such a sense that they must be considered as descendants from them. One reason of this appears to be the difficulty of reconciling it with the Mosaic record. Another objection is, the equally great difficulty of explaining some of the facts which seem to militate against the idea. I am inclined to think, however, that the tendency of investigation, at the present time, is to the conclusion, that both the Mosaic and the geologic records are quite as much in accordance with the development theory as with that of distinct human creations; but the final decision of this question must depend upon the results of more extended researches. A few years ago, there was a strong prejudice against geology, as a whole, which now has entirely died away; and the opposition is confined to certain doctrines which claim a geological basis. One of these doctrines is called the development theory; which teaches that the highest animals are gradually developed from the lowest; another is the modern doctrine, advocated by Prof. Agassiz, of a plurality of origins of the human races: that negroes were first created in Africa, white men in Asia, and red men in America, instead of all being descended from one man, Adam. I am disposed as much as possible to avoid, in this treatise, the discussion of questions which necessarily involve controversial theology. My only ambition is, to discover and to proclaim the laws of the Creator, as indicated by His works — especially in the constitution of the nervous organism. It has seemed to me, that the law of expansion, concentration, and differentiation, for the purpose of economy, is obvious in all the creations of God, affording a key to many of His works which have hitherto appeared exceedingly mysterious, and abounding with illustrations of His infinite wisdom, goodness, and power. It has been my ardent desire, that each advancing step in this investigation may be made upon well established facts, for the existence of which the Creator is alone responsible, and to examine which, and to endeavor to interpret aright, is our imperative duty. I am a firm believer in the great principles of Christianity, and in the necessity of inculcating them, both by precept and by example, in order to advance the temporal and spiritual welfare of mankind. According to my best judgment, a knowledge of the organic laws of human nature, as set forth in this treatise, is absolutely necessary, to enable the teachers of mankind to develop their highest capabilities, as men and as Christians. It is a remarkable fact, that the doctrine of gradual concentration prophetically points to the consummation of the Christian millenium — when all mankind shall be of one family, one language, and one religious faith; when war, pauperism, and slavery, shall be no more; and the welfare of each human being shall be considered as bound up with that of every other. The system of organic law here developed must necessarily tend to produce this desirable result. It seems that the design of the Creator, as indicated in the system of nature, was, from the very beginning, to produce the unity and happiness of the whole human race on earth, and to raise them to the highest point of perfection that organized beings are capable of attaining, in this sublunary world. To my mind, it appears demonstrable that, from the time that our solar system commenced its career until now, there has been one law in continual operation, unceasingly aiming to produce the present condition of the earth, and all the organized beings that it contains; and that the present tendencies are still in the same direction, producing the centralization of humanity.

Mathematically speaking, it may be said that there is nothing in existence but God and matter. Motion is the manifestation of the power of God, and matter is the substance through which alone motion can be manifested. Motion has two attributes — quantity and direction. Any substance is capable of receiving a greater or less quantity of motion. The origin of a motion is called a force, or cause, and God is thus the first great origin, or cause, of all motions. When two substances meet which possess different quantities of motion, that which contains the greater quantity communicates motion to that which contains the less, until the two contain equal quantities. Motion is never annihilated nor diminished; but it may be communicated from one substance to another, so that the same substance may contain more motion at one time than at another. We know that the Creator has not communicated to the material universe as much motion as it is capable of receiving, and the consequence is, that what motion there is in existence is being continually transferred from one part of the universe to another: the whole quantity of matter, and the whole quantity of motion, in the universe, being always invariably the same. What we call the phenomena of nature, are all produced by the transfer of motion from one place or department of matter to another, and back again. Geology and astronomy teach us that the part of the universe in which we live contains much less of motion (heat) than it did formerly. It is calculated, that our solar system is performing a journey around a centre, which is in or near the star Alcyone, one of the Pleiades, and that the distance is so great that it will require not less than 18,200,000 of our years to make one great year.

Heat is a kind of motion of the smallest particles of matter among each other; and like every other kind of motion, may be communicated or transferred from a substance that has more, to a substance that has less. Our solar system, in performing its vast circuit, must have transferred or communicated a large portion of the heat which it once contained, to the colder regions through which it has passed during the later portion of its career. Heat has the effect of expanding any substance to which it is communicated in sufficient quantity, and of causing the constituents of any substance to concentrate by departing from it. When our solar system transferred its heat to other parts of the universe, it concentrated its planets to their present positions and sizes. As the earth annually moves in its orbit around the sun, a part of its surface is expanded by the heat communicated by the sun, and then concentrated by the communication of that heat to the cold ocean of ætherium, through which our system is passing. The sun is continually communicating and losing its heat, and must finally be exhausted, and "grow dim with age;" the spots or clouds that occasionally appear upon its face, may be, as has been suggested, the beginnings of the external envelópe which will ultimately shut it out from the view of terrestrial beings, unless the great Divine moving cause shall previously bring it around to the summer of its immense cycle. We certainly do know, that the earth was once expanded by heat, until the whole ocean, and the very rocks, existed only in the form of vapors, and from that condition it was concentrated by cold to its present state. On this assumption, we can explain the phenomena of geology, and upon no other.

The annual revolution of the earth in its orbit is the cause of the seasons, and of all organization. The heat of summer causes organic expansion; cold causes the concentration of all organisms into more economic forms. The more concentrated and economic the form of any organism, the higher it is in the scale of organization. Let us apply these principles to the formation of crystals, plants, and animals. Crystals may be liquified by heat or solution; but when allowed to concentrate again, they always assume, under the same circumstances, the same organic forms. If there is a large quantity of material, the crystal does not on that account become larger in reality, although it may appear to do so. When one small crystal is formed, instead of appropriating the surplus of similar material to enlarge itself, it allows these materials to form another, and another, until the material is exhausted. The appropriation of material, to form one crystal, is *assimilation;* to repeat the process, is multiplication, or *reproduction.*

As we rise through all animated nature, we shall find that assimilation and reproduction are the two principal functions, and those to which all others are subordinate. Let us now consider the lowest species of plants: they differ from crystals in their composition, and in their greater liability to undergo a change of form; but they agree with them in this, that one individual is first formed, and then the surplus material goes to form another just like the first—and thus they continue to multiply, until the material is exhausted. The lowest and first created plants do nothing more than thus to assimilate, and to multiply by extension or repetition, after the manner of crystals. There is, however, one important peculiarity in which they differ from crystals; and that is, that, as far as human knowledge at present extends, no artificial combination of chemical or mineral elements will produce a plant; but an organized plant must be used to commence with, before we can produce another. Here is a secret which Providence has hitherto withheld from man—the commencement of life without a parent, seems not, at present, to be proved to have ever taken place. The seeds of the lowest species of plants are the plants themselves, of full size—nor is there any distinction of sex: in other words, the lowest plants are like the crystals, in having neither sex nor concentrated seeds.

NOTE. It is a favorite and universally accepted dogma of naturalists, that every known species of plants and animals are produced from seeds or eggs; and I have no doubt of its perfect truth: nor do I believe it to be possible to produce a seed by any artificial proceeding. Seeds are the productions of the Creator, and we can only form a conjecture concerning their circumstantial origination. Analogy would lead to the supposition that seeds are progressive creations, like all other organisms. When we learn to regard a seed as the concentrated or coiled up plant itself, stripped of its unessentials, for economic reasons, we can begin to see that it must be subject to the same law of creation as the plant of which it is but an epitome. There must have been a time on this earth when there were no plants; then plants without concentrated seeds; then, with imperfect concentration, and so on; as the coldness of the earth increased, the concentration and perfection of seeds also increased, to the present time. If this is a true view of the matter, then seeds are like the mountains, or the earth itself—the results of indefinite ages of gradual progression, each generation adding an imperceptible quota toward the present organization. The same reasoning being applied to animals and man, brings us to the conclusion that the development of our children is but the uncoiling of the organization of some of our ancestors.

I now proceed to show that sexes and seeds were created to promote economy.

A certain combination of elements is necessary to produce the simplest plant which is capable of growing. We will not here pause to inquire what are the elements which must thus combine for this purpose; but the fact is, that in plants which produce seeds, the proceeding is as follows: the highest part of the plant divides, or differentiates, into two parts, one of which is male, and the other female; neither is capable of growing further without being combined with the other; of course, the growth of the plant stops as soon as this division commences. Let us now examine these two divisions, and learn their purposes. We find that the essential process that takes place in them is a concentration of their elements or constituents; and it would seem that the design of the division is to stop the further growth of the plant, and to render concentration necessary; for as soon as this process of concentration is perfected, the two separated male and female elements may be again combined, and growth recommence, when circumstances are favorable.

NOTE. The law announced by Von Baer, that all *development* takes place from the general to the special, is true; but I have no where seen it remarked, that the formation of seeds is a reversal of the order of development, and proceeds from the special to the general. If a plant, in its full development, may be said to be a perfect specialization of the seed, then, on the other hand, the seed may be denominated the generalization of the plant. This reversal of the order of development, which may be called an *in*velopment, may be observed in other organizations, besides those of seeds. I think that a rigid examination of the functions of the highest organs of the human brain will result in proving them to be invelopments, or generalizations of the lower: that the reflective faculties, for instance, which are only two, namely: comparison and causality, are generalities, of which all the lower organs and external senses are specialities.

We learn here, that the original design of the Creator, in dividing organized beings into male and female, was to produce a concentration of their elements when circumstances are unfavorable for growth, in order that when the proper time arrives, they may be enabled to recommence growing — in other words, the original purpose of the institution of the sexes was to check and postpone multiplication, during a period which is rendered unfavorable to its progress by a scarcity of food or warmth. It may seem to be a paradox, but it certainly is true that organized beings were divided into male and female, not to promote reproduction, as is commonly supposed, but to check it, postpone it, prevent excess, and promote economy of nutrition. In accordance with this doctrine, we find that in proportion as animals rise higher in the scale of organization, this economical principle is extended. Among human beings, upon these principles as well as others, polygamy is injurious to society.

Let us consider the nature of the concentration which constitutes a seed or an egg, for eggs are the seeds of animals. The lowest plants and animals reproduce without seeds or eggs; a new one grows out of the old one, which is just as large, and costs just as much, as its parent. A seed, however, contains only the *essential* elements of the plant; all that can possibly be left out in forming the seed, and supplied when it is growing, is discarded; and thus a hundred seeds can be made at a less cost of material than one whole plant. In this way, a plant that can not continue to grow, itself, during the winter, can actually reproduce nearly as many by means of seeds, as the lower plants can by continual gemmation. It seems as if the egg or seed is essentially the plant or animal itself, existing in the smallest possible space; coiled up, as it were, in miniature, and ready for the elaboration and expansion of its parts on the application of warmth and nutriment. There is no other assumption that will account for the fact, that a slight change in the habit, health or form of the parent, will be reproduced in the offspring in the most minute particulars. This could not be so if those minute particulars were not represented in the egg itself. Not only so, but every part of the organism of both parents must be represented in the egg or seed; for it is common to see plants, animals, and men who have a resemblance to both parents in every feature: this is almost invariably the case with mulattoes. We have thus seen that the first instance of concentration which is presented at the bottom of the scale of organized beings is in the production of seeds, and that it is strictly economic. The first instance, also, which is presented of specialization is that in relation to the sexes, and this is equally promotive of economy, and evidently designed for that purpose.

The lowest and first created animals are reproduced just as the lowest plants are, by gemmation or addition, without eggs or sexes, and as they rise higher in organization, they are made male and female, and produce eggs. Among the vertebrated animals, some of the lower fishes produce a million of eggs at one time, a large proportion of which are lost. The higher fishes, such as the sharks, are formed upon a much more economical plan; their eggs are fewer but more perfect, and less likely to be unproductive. Upon the same principle, man produces fewer than any other animal, and yet enough, by dint of mental economy, to rule over the whole animal kingdom.

If we select any class of organs, and trace the modifications under which they present themselves, from the lowest animal to the highest, and consider the advantages which the higher animal possesses over the lower by the greater differentiation of the organs, we shall find that they can all be expressed in the two words—concentration and economy. The nervous organism and brain, so far from being an exception to the rule, is its most interesting illustration; for it is certain, that in proportion as animals have these organs developed, they are able by their instrumentality to produce the greatest results with the smallest means. An organ, in this general sense, is an arrangement of nutritive materials produced by alternations of expansion and concentration, and subject to them as a law of nature. Heat, or atomic motion, is the cause of all organic expansion, gemmation, or repetition of similar parts; cold, or the lessening of motion, is the remote cause of the concentration, differentiation, and improvement of all organisms, from that of the lowest plant to that of the human brain.

Let us apply the principles of progressive concentration and economy to the digestive organs.

The nutritive system of the lowest animals is entirely destitute of differentiation. The stomach admits water which contains some particles fit for nourishment; these it absorbs at once; there is nothing like digestion; and the refuse water passes out again through the same orifice by which it entered. In such a low organism, many substances are received which are highly nutritive, but which require digestion before they can be made available; the animal must of course reject them on account of its inability to digest food. The special power of secreting the gastric or digesting juice does not seem to be possessed by the lowest animals; and when this was added, it increased the power of the animal to nourish himself, in a very great degree. The next step was to modify a part of the stomach, so as to constitute it into a liver, or its equivalent. The use of the liver is to enable the animal to derive nutriment from substances which would otherwise be cast out of the body and wasted. The same may be said of the pancreas and the salivary glands. The animals that feed, like the beaver and cow, upon coarse, dry or crude materials, have the salivary glands large, to enable them to swallow and digest articles which they would otherwise be unable to use at all. Such animals, also, have the liver large; while the animals that feed, as the tiger does, upon meat, which requires but little change to qualify it for assimilation, have the salivary glands and the liver small. In the highest animals, where all the nutritive organs are developed in due proportions, it is found that the stomach allows a part of its contents, after feeding, to be directly absorbed, as in the lowest animals, without requiring it to go through any process of digestion; another portion is digested and then absorbed; a third portion the stomach seems to be incapable of digesting, and it is therefore separated from the rest, and passed on, to be acted upon by the liver and pancreas, before it is permitted to enter the circulation. Even the bile is returned to the blood and applied to a useful purpose. I regard it as an egregious error to consider the liver as principally an excreting organ; its evident purpose is to perform the most difficult part of assimilative digestion; for we find it largest in those animals whose food mostly consists of crude vegetable materials, which, by the aid of the liver, are made available.

The spleen is peculiar in being possessed only by vertebrated animals; and, until lately, its function has been considered an enigma. I think there can be now no question that it is a pro-vital organ, whose office is to hold in store a large quantity of nutritive material, which has been digested, but which is not yet required for assimilation. This seems to be indicated by the fact that it is most distended with blood about five or six hours after eating a full meal. It is also large in hybernating animals that need it as a reservoir to sustain their vital powers during their long winters' sleep.

The true vertebra, spleen, brain, lacteals, and lymphatics were all first created and introduced together in the class of animals to which we belong: namely, the vertebrates; and the spinal cord, though it existed before, was carried in the abdomen, because those low animals have no vertebra in which to deposit it. Even the lungs could scarcely be said to exist in the invertebrates; a very few of them breathed after the manner of the fishes; but, as a whole, it may be said that animals without brains are without lungs. From this we may perceive that the vertebrate plan of organization is an immense improvement upon the invertebrate. And if we study the changes which have been made in each department of the body and consider their advantages, we shall find that economy is, in every instance, the object and the result of the elevation of vertebrate animals above the invertebrates. It is unnecessary to go into details in this place to illustrate a law to which there is no exception in all nature; but though it may not be necessary to do more to prove the universality of the law of economy, it will be useful to bear it in mind and frequently refer to it as a test by which to determine the function of any nervous organ of doubtful character. The noblest use which we can make of any newly discovered truth is, to make it serve to identify its brethren, and help to raise them from undeserved obscurity.

In this work I have not inquired concerning the special origin of man; nor have I discussed the question whether the different tribes of men were originally one pair, or whether they had a plurality of origins; but have confined myself to an inquiry concerning the organic laws by which all animals and men are constituted. In pursuing these researches, I find the progressive principle pervading all the works of God — the planetary, the geological, and the organic. If the constitution of man is not the result of this progression, it is its most perfect illustration; for every step in the march of creation is recorded upon the human organism by the unerring finger of Divinity. It appears as if the organization of man was planned before the foundations of the earth were laid, and that every advancing stage in the formation of the earth was prophetic of a corresponding stage in the organization of its noblest inhabitant. This correspondence could not have been more complete, if the Creator had commenced the organization of man and of the earth at the same time, and gradually advanced them both, simultaneously and equally, to their present condition. So true is this that we can not understand human physiology without regarding it as a miniature panorama of the whole organic creation. Commencing with those simple cellular organs and elements of man, that were possessed by the very first organic beings that the Creator placed upon the earth; considering the cellular structure as the first link in the chain of geologic animals, we find that it is also the basis of the human organism, and the only constituent of man, when he commences his embryotic development. If the first geologic animal was a mere radiated stomach, so is that viscus the vital centre of man, around which all else revolves in the most perfect subordination. If all the animals that succeeded the first were merely a series of differentiated stomachs — in other words, if the animal creations that preceded man were merely a succession of superadditions, with the stomach as a basis and starting point — the same is true of the human organism; consequently, the best, and only philosophic, method of studying human physiology is, by commencing where the Creator commenced, with the stomach and its auxiliaries, and proceeding in the creative order, follow the indications of our Divine Teacher, making the succession of his works our study, and the object of our researches; for it is only in this succession that we can clearly perceive the laws by which our own natures are organized and governed. The lowest and first created organ of man is that which relates to food; the highest is that which relates to faith; between these two, is a series of organs which are perfectly continuous.

The chain of human faculties is a perfect representation of that which binds all animated nature together — reaching down through the long periods of geology; and it is coiled up in compact and admirable order, to constitute the organism of man. This work is a feeble attempt to trace its connections, and identify its successive links, from its lowest attachment in the nutritive organs, to the highest point of its elevation in the supermental region of causality, hope, and faith.

SECTION II.

ELEMENTS OF THE NERVES.

NERVE SUBSTANCES, OR NEURINE.

THE substances of which the nerves are composed are found in three forms:

1. *Tubular Fibres.* These are small, white tubes, which inclose a dusky gray substance: the material of which the tubes are composed is called "the white substance of Schwan," it having first been described by an anatomist of that name; the internal gray substance is called the *axis*, to distinguish it from the tube. Around the tube is a delicate membrane. Careful observations, by the aid of the microscope, tend to the conclusion that the axis is the essential part of the nerve, and the conductor of the nervous influence. The membrane and the Schwan substance appear to be useful as mechanical protectors and insulators of the axis.

2. *Fine Gray Fibres*, without tubes, are found associated with white tubular fibres, and the present prevailing opinion is, that the gray fibres differ from the white only in being destitute of tubes or sheaths of Schwan substance. This opinion is confirmed by the fact, that, in some instances, the tubular fibres are without tubes at their extremities, where they are connected with delicate tissues. It is also found that the fine gray fibres, mostly,

if not all, belong to the pro-vital, or sympathetic system of nerves.

FIGURE 1.

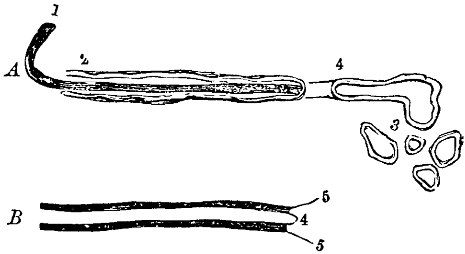


FIGURE 1, *A*, is intended to give an idea of the appearances occasionally seen in tubular fibres. 1, The axis, or conducting substance, projecting beyond the tube, and bent upward. 2, Membrane, and white sheath of Schwan substance. 3, Parts of the contents of the tube escaped. 4, A part where the membranous tube is seen empty.

FIGURE 1, *B*. Diagram, showing the parts of a tubular fibre, greatly magnified. 5, 5, Membraneous sheath. 4, Axis, or real conducting nerve, which, in this figure, is, by mistake, represented as white, while the white substance of Schwan is represented by black lines.

The whole contents of the nerve tubules appear to be extremely soft; for, when subjected to pressure, they readily pass from one part of the tubular sheath to another, and often cause a bulging at the side of the membrane. They also readily escape, on pressure, from the extremities of the tubule, in the form of a grumous, or granular material. The size of the nerve fibres varies, and the same fibres do not preserve the same diameter through their whole length, being largest in their course within the trunks and branches of the nerves, in which the majority measure from one-two-thousandth to one-three-thousandth of an inch in diameter. As they approach the brain, or spinal cord, and generally, also, in the tissues in which they are distributed, they gradually become smaller. In the gray, or vesicular substance of the brain and spinal cord, they generally do not measure more than from one-ten-thousandth to one-fourteen-thousandth of an inch.

The fibres of the second kind, which constitute the principal part of the trunk and branches of the sympathetic nerves, and are mingled in various proportions, in the cerebro-spinal nerves, differ from the preceding chiefly in their fineness, being only about one-half or one-third as large in their course within the trunks and branches of the nerves; in the absence of the double contour; in their contents being apparently uniform; and in their having, when in bundles, a yellowish gray hue, instead of the whiteness of the cerebro-spinal nerves. These peculiarities make it probable that they differ from the other nerve fibres, in not possessing the outer layer of white, or medullary nerve substance; and that their contents are composed exclusively of the substance corresponding with the central portion, or axis cylinder of the larger fibres. Yet, since many nerve-fibres may be found, which appear intermediate in character, between these two kinds, and since the larger fibres, as they approach both their central and their peripheral ends, gradually diminish in size, and assume many of the other characters of the fine fibres of the sympathetic system, it is not necessary to suppose that there must be a material difference in the office or mode of action of the two kinds of fibres. —*Kirke & Paget's Physiology.*

FIGURE 2.

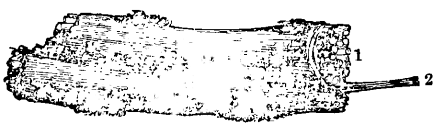


FIGURE 2 represents, according to C. Bell, a nerve, consisting of many smaller cords, wrapped up in a common cellular sheath. 1, The nerve. 2, A single cord, drawn out from the rest. A dissection of this single cord would show it to be composed of tubular fibres, not more in any case than one-fifteen-hundredth of an inch in diameter.

3. *Corpo-neurine,* or vesicular neurine, is nerve substance which is commonly found in masses, called ganglia, or knots, instead of being arranged in fibres. It is composed of granules, or small grains, in which are embedded a variable number of small cells, vesicles, or corpuscles;

each corpuscle has a central nucleus, and each nucleus has a central nucleolus; in other words, there is a cell within a cell, and another within that. It is supposed that the outer cell develops and bursts, to supply nervous force, in some unknown way, and then the next cell within develops and bursts, and so on.

FIGURE 3.

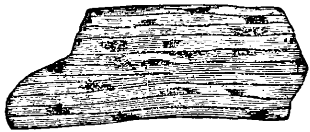
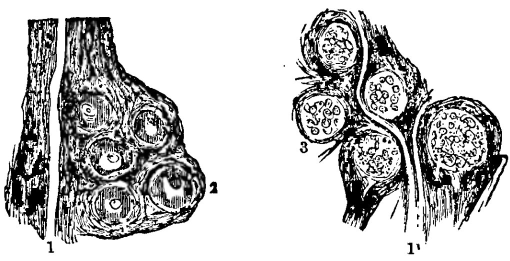


FIGURE 3, Gelatinous fine gray fibres, magnified three hundred and forty times, according to Professor Hanover.

FIGURE 4.



A *B*

FIGURE 4, *A* and *B*. Magnified representations of ganglion corpuscles, which distinguish corpo-neurine, imbedded in fine gray fibres, with several tubular fibres. 1, 1, Tubular fibres passing through. *A* Shows some of the corpuscles. *A*, 2, With nuclei containing nucleoli within them. *B* Shows large corpuscles covered by capsules of granular cell nuclei.

In the grey matter of the cerebro-spinal centre, the nerve cells are usually imbedded in a sort of matrix of granular substance, which is interposed between them in greater or less quantity, and is very generally traversed by nerve fibres. In the ganglia, properly so called, the cells are packed up among nerve fibres, chiefly of the gelatinous, fine grey kind; but each cell is also immediately surrounded by a coating, or capsule, formed of gelatinous fibres, and a layer of granular corpuscles, not unlike the most common kind of granular cell-nuclei, united together by a pellucid substance.—*Quain & Sharpey.*

The corpo-neurine is of a purple gray color, and it has, for that reason, been named the cineritious, or ashes colored substance. It covers the brain to the depth of half or three-fourths of an inch, and for that reason, it was anciently called the cortical, or bark-like substance. From its soft consistence, it is sometimes denominated the gray pulp. It is now generally considered as the generator of the nervous force; and the fact that it contains a large number of minute bloodvessels, and also the fact that it is most abundant at the extremities of the sensory nerves, sustains the idea.

FIGURE 5.

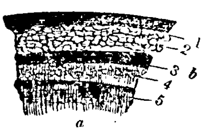


FIGURE 5. This figure shows the arrangement of the corpo-neurine among the fibres, in the convolutions of the brain. The numerals, 1, 2, 3, 4, 5, indicate a succession of layers of corpo-neurine and fibres. At *a* we see fibres which connect the circumference of the brain with the central parts. At *b* we see horizontal intersecting fibres, the uses of which are unknown, but which are probably related to the commissures, or fibres, that connect the functions of distant nervous organs.

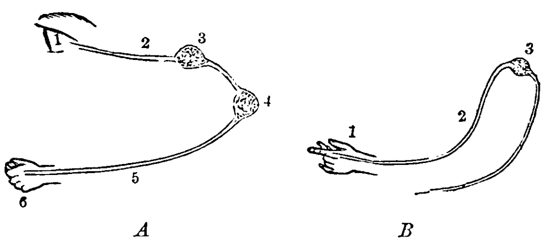
There is no evidence that nervous and electric influences are identical; but the nerves appear to transmit their forces in a manner analogous to that in which the telegraph wires operate; so also does the corpo-neurine appear to generate force from the blood, in a manner that must necessarily remind us of the galvanic battery. We are, therefore, justified in concluding that the nervous apparatus is similar to the galvanic, whether the two forces are identical or not.

NERVOUS APPARATUS.

A nervous apparatus is sometimes called a nervous circle, and is composed of several parts, each of which must be separately considered.

1, An impressorium.
2, An afferent nerve.
3, A potentive ganglion.
4, A central ganglion.
5, A motor nerve.
6, A muscular terminus.
7, A commissure.

FIGURE 6.



A Represents a simple nervous apparatus. 1, The eye, or impressorium. 2, The afferent, or sensory nerve. 3, Potentive ganglion. 4, Central ganglion. 5, Motor nerve. 6, Muscular terminus in the clenched fist: as if a blow were aimed, guided by the eye. *B* Represents a nervous apparatus, with the potentive ganglion absent, as in many invertebrated animals, and in some parts of the human body. 1, The impressorium in the finger, as when the finger is burned by being thrust into the fire, the impression is transmitted to the center, 3, and from thence a motor influence is conveyed along the nerve, 4, to the arm, causing it to withdraw the hand.

1. An impressorium is that part of a nervous apparatus which receives the first impression, and communicates it to an afferent nerve; thus, the eye is the impressorium which receives the first impressions of light, and communicates them to the optic nerve; thus, also, the tongue is the impressorium of the nerves of taste, and the skin of touch. The most remarkable circumstance connected with impressoria is the exceedingly perfect arrangements which are made in all of them, to secure their nutrition, by means of an immense number of capillary bloodvessels; thus enabling them to perform their functions with vigor and precision. This is, of course, the more necessary, from the fact that all the other parts of a nervous apparatus are dependent upon the integrity of this part. It is believed that a small quantity of corpo-neurine, or something equivalent to it, constitutes a part of every impressorium.

2. An afferent nerve, (Fig. 6; 2,) is that part of a nervous apparatus which communicates the impressions received from the impressorium to the centre. It is composed of fibres.

3. A potentive ganglion, (Fig. 6; *A*, 3,) is a mass of corpo-neurine on the course of a sensory nerve. Upon the optic and the olfactory nerves, these ganglia are in

some animals larger than the whole brain. Their use has hitherto been considered as undetermined; but I think I have ascertained that it is to enable the nerve to continue in the performance of its functions, without exhaustion, for a length of time proportionate to the size of the ganglion.

FIGURE 7.

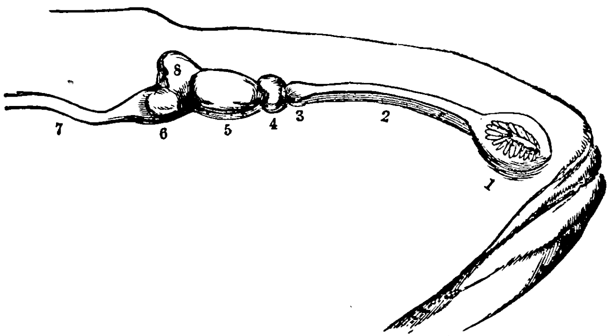


FIGURE 7. Brain of a perch, side view. 1, The impressorium of the olfactory nerve. 2, The olfactory nerve. 3, The potentive ganglion of the olfactory nerve. 4, The striatum, or brain. 5, The potentive ganglion of the optic nerve. 6, The oblongata. 7, The spinal cord. 8, The cerebellum.

4. A central ganglion, (Fig. 6; *A*, 4,) is a small mass of corpo-neurine, situated at the terminus of an afferent, and the commencement of a motor nerve. Its office is to transfer the impressions from afferent to motor nerves. The larger a central ganglion is, the longer it is capable of continuing in operation. This fact has not previously been announced, but it is abundantly sustained by comparative physiology. Every central ganglion is *potentive* in proportion to its size; that is to say, it has the power

of continuing its function a length of time proportionate to the quantity of corpo-neurine it possesses.

The only reason which I can perceive why the potentive ganglia are sometimes separated from the central is, because they require more room than can be conveniently spared at the centre, or at the impressorium. This idea is supported by the fact that the olfactory ganglion is found near the brain in some animals, as the eel, and at a distance from it in others, as the shark and skate.

FIGURE 8.

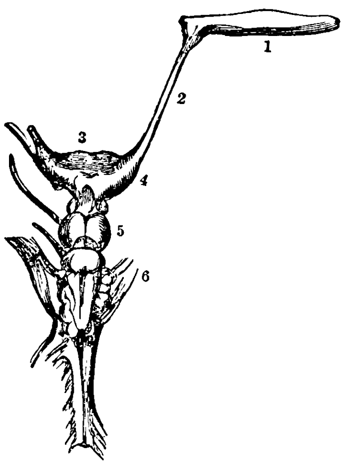


FIGURE 8. The brain of a skate, removed from the skull, and seen from above. 1, Potentive ganglion of the olfactory nerve. 2, Olfactory nerve. 3, Striatum, or brain. 4, Claustrum, or lateral part of the brain. 5, Optic potentive ganglion. 6, Potentive ganglion of the vagus, or stomach nerve.

5. A motor nerve extends from a central ganglion to a muscular terminus; and is exclusively composed of

fibres, which proceed in unbroken continuance from the ganglion to the muscle. Motor nerves have no potentive ganglia in their course.

6. A muscular terminus is the part of a motor nerve which comes in contact with the muscle, and communicates an influence, the precise nature of which is uncertain, but the result is a contraction of the muscle.

FIGURE 9.

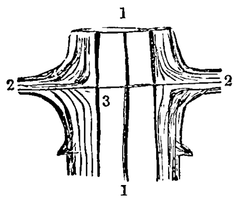


FIGURE 9. Magnified view of the upper surface of a segment of the spinal cord of an insect, (the spiro-streptus, from *Newport*,) to illustrate the nature of a commissure. 1, 1, The median line which divides the right side from the left. 2, 2, The nerves that are connected with the limbs. 3, The commissure, or set of nerve fibres that connect a limb of one side with a limb of the opposite side, so that an impression made on either side can communicate motion to the opposite.

7. A commissure is a nervous connection of the parts of one side, with the corresponding parts of the opposite side of the head or body. The term is sometimes used improperly, as I think, to designate fibres that connect parts of the same half. In such cases they are called longitudinal commissures. There are many nervous apparatuses that have neither commissures nor potentive ganglia; such are constituted of only five parts; namely, impressorium, afferent nerve, central ganglion, motor nerve, and muscular terminus. (See Fig. 6; *B*.)

However complicated any nervous organism may appear to be, it is, in reality, always constituted of the simple parts just described. The great difficulty which attends their investigation consists in ascertaining, in particular cases, whether a nerve fibre is afferent or motor — whether it is, or is not, connected with a particular centre, or impressorium, or muscle. When the connections of a nervous apparatus are ascertained, its function can easily be determined; but, notwithstanding the theoretic simplicity of this matter, no part of physiology is so full of practical difficulties. The principal embarrassment arises from the impossibility of making anatomical distinctions between fibres and centres that are physiologically distinct, and entirely independent of each other. For instance, the spinal cord has been proved by experiments to contain thirty-one distinct nervous centres, but anatomical demonstrations never revealed the existence of one. The same remark may be applied to the functions of the brain: anatomy has done but little to indicate its functions, though when they are discovered, it always confirms them. It is an interesting and encouraging fact, that almost the only European investigators who have made useful discoveries concerning the functions of the brain, have been the phrenologists, Gall, Spurzheim, and Solly. If phrenology is true, this is what might reasonably have been anticipated.

AGENCY OF THE BLOOD IN THE TRANSFER OF IMPRESSIONS, AND GENERATION OF NERVE FORCE.

One of the most important facts connected with nervous physiology is, that no impression produces any effect without being accompanied with a chemical change of the substance of the nerve, which causes the expenditure of a certain quantity of blood. No progress can be made in our understanding of the operations of the nerves or brain, until we distinctly appreciate the value of this fact. An impression made by light upon the eye has no effect, unless it is followed instantly by a chemical change in the composition of the blood which is in the eye, and that part of the optic nerve called the retina. A little observation will satisfy us of this; for if strong impressions are often repeated, the bloodvessels become exhausted, and begin to perform their office imperfectly, and finally cease altogether; or if, from any cause, the blood is prevented from circulating in the eye, or in the nerve, its operations are immediately suspended. It is equally true of the sense of taste, of touch, of smell, or hearing, that the principal active agent concerned in transferring the impressions is arterial blood. When we are asleep, the probable reason why impressions made upon our senses do not arouse the mind and the muscles is, that the blood which is necessary to act in concert with external impressions is, through the influence of the pro-vital nerves, retained in its own proper vessels, and prevented from combining with the senses. It is a popular fallacy that external impressions are sent to the brain — they never go beyond the external organ which they impress — but an external impression produces a change in the composition of the nerve and of its blood; this chemical decomposition generates or lets loose a force, which moves along the nerve, from its impressorial commencement to its center; and there, again, the same process is repeated; that is to say, the impression which reaches the center produces a change in the blood, the consequence of which is, that an impression is transmitted through the motor nerve to its terminus in the muscle. If the blood which supplies the central ganglion is wanting, no transfer of the impressions takes place; or if the blood in the center is defective in its qualities, it operates imperfectly. Sometimes the center is inflamed, and in an excitable condition, as in cases of tetanus, and other convulsive disorders; then the change takes place in a manner so vigorous as to excite surprise and alarm—it is a species of insanity of the nerves.

In the muscular terminus, the common notion is, that the nerve imparts a force which operates upon the muscle, and causes it to contract; but modern investigations have satisfactorily determined that the muscle is dependent for its force upon its own constitution, and the chemical union of the oxygen of the blood with its particles. If blood is withheld from a muscle, no quality or quantity of nervous influence can continue its power; but if a muscle is well supplied with blood, it contracts, in the lowest animals, and, under some circumstances, in higher animals, without the agency of any nerves whatever. The probability is, that the only effect which a nerve produces upon a muscle is to promote a chemical union of its particles with those of the blood. In what way the influence of the nerve does this is unknown—perhaps by a slight change in the electrical state of the muscle, so as to qualify it to have an affinity for the oxygen of the blood—perhaps by causing a slight movement among the particles of its carbon, so as to expose them to the action of the blood; but it is perfectly certain, that the muscular force is generated in the muscle itself, and is no more derived from the nerve, than the power of a steam engine is derived from the man who lets on the steam, or the heat of fire is derived from the servant who applies the match to the fuel—it is merely an exciting cause of the chemical decomposition which produces the muscular contraction.

NERVE FORCE.

The nerve force is derived from the blood, and is in exact proportion to the quantity of it decomposed by the nerve: in a word, the blood is the fountain of nerve force. The first impression which is made upon a nerve produces the decomposition of a certain number of blood particles in the impressorium: let us call the number seven. A force, then, which may be represented by seven, is transmitted along the nerve to the centre; it will follow, that since an effect can not be greater than its cause, the force generated in the centre can not be more than seven; and, of course, the motor nerve can not communicate to the muscle a force greater than seven; in other words, the nerve decomposes precisely the same amount of blood in the muscle that it does in the centre, and the same in the impressorium that it does in the muscle; for the change produced in the first part of the nerve circle is transferred to the second part, and this to the third; and it is no greater in amount in one part of the circle than in another. We must not allow ourselves to be misled in reasoning on this subject; the nerve force, in muscular contraction, is merely one link in a chain of causes which lead to the expenditure of a large amount of blood. We must remember that it is not the nerve that uses most of the blood in this case, but the muscle.

REMARKS UPON POTENTIVE GANGLIA.

I have given the name of potentive ganglia, or potentive neurine, to those masses of corpo-neurine which are found accumulated upon the course of some of the sensory nerves, between their impressoria and their centres.

They seem to give the nerves upon which they are situated the power of continuing a long time in operation. The optic ganglia, called the quadrigemina, are of this character, and are found largest in those animals whose motions are *habitually* guided by sight. In fishes this ganglion is in many instances larger than all the brain besides. (See Fig. 7; 5.) The olfactory ganglion in the higher fishes, as the shark and skate, (see Fig. 8,) divides the labor of guiding motion to its external objeets with the optic ganglia. A thorough examination of this matter will show that all of the nerves of special sense in the higher animals have potentive ganglia upon some part of their course. Physiologists have in several instances mistaken these ganglia for the central *termini* of the nerves upon which they are plaeed, and supposed that the ganglia themselves are the *seats* of sensation; (see *Carpenter's Physiology;*) but there is no evidence that there is such a seat in any of the nerves. There is a point in the oblongata around which the sensory nerves seem to terminate, and which I, therefore, call the conscious eentre or phrene. Most of the corpo-neurine in the oblongata is, probably, of a potentive or power generating character, and belongs to the several nerves that terminate there. This becomes evident, if we examine some of the animals in which the pneumo-gastric nerve appears to have a corpo-neurine ganglion attached to it where it joins the oblongata; in other animals, the auditory nerve has a distinct mass of the same substance; in some instances, also, the trigeminus is seen to possess a potentive ganglion near its terminus in the oblongata. There seems to be a tendency in all the ganglia on the sensory nerves to approach nearer and nearer to the brain from the lower animals to the highest, as if impelled by a principle of progressive coneentration.

The optic ganglion, which is generally considered as the terminus of the optic nerve, is found, in many of the invertebrates, almost in contact with the eye. I am satisfied that the optic nerve sends fibres to the oblongata, which constitute most of what is called by Solly the olivary column. (See Fig. 26.) So, too, the auditory nerve appears to terminate in the ganglia; but the ganglia are probably merely potentive, and the nerve proper continues its fibres to the conscious centre, as may plainly be seen by a careful dissection. The olfactory nerve in fishes can be traced into connection with the oblongata, though in man it *seems* to terminate far above it; but, that it also terminates in the oblongata in man, I have no doubt. The ganglion upon the olfactory nerve is, in some fishes, at a considerable distance from the brain, with a long, fibrous stalk, connecting it with the oblongata, thus proving, that instead of being a part of the brain proper, it is merely a ganglion on the course of the nerve. (See Fig. 7.) When, in higher animals, the brain becomes large, the functions of the potentive ganglia on the sensory nerves appear to be transferred to the brain, and the ganglia on the nerves become smaller. This is evident enough, if we will observe the enormous brain of the porpoise, and notice that he has no olfactory nerve, and but a comparatively small optic ganglion. The corpo-neurine of the brain itself is evidently of the same potentive or power-producing character as on the course of the nerves. The larger a phreno-organ is, the longer it can continue its functions; and it is principally in this way that it has the advantage of smaller organs. Corpo-neurine is, doubtless, related to the nutrition of the nerves, to enable them to perform their functions without exhaustion. Its masses are accumulated between the bloodvessels and the nerve fibres, like arsenals of prepared ammunition, the nerves being considered as the guns in which it is to be discharged. If this illustration is appropriate, it is plain that the number of discharges which can be made without exhaustion will depend upon the quantity of the accumulated particles in the ganglia; but the *energy* of the discharges will depend upon the *quality* of the blood in the ganglia. The large size, therefore, of a ganglion, or of a phrenological organ, signifies that it may receive more stimulus, and can transmit more than a smaller one — not more in a given time, but it occupies the mind during a *longer* time. Its size is an indication of its sustaining power. The smallest mass of corpo-neurine can produce just as vigorous a motion, and just as acute a perception, but it can continue but a short time to sustain its vigor and its acuteness.

It is my own opinion, that the large extent of *surface* required by the brain and ganglia is to accommodate the great number of capillary bloodvessels, that furnish the nerve fibres with the means of generating power.

SECTION III.

PHRENO-PHYSIOLOGY.

I HAVE adopted this name for a beautiful system of natural relations, which I have lately discovered, combining the principles of Phrenology with those of Physiology, in a manner which adds greatly to the value of both.

I propose here to give a brief outline of some of these relations, and afterwards to discuss more in detail those parts of the subject which require further illustration.

First, let me give a concise statement of the circumstances which led to this discovery:

In 1838, I proposed a natural classification of the phreno-organs, which is well represented in the engraving of the bust, and which differs essentially, both in principle and detail, from that of Spurzheim. After much controversy, a report was made, in 1840, by Prof. E. N. Horsford, to the Albany Phrenological Society, in favor of my views, and adopted by the society. This put an end to the discussion. In 1844, I published a volume upon the relations of Phrenology to Mesmerism, in which I insisted that the mental phenomena observed in mesmerized subjects are nearly all referable to an excitement of the conforming Social organs of the brain, particularly the organ of Credenciveness. In the same work, I took the position that the conscious centre of the nerves and brain is in the middle of the oblongata, and that the most excited phreno-organ rules the mind, by controlling that centre. In 1851, I published a volume, entitled Phreno-Geology, in which I endeavored to show that the phreno-organs of each of the three classes represented in the bust are arranged in the brain, in the same order of succession, from below, upward, as that in which the faculties and instincts of animals were created, according to the indications of Geology.

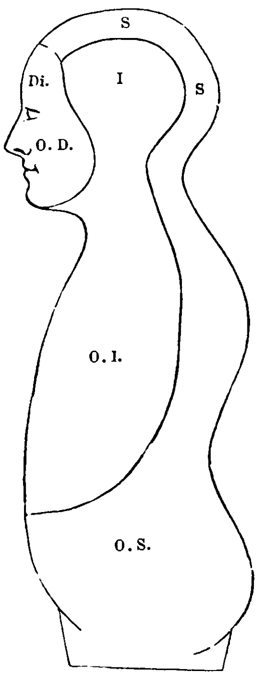
The late excitement in relation to Spiritualism having attracted my attention to Mesmerism again, in the course of my experimental investigations, I discovered that, by conducting the conversation with mesmerized mediums in a skillful manner, I could excite almost any desirable condition of the arterial circulation. Let me not make a mystery of this matter — I merely directed the mind of the subject, by conversation, in a way calculated to excite such emotions as I wished to see manifested, and the effects upon the circulation invariably resulted from the mental excitement. In proceeding in this manner, I found that certain faculties of mind are specially related to certain parts of the body, so that the excitement of a mental faculty is necessarily followed by a disturbance of the related bodily function. Thus, speaking upon subjects calculated to excite fear, caused the hands of the patient, or medium, to become cold; by talking of combats, they were made to become warm; speaking of delicious food, caused the saliva to flow; of disgusting substances, produced instant nausea. It was not mere acting; for the circulation, the pulse, and the temperature, changed, as I changed my conversation from one topic to another. These observations, daily continued for many months, led me to reflect upon the relation which must exist between the brain and the body, to render such phenomena possible. I commenced a series of investigations, the result of which is, that I find that the general divisions of the phreno-organs are identical with those of the bodily organs, and that, to be understood, the brain and the body must be studied together, as parts of one connected apparatus. The annexed diagram conveys a better idea of the arrangement and relations of the organs of both brain and body than any verbal explanation can give. This simple figure is at once a demonstration and an illustration of the discovery, that the brain and the body are created in three classes, or groups, of organs—Directive, Ipseal, and Social. The division is not fanciful, nor founded upon mere speculation; it is the work of the Author of Nature, and, like all his productions, it will bear the closest scrutiny. My ardent hope is, that it will be instrumental in relieving Phrenology of some of its imperfections, and making it more worthy of general acceptance, especially by those whose duty it is to heal the sick, to educate the young, or to instruct the congregations.

COURSE OF THE NERVES OF SENSATION TO THE BRAIN.

To fully comprehend the three grand divisions, we must understand the course of the nerves of sensation, from each division of the body, to its corresponding department of the brain.

Thus, all the nerves of the external senses, (except those from the body that relate to touch,) proceed from the face to the upper part of the oblongata, and from thence to the anterior portion of the brain, developing, or rather constituting, the phreno-organs of Flavor, Size, Direction, Weight, Color, etc. These organs, in this work, are called the *Directives*, because they are the instru ments through which the mind perceives external things, and sends (through the anterior column of the spinal cord,) voluntary motor influences, to the face, limbs, and body, to direct external movements.

FIGURE 10.



Di, Directive class. *O, D*, Place of origin of directive nervous organs in the face. I, Ipseals of the brain. *O, I*, Place of origin of the ipseal nervous organs in the body. *S*, Social organs in the brain. *O, S*, Place of origin of the social nervous organs in the body.

Fig. 10 represents the general division of the body and head into three classes of organs: the anterior lobe of the brain, with the external senses in the face, constituting the Directive class; the middle lobe, with the nutritive organs in the neck, chest, and abdomen, constituting the Ipseal class; the posterior parts of the brain, with the posterior and lower parts of the body, constituting the Social class. This figure is of the nature of a physical demonstration, that the brain is naturally divided into three classes of organs, that correspond in function with three divisions of the body.

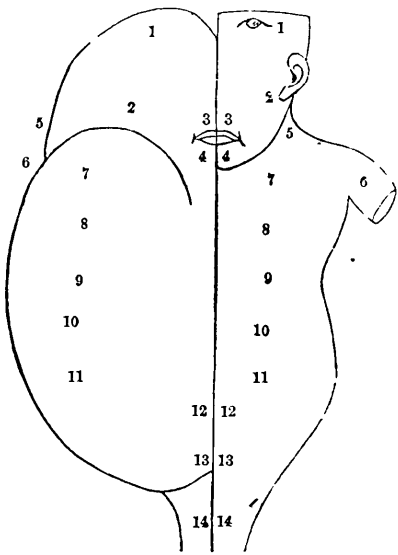
The middle division of the head and body I have denominated the Ipseals, because they relate to the wants of the individual himself, without any special reference to society. I call them Ipseal *Impulsives*, because they impel the powers, both of body and mind, to action; but have no attributes of perception, reflection, nor of direction, being dependent, for external guidance, upon the Directives, including the external senses.

To understand the structure, functions, and development of the Ipseal organs of body and brain, we must regard the nerve called the vagus, or pneumo-gastric, (lungs and stomach nerve,) as bearing the same relation to them as the nerves of the external senses do to the face and the brain—that is to say, the vagus connects the body and brain, and may be called the great nerve, or system of nerves, of the *internal ipseal senses*. The vagus proceeds from all the organs of the body that are concerned in the manufacture of blood, and which occupy the middle portion of the body, to the middle part of the oblongata, and thence to the base of the middle portion of the brain, developing there the organs of Alimentiveness, Pneumativeness, Thermativeness, etc., and sending from thence motor influences to the blood-making and cireulating organs, to impel them to inerease or diminish the supply of blood, to suit the immediate wants of the ruling Ipseal Impulsives.

To comprehend the strueture, eonneetions, and functions of the Soeial Impulsives, we must regard the posterior columns of the spinal eord as bearing the same relations to them that the vagus does to the Ipseals, and the nerves of external sense do to the Direetives; for the nerve fibres of social sensation proeeed from all the organs in the lower and posterior portions of the limbs and body, that relate to loeomotion, sex, and offspring, *through* the *posterior* part of the spinal cord, to the posterior part of the oblongata; thence, a portion, under the name of restiform fibres, go to the cerebellum, developing the phreno-organs of Equi-motiveness and Amativeness. Another portion—the posterior pyramids, as they are called—proceed to the thalamus, thence developing the posterior portion of the eerebrum, which is the locality of the parental impulse, (Philoprogenitiveness.) From these soeial organs of the brain, motor influenees are sent to the blood-making and eirculating organs of the body, to cause them to act in unison with the mental Soeial Impulsives.

But it is not in the three general divisions only, that this beautiful harmony of the brain with the body is found. It applies equally to eaeh partieular department of functions, from the eyes to the lower extremities, as will be seen by the figure, 11, whieh represents the base of one-half of the brain, united to a miniature representation of the faee and body. Here it will be perceived that the face corresponds with the anterior lobe, in position, and in funetion; the upper part of the body, and the upper extremities, with the middle of the brain; and the lower portions of the body, and the lower extremities, with the lower portions of the brain. And if we descend to the details, commencing with the eyes, and proceeding down to the lower limbs; and then commence in the anterior lobe of the brain, and proceed from the perceptive organs back to the cerebellum, we find that each essential function of the body has its representative in the base of the brain, occupying the same relative position in the brain that the bodily organ which it represents does in the body.

FIGURE 11.



EXPLANATION OF FIGURE 11.

1. The phreno-organ of Color is so situated in the brain as to give prominence to the brow nearly in the middle, and corresponds with the eye, 1, in relative position.

2. The organ of the Memory of words or vocal sounds, commonly called the organ of Language, is situated in the base of the anterior lobe of the brain, so as when large to crowd the eyeball downward and outward, and corresponds in relative position and in function with the ear, 2, which, next to the eye, is the highest in position of all the external senses.

3. The phreno-organs—situated near where the nose joins the forehead—Size and Weight, are probably superadded to the nerves of the sense of Touch, and correspond with the lips, 3, the homologues of which were the first created organs of prehension.

4. The phreno-organ of Flavor is immediately behind the organ of Words, or Language, and when large, it crowds forward the bones of the face under the eye, so as to make them appear prominent, compared with the forehead, in a profile view. This corresponds with the tongue and sense of Taste, 4.

5. The organ of Tune is situated more anteriorly than any other of the Impulsives in the head. All phrenologists admit its existence, but they have erred in classing it with the Directive, or intellectual organs. It merely gives the disposition to exercise the vocal powers, and corresponds with the throat, 5.

6. The organ of Constructiveness is the next most anterior Impul sive, and gives the disposition to manufacture. It corresponds in position with the arms and hands, 6.

7. Thermativeness is an organ lately observed, and is just below and behind Constructiveness, giving the impulse to regulate the warmth of the body, by shelter and clothing. According to this theory, it should be related to the upper part of the lungs, where the thymus gland is situated; and it is a curious coincidence, that this gland is large in hybernating animals: it is useful to them as a reservoir of nutriment, with which to sustain warmth, by supplying materia for respiration during the long fast which they keep in the winter. It is certain that animal heat is related to respiration, and therefore the correspondence is obvious in this case.

8. Pneumativeness, the impulse to attend to ventilation and respiration. It corresponds in position with the lungs, 8. It is best observed in persons with delicate and small face-bones, who are yet prominent in this part.

9. Alimentiveness, the impulse to attend to food, needs no definition; it is situated immediately before the upper part of the ear, and

corresponds, in position, with the stomach, 9,— the very centre of animal life.

10. Sanativeness, the impulse to continue life and health, giving width to the head immediately above the ears, below Destructiveness: no organ is better established. It corresponds in position with the mesentery, and spleen, and solar plexus, which are all eminently conservative in their functions, and like Sanativeness, relate to the continuance of life.

11. Ex-Sanativeness, the impulse to attend to the healthful functions of the excretory organs below the stomach, and corresponds, in position, with those parts, 11.

12. Parentiveness, or Philoprogenitiveness. This organ I have shown to originate in the part of the brain called the thalamus. It develops backward, constituting the posterior lobe of the cerebrum, and thus lies at the foundation of the social class, just as the parental relation lies at the foundation of society. This organ corresponds in position with the highest pelvic viscera, 12, that relate to offspring. The correspondence is obvious enough, if we consider the thalamus as the root of Parentiveness, and do not allow ourselves to be misled by the cerebral organ being so large, and developing so far backward.

13. Amativeness relates to the sex, and corresponds in position with the organs of sex, 13.

14. Equi-motiveness, or locomotion, is a phreno-organ just admitted, and differs from all others in being sanctioned and introduced by the medical opponents of phrenology. It relates to and corresponds with the lower extremities, 14. Society could not exist without locomotion; and it is certain that in the present age it contributes more than anything else to the centralization of social institutions. The situation of the balancing and locomotive organs at the very root of the Social class is, therefore, perfectly consistent with the principles of harmony which we are illustrating.

FIGURE 12.

This is a diagram representing the phreno-physiological departments, or zones, of the body, in a side view, showing that each organ at the base of the brain is specially related to a distinct region of the body, which corresponds with it in position.

The face, 1, is the place where the external senses originate, and

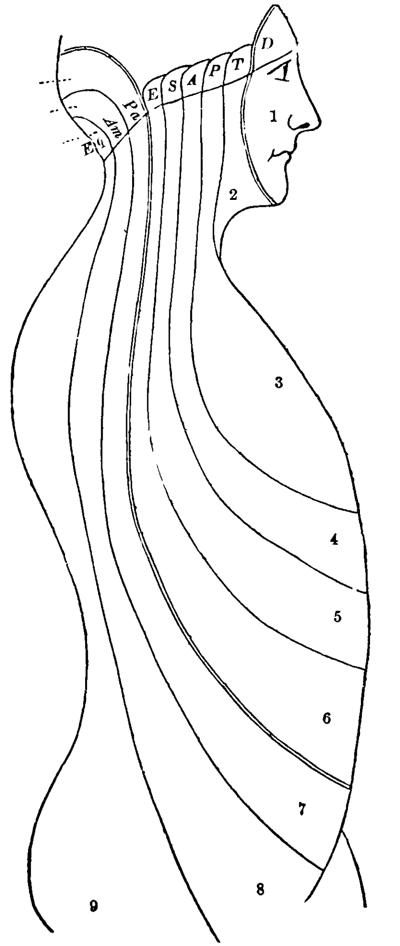


FIGURE 12.

from whence they develop through the oblongata to the forehead, *D*, where the functions of the external senses terminate in the Directive class of phreno-organs. The face and the forehead are, therefore, connected in function, and, together, constitute a distinct region, which, in the figure, is bounded by a double line, that separates it from the Ipseal region.

The throat, 2, is the vocal region, immediately behind and below the face, and corresponds in relative position, and also in function, with *T*, the organ of Tune, in the brain.

The lungs, 3, relate to respiration and warmth, and correspond in function as well as in relative position and order of arrangement, with *P*, the region of the brain called Pneumativeness, or the impulse to attend to the respiratory function. The upper part of the region of the lungs, 3, and the upper part of the corresponding region of the brain, *P*, are believed to relate to warmth.

The region of the stomach, 4, corresponds, in position and in function, with *A*, the phreno-organ of Alimentiveness, which is the impulse to attend to the wants of the stomach. Below and behind the stomach, 5, are the spleen, the mesentery, and the solar plexus, all of which specially relate to the continuance of life, and in position, as well as function, they correspond with *S*, in the brain, which is the organ of Sanativeness. Immediately below the digestive organs is the region of the body, 6, where the kidneys and intestines commence the excretory process, and in the brain, the organ of Ex-sanativeness, *E*, corresponds, in position and in function, with this part of the body.

It will be observed that a double line divides the Ipseal from the Social region. The highest region of the body, which relates to the social functions, 7, is immediately below the kidneys, and corresponds in position and in function, with *Pa*, the phreno-organ of the brain that relates to offspring.

The region of the body, 8, which relates to sex, corresponds, in position and in function, with *Am*, the phreno-organ of Amativeness.

The region of the lower extremities, 9, relates to equi-motion, balancing, and locomotion, and corresponds, in position and function, with *Eq*, the phreno-organ of Equi-motiveness.

The region of the face, 1, communicates with the brain by means of the external senses. The regions of the body designated in the figure by the numerals 2, 3, 4, 5, 6, communicate with the brain by means of the vagus, or pneumo-gastric nerve; the region below this, 7, 8, 9, communicates with the brain almost exclusively through the spinal cord. The nerves of the external senses may, therefore, be regarded as the roots of the Directive class of phreno-organs of the brain; the vagus as containing the roots of the Ipseal class, and the spinal cord, as containing the roots of the Social phreno-organs.

Let us recapitulate, by placing the organs of the face and body in one column, and the corresponding phreno-organs opposite—it being distinctly understood, that this correspondence was not observed by any one, until after the functions and locations were determined by phrenologists, as here set down, and had been published for several years:

	Organs of the Face and Body.	Phreno-Organs of the Base of the Brain.
Directives,	Eyes,	Color.
	Ears,	Language.
	Nose,	Unknown.
	Lips,	Size and Weight.
	Tongue,	Flavor.
Ipseals,	Throat,	Tune.
	Arms,	Constructiveness.
	Thymus Gland,	Thermativeness.
	Lungs,	Pneumativeness.
	Stomach,	Alimentiveness.
	Solar Plexus, etc.,	Sanativeness.
	Kidneys, etc.,	Ex-Sanativeness.
Socials,	Loins,	Parentiveness.
	Sexuals,	Amativeness.
	Lower Limbs,	Equi-motiveness.

The phreno-organs above the base of the brain are not as directly related to the bodily functions as those at the base are; but the higher phreno-organs are regularly superadded to the lower, upon the principle of economic specialization, in a manner which is exceedingly suggestive of philosophical and moral reflections, for which this section does not afford sufficient space.

What is the true signification of these remarkable relations? Why are the cerebral representative organs arranged to correspond, in relative position, with their principals in the body? Is there an actual anatomical and functional connection between the phreno-organs and the corresponding bodily organs? If so, what is the precise nature of that connection? I have already explained that the external senses extend to the anterior lobe; the Ipseal internal senses (through the vagus) extend to the middle lobe; and the Social internal senses (through the posterior column of the spinal cord) extend to the thalamus posterior lobe and cerebellum. I do not wish to be understood as asserting that the nerves of sensation can be traced, and *anatomically* identified, through the oblongata, to the anterior and middle lobes; but only that we have convincing *physiological* evidence that the anterior, middle, and posterior portions of the body, oblongata, and brain, are related to the same functions; and, also, that the more minute subdivisions of each of these are equally related in function, and equally correspondent in position.

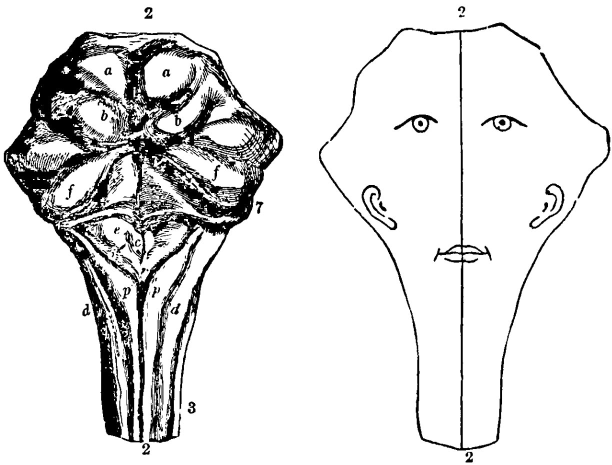
When a nerve of sensation from the body reaches the brain, it may, anatomically, appear to terminate in the oblongata; but, physiologically, it certainly continues up into the brain, and expands there into special organs, of a higher character than the nerve possessed, yet relating to the same functions as the nerve, and the same, also, as that part of the body from which the nerve is derived. According to this view, the bodily organs are the roots; the nerves of sensation, the trunks; and the phreno-organs are the highest developments; but relating to the same functions.

The bodily organs may be compared to so many towns; the brain, to a city telegraph building; each phreno-organ at the base of the brain, to one of the rooms in the building, which is appropriated to the wires from a particular town. Now, the most natural arrangement would be to have the wires from the northern towns terminate in the northern rooms; from the eastern towns, in the eastern rooms; and from the western towns, in the western rooms of the building; so that the topography of the rooms would, of course, coincide with that of the towns. Precisely the same relation which the towns, the wires, and the rooms, in this case, bear to each other, do the bodily organs, the nerves, and the phreno-organs, bear to each other.

While I was engaged in endeavoring to find an explanation of the correspondence of the brain with the body, already described, I was led to observe that the ganglia on the nerves of special sense from the face have relative positions in the oblongata, precisely like those of the external organs of the senses which they severally represent.

This can be best understood by comparing the two annexed engravings of the oblongata. One is copied from the excellent work of *Quain and Sharpey*, which is at present the highest authority in anatomy. The references are also theirs; it can not, therefore, be said, that any thing is strained to make out a coincidence. By the side of it, I have placed an outline of the same figure, with the eyes in the place of the optic ganglia, the ears in the place of the auditory, and the mouth in the place where the gustatory nerve appears to terminate.

FIGURE 13.



A *B*

FIGURE 13, *A*. Posterior view of the oblongata. *d*, Fibres, called restiform, that connect the organs of the body with the cerebellum. *p*, Fibres called posterior pyramids, that connect the organs of the body with the thalamus. *a b*, Optic ganglia. *f f*, Fibres that connect the cerebellum with the conscious centre. *e*, Mass of corpo-neurine, related to the nerves of taste. *i*, Mass related to the vagus. 7, Place where the auditory nerve unites with the corpo-neurine in the oblongata, to form the auditory ganglion. Some of the white fibres of the nerve may be seen proceeding from 7, to the median line, where it is believed that consciousness has its seat. 2 2, Median line which divides the right half from the left. 3, Extremity of the spinal cord. It will be observed that *p* and *d* relate to the Socials; *i*, to the Ipseals, and *a b e*, and 7, to the Directives; and that their relative positions are upper, middle, and lower, like the bodily and facial parts to which they relate.

The following are the references, as given by *Quain and Sharpey*:

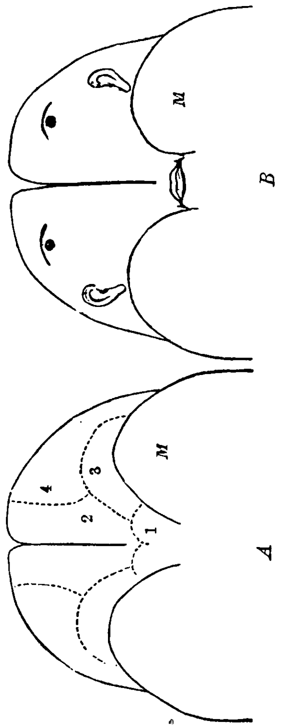
Posterior view of the medulla oblongata, and back of the pons Varolii. The peduncles of the cerebellum are cut short. *d d*, Restiform bodies, (fasciculi cuneati;) passing up to become inferior peduncles of cerebellum. *p p*, Posterior pyramids. *v v*, Posterior fissure, or calamus scriptorius, extending along the floor of the fourth ventricle. *a b*, Optic ganglia. *f f*, Superior peduncles of cerebellum. *c*, Eminence connected with hypo-glossal nerve. *e*, With glosso-pharyngeal nerve. *i*, With vagus nerve. *v*, With spinal accessory nerve. 7 7, Roots of auditory nerves. —*Quain and Sharpey.*

FIGURE 14, *B*. This figure is the same in outline as Fig. 13; but the place where the nerves from the external senses seem to terminate in the oblongata are here occupied by the organs of the external senses. Thus, where the eyes are placed is the true situation of the optic ganglia. Where the ears are placed is the situation of the ganglia of the auditory nerves. Where the upper lip, which, in many animals, is the principal organ of touch, is situated, is the place where the trigeminus terminates. Where the back part of the mouth and tongue is situated, is the location of the ganglia in which the glosso-pharyngeal seems to terminate.

It will be observed, that in the representation of the oblongata, Fig. 13, the *upper* portion is appropriated to the nerves of the external senses from the face, and the *lower* portion is appropriated to the vagus from the throat, lungs, and stomach, thus preserving, or rather representing, the relative position of the face to the body.

To make the coincidence still more obvious, I have inserted an engraving of the base of the anterior cerebral lobe, showing the location of the phreno-organs, as I represented them in a work published in 1838; and in another engraving of the same outline, I have made the external organs of the senses — eyes, ears, and mouth — to show that the same relative positions are preserved in the face, oblongata, and cerebrum.

FIGURE 14.



A. 1, Location of the perceptive organ of Flavor, as it was pointed out in "The New System of Phrenology," in 1838, and corresponding with the mouth in *B*. 2, Location of the phreno-organs of Size and Weight. 3, Location of the organ of Words, corresponding with the ear. 4, Location of the organ of Color, corresponding with the eye.

Between the oblongata and the phreno-organs of the cerebrum, are the intermediate submental organs, which I shall describe particularly hereafter—namely, the striatum and thalamus; and, according to this system of nervous physiology, the functions of the intermediate parts may also be known, from their relative positions corresponding with those of the phreno-organs above, and of the nerves and bodily organs below. It can not but be regarded as an important improvement in Physiology, when it is admitted that all the nervous and cerebral functions are merely superadditions to the bodily functions; and that, from the lowest organs of the body to the highest parts of the brain, the same functions are continued; the apparent differentiations being merely superior and more economical modes of accomplishing, by more numerous and special organs of a higher character, the same results.

THE FIVE STAGES OF DEVELOPMENT.

I have also discovered that the human body contains within itself the indications of at least five distinct stages of development, which correspond with the five principal divisions of the animal kingdom.

The *first stage* is the stomach alone, without nerves, or any thing else but a neck and orifice, or mouth. This may represent the lowest stage, as exemplified in the polypus.

The *second stage* is the same stomach, with a few spinal, aconscious centres, near the oblongata. This represents the degree which is exemplified by the starfish.

Nerves are not absolutely necessary to animal existence, though all but the lowest animals possess them. They may rather be regarded as telegraphic arrangements, intended to accomplish the same objects which, in lower animals, are attained (though in a less economical manner) without them. A nerve centre is situated like a coach-driver on his box, who can, from a central point, manage a number of horses at once. If we would apply this illustration to the whole nervous organism, we must suppose the mind to be seated on the driver's box, in the oblongata, and we must regard all the aconscious nerve centres in the face and body as so many postillions, that only manage one pair of horses each, and are continually liable to be overruled by the principal driver, on the box.

FIGURE 15.

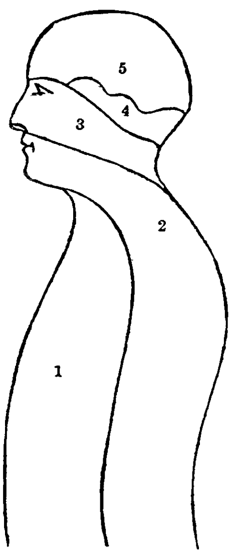


FIGURE 15 represents the five degrees or repetitions of the animal functions. 1, The vegetative, which corresponds with the whole organism of the polypus. 2, Represents the degree of elevation of the animals, which, like the starfish, have merely a few apparently aconscious nerve centres around the mouth, but no definite conscious centre. 3, Represents the proto-conscious department, which was added to constitute an articulated animal, like an insect, or a lobster, in which there are senses, and oblongata, but no cerebrum nor cerebellum. 4, Represents the submental addition, which distinguishes the fishes from the invertebrates. 5, The cerebral, or supermental addition, which distinguishes higher animals and man.

The *third stage* is constituted by the addition of the face, spinal cord, oblongata, and limbs: in a word, every essential animal organ, except the brain. This stage represents the articulate division of the animal kingdom.

In the *fourth stage*, the addition of the striatum and cerebellum represents the class of fishes.

In the *fifth stage*, the addition of the cerebrum represents the higher vertebrated animals. If we would subdivide the cerebrum, to represent the various degrees of intelligence among the higher animals, we must resort to phrenological classifications.

The important principle involved in this discovery, and which I would state more clearly, is, that the five stages are essentially repetitions; for the organs which constitute the lowest stage, 1, are sufficient for mere animal existence; the second stage consists of superadded organs, which relate to the same functions and accomplish the same objects in a more extended sphere. The third, fourth, and fifth, are also so many distinct apparatuses, but they are all related to the same general objects.

PHRENO-GEOLOGY.

On similar principles of progression, the phreno-organs of the cerebrum are superadded, one to another, in the order of their geological creation. I will here give their general arrangement and classification. The cerebral functions and organs are naturally divided into Directives and Impulsives. (See bust.) The Impulsives are divided into Ipseals and Socials. The Ipseals are developed on the side of the head, and arranged from the base of the brain, upward, in the order which appears to agree with the succession of animal creations; the lowest organs of the series being those which were required by the first created animals, and functionally related to the lowest bodily wants. The second stratum, or range of organs, is situated immediately above these, and is adapted to the habits of more vigorous animals. The third range, immediately above the last, is adapted to the habits of animals that find it necessary to resort to cunning, to surprise their prey; or of equal cunning, foresight, and prudence, to avoid their enemies.

The fourth range is adapted to the habits of animals that find it necessary to contend with a chilling climate, by constructing habitations, and storing provisions, or by migrating to regions nearer the equator. The geologist will readily perceive, that there was no occasion for the existence of this range of organs before the tertiary period, when winter first made its appearance upon the earth, and inspired the highest class of animals which then existed with economical and migratory instincts.

The fifth range is adapted to the habits of the highest class of animals, that are, in some measure, free from the bonds of imperious instinct. Under favoring circumstances, in large communities, these organs originate the mechanical and the ornamental arts, and raise the beings that cultivate them judiciously, to the summit of earthly greatness. They relate to leisure time, and works of supererogation, and imply a surplus of vigor, sometimes manifested playfully.

CLASSIFICATION AND ARRANGEMENT OF THE PHRENO-ORGANS.

IPSEAL ORGANS.

1. *Corporeal Range.*
   - *Tu.*, Tune.
   - *Th.*, Thermativeness.
   - *Pn.*, Pneumativeness.
   - *San.*, Sanativeness.
   - *Ex-s.* Ex-sanativeness.

2. *Belligerent Range.*
   - *Des.*, Destructiveness.
   - *Comb.*, Combativeness.

3. *Prudential Range.*
   - *Sec.*, Secretiveness.
   - *Caut.*, Cautiousness.

4. *Industrial Range.*
   - *Con.*, Constructiveness.
   - *Acq.*, Acquisitiveness.
   - *H.*, Hope.

5. *Improving Range.*
   - *Exp.*, Experimentiveness.
   - *Per.*, Perfectiveness.

The social organs are also developed from the base of the cerebellum and cerebrum, in a manner which so reminds us of the development of a tree, that we are forced to admit its perfect naturalness. The lowest organ relates to equilibrium and locomotion, without which society could not exist; the next to reproduction, without which it could not continue; the third, to the care of offspring, without which higher animals, and society, would all be destroyed. The two higher are adapted to the necessity of having a fixed home, and a mutual feeling of dependence, without which society must be rudimentary and imperfect. Next above these, is a group of organs which are adapted to the necessity of government, without which no large community could become permanent, regular, and safe. Higher yet, are the organs that are adapted to the necessity which exists in society, of a willing and cheerful obedience to the sovereign authority; conformity to the wishes, habits, manners, and opinions, of those who are entitled to respect, and to credence, and whose examples are worthy of imitation. These are the organs which are adapted to extensive communities, and when large, qualify their possessor to vary his conduct, to suit the most complicated social circumstances.

SOCIAL ORGANS.

Group that Establish Society.

E,	Equi-Motiveness.
Am.,	Amativeness.
Pa.,	Parentiveness.
In.,	Inhabitiveness.
Ad.,	Adhesiveness.

Group that Govern Society.

Imp.,	Imperativeness.
App.,	Approbativeness.
Fm.,	Firmness.
Eqt.,	Equity.

Group that Conform to the Requirements of Society.

Sub.,	Submissiveness.
K.,	Kindness.
Imt.,	Imitativeness.
Cre.,	Credenciveness.

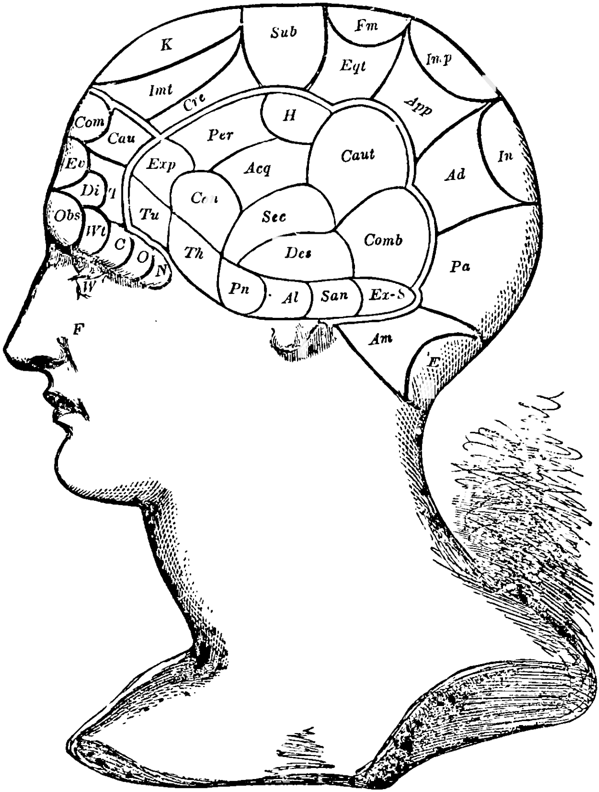

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FIGURE 16

The Directive organs are developed from the base of the anterior lobe of the cerebrum, so that the organs that relate to taste and smell give prominence to the bones of the face, under the eyes, and are, in practice, difficult to determine. Next, the organs that relate to touch and form, give prominence to that part of the forehead where it joins the nose, including the faculties of form, size, direction, and weight. Next in the creative order, is the organ that relates to hearing and remembering sounds and words, situated just before the organ of Flavor, and crowding the eye downward and forward. Next is the organ of Color, that specially relates to the sense of sight. Order and Number, as their situation indicates, are related, in function, to both sounds and colors. In the centre of the forehead, is the organ that relates to motions, changes, and events. At the side of this, is the organ of succession, or Time. At the top of this class, in the centre of the forehead, is Comparison, relating to the memory of resemblances, classes, repetitions, and illustrations. At the side of this, is the organ of Causality, which is related to the perception of specialization, to invention, and to philosophy.

DIRECTIVE ORGANS.

F.,	Flavor.
Obs.,	Observation, or Form, and Size.
Di.,	Direction.
Wt.,	Weight.
W.,	Words.
C.,	Color.
O.,	Order.
N.,	Number.
Ev.,	Eventuality.
Com.,	Comparison.
Cau.,	Causality.

SECTION IV.

ANATOMY OF THE CRANIO-SPINAL AXIS.

In this section, I propose to give a concise outline of all the principal parts of the human nerves and brain, except the so called sympathetic; and, in the three following sections, to review the same parts, and explain their physiology, and the successive order and purposes of their creation in animals. In this investigation, it will be necessary to consider: 1. The order in which the nerves are arranged in the constitution of man. 2. The successive order in which they develop during the growth of man and animals. 3. The order in which they were originally created, according to the indications of Geology and Comparative Physiology. 4. The economic nature of that superiority which results from the higher developments, when compared with the lower.

CRANIAL NERVES.

For the convenience of description, anatomists reckon the cranial nerves numerically, from before backward. In this enumeration, some include the vagus, glosso-pharyngeal, and accessory, as one nerve—namely, the eighth; because they all leave the skull together, through the same orifice. Instead, however, of their being physiologically one nerve, they are the three first created systems of nerves: one relating to external sense, another to internal, and a third to respiratory motion. The auditory nerve is also intimately associated with the facial, so that the two, though as much unlike as possible in function, are, by some anatomists, reckoned as one—namely, the seventh. Those who reckon in this way, make but nine pairs of cranial nerves; but the most approved writers make twelve, reckoning from before, backward, to the spinal cord, as follows:

FIGURE 17.

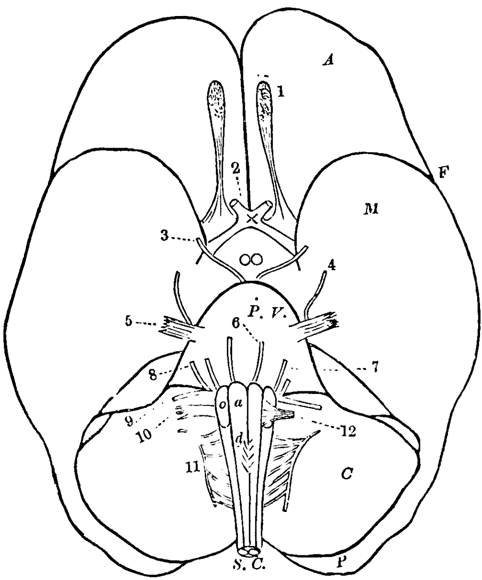


FIGURE 17. Diagram of the base of the human brain, and the cranial nerves. *A*, Base of the anterior lobe, in which the lower Directive organs are located. *M*, Base of the middle lobe, in which

the lower Ipseal organs are situated. *P*, Base of the posterior lobe, in which the lower Social organs are situated. *C*, Base of the cerebellum. *S*, *C*. Spinal cord, the upper part of which is the oblongata. *d*, Decussation, or crossing of some fibres of the lower part of the oblongata, from one side to the other, which is supposed to account for injuries in one side of the body, producing paralysis on the other side. *a*, Anterior pyramid or column of the oblongata. *o*, Olivaria, or olivary body. *P*. *V*. *Pons Varolii*, or bridge of Varolius, which connects the two halves of the cerebellum. ×, Commissure, or place of junction of the two optic nerves. *F*, Fissure of Sylvius, which divides the anterior from the middle lobe.

The numerals indicate the twelve cranial nerves, as they are enumerated in the text. Below the junction, ×, of the optic nerves, are two little round mammillary bodies, which are a part of the fornix, and will be explained in connection with the cerebrum.

1. The Olfactory.
2. The Optic.
3. The Oculo-motor, that moves the eye upward, inward, and downward.
4. The Patheticus, that moves the eye a little inward and upward.
5. The Trigeminus, that gives sensibility to the face, moves the jaw, and gives the sense of taste to the fore part of the tongue.
6. The Abducens, that moves the eye outward.
7. The Auditory.
8. The Facial, that moves the face, in expression.
9. The Glosso-pharyngeal, that gives general sensibility to the throat, and taste to the back part of the tongue.
10. The Vagus, or Pneumo-gastric, that gives the sensations of hunger, thirst, suffocation, and pain from the nutritive viscera.
11. Accessory, that moves the lungs.
12. Hypo-glossal, that moves the tongue.

CREATIVE ORDER OF THE CRANIAL NERVES.

FIGURE 18.

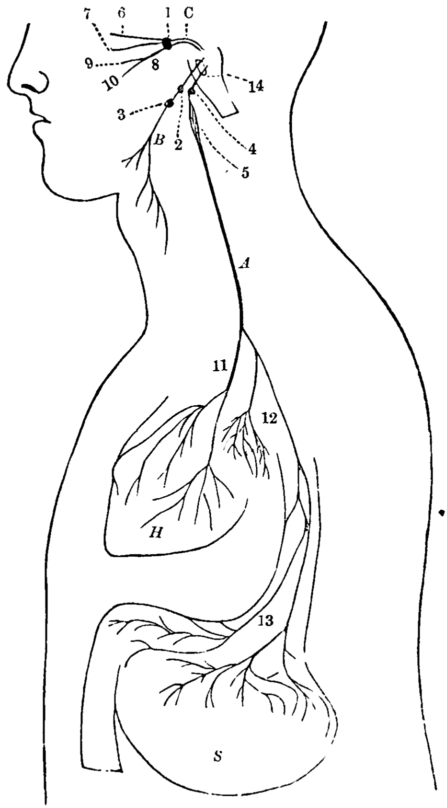


FIGURE 18. Diagram of the first created nerves of sensation. *A*, Vagus, or pneumo-gastric. *B*, Glosso-pharyngeal. *C*, Trigeminus. *H*, Heart. *S*, Stomach. 1, Gasserian ganglion on the trigeminus. 2, Jugular ganglion on the glosso-pharyngeal. 3, Petrous ganglion.

4, Ganglion of the root of the vagus. 5, Ganglion of the trunk of the vagus. 6, Upper, or opthalmic branch of the trigeminus. 7, Middle, or upper maxillary branch. 8, Lower maxillary branch. 9, A nerve of the sense of taste. 10, Nerve that moves the jaw. 11, Cardiac branch of the vagus, connected with the heart. 12, Pulmonary branch connected with the lungs. 13, Gastric branch distributed upon the stomach. There are a great number of branches — one to each organ concerned in the manufacture of blood; but I have only given the main branches, to convey a general idea that the first created organs all relate to nutrition. 14. The oblongata, or centre of all the sensory nerves, and phreno-organs. The diagram shows that though these nerves originate from very different and distant parts of the face and body, they all meet just behind the olivary body, 14, in the oblongata, thus demonstrating its importance.

I prefer to consider the nerves in the order of their creation, and not according to the mere accident of their apparent positions; and, by this rule, the two first are the vagus and glosso-pharyngeal.

There is no animal, however low, that has nerves, and manifests any degree of intelligence, but it has the homologues or equivalents of the vagus and glosso, connecting its stomach and mouth with its conscious centre. The Author of our nature commenced the work of building up the nervous and conscious organism, by creating these two nerves, and placing them at the foundation of the two grand divisions of the mental powers; namely, Impulsives and Directives. The functions of these two nerves are the generalities, of which all other parts of the nervous organism are the specialities. In other words, these are the two roots from which all other nervous and cerebral parts are but the offsets and superadditions.

Figure 19.

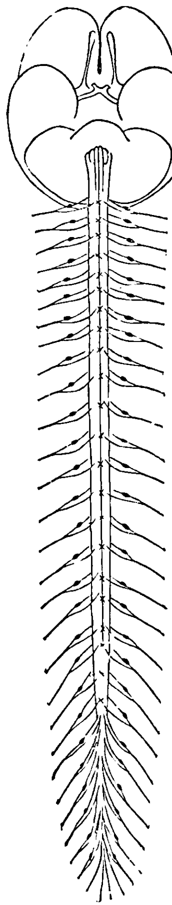


FIGURE 19. Diagram representing an outline of an anterior view of the cranio-spinal axis.

The view of the brain is the same as that in Fig. 17, but the cranial nerves, with the exception of the olfactory and optic, are left out.

The series of crosses in the middle line represent the spinal reflex, or aconscious centres.

There are thirty-one pairs of nerves connected with the spinal centres; each nerve has two roots—an anterior, or motor, and a posterior, or sensory root. Each posterior root has a swelling, or ganglion, upon it. The two roots unite to form a spinal nerve. Each root has fibres which centre in the spinal cord, and when excited acts aconsciously; that is to say, it acts independently of the mind. Besides these, each spinal nerve has other fibres that extend up through the spinal cord to the oblongata and brain, to act in concert with the mind, or conscious centre.

The Glosso-Pharyngeal represents the two lowest external senses — namely, taste and touch; the functions of which are to direct the voluntary movements of the very lowest and first created animals to those external objects which satisfy the stomach. The vagus represents the lowest of internal senses — namely, hunger; pneumor, or the desire for air; and pain, or the sense of bodily injury. If we study the figure of the phrenological bust, we shall find that the lowest of the Directive class of organs in the anterior lobe are but a higher development of the same functions as those performed by the glosso-pharyngeal — namely, taste, and the perception of distance, form, and direction — faculties which, in the lowest animals, are dependent upon the senses alone. We shall also find that the lowest of the Ipseal organs — namely, Alimentiveness, Pneumativeness, and Sanativeness, are but higher developments of the same functions as those performed by the vagus.

The Accessory nerve is so called because it is an accession to the vagus. It is altogether a motor, and is not, therefore, of much importance in this connection, except to show that the motor nerves that are associated with the glosso-pharyngeal and vagus are subordinate to their functions. Thus, the accessory moves the lungs, and the hypo-glossal moves the tongue.

The Trigeminus, or three branch nerve, is the next in creative order. This is connected with the oblongata, at the same place as the glosso-pharyngeal. The lowest branch relates to taste, in connection with the front part of the tongue; one of its divisions relates to the motions of the jaws in eating; it is, therefore, physiologically related to the glosso-pharyngeal. This anatomical separation of two nerves that are so nearly allied in function can only be explained upon the principle of progressive creation — one being created before the other. The lowest animals that possess stomach and mouth nerves, have no jaws nor tongue, but a mouth which is merely the entrance of the stomach; and, therefore, the nerve of taste only extended to the pharynx, or throat, and was merely *pharyngeal*. When a rudiment of a tongue was created, it ramified upon the back part of that also, and became glosso-pharyngeal. The lower branch of the trigeminus was afterward added, to give the power of taste to the front part of the tongue; and the motor branch was, doubtless, created at the same time. The figure, 36, of the acidia mammillata represents an animal that has the homologue, or equivalent of the vagus and glosso-pharyngeal, without any trigeminus. Its body is all stomach, and its head all mouth.

The trigeminus is considered as mostly a nerve of common sensation, and gives sensibility to all parts of the face, besides having one of its branches devoted to the special sense of taste. It has a ganglion on its main trunk, situated at the point where its three branches unite, called the Gasserian ganglion.

The Facial nerve is, to the motion of the face, what the trigeminus is to its sensibility; and the two nerves may be justly reckoned as parts of one circle — the facial generally responding, by producing motions, whenever the trigeminus transmits sensations. The facial nerve especially stimulates the muscles of the face that are related to respiration, such as produce speaking and singing; and as these are greatly assisted by the sense of hearing, the auditory nerve is so intimately related to the facial that it is commonly reckoned with it, the two constituting, together, the seventh pair, as reckoned by some anatomists.

The Olfactory nerve is next in the order of creation, and was probably not developed until after those that relate to hunger, pneumor, taste, and touch. This is indicated by the fact, that the nose is situated above the mouth, in the middle part of the face; for nature evidently progressed in her creative labors, from the stomach to the eyes, in the upper part of the head. The very lowest animals can not be said to have a head, nor even a neck; and the first use which nerves were put to, was to guard the orifice which we call the mouth, and which is a mere entrance to the stomach — the head and neck proper not being yet created. The first created animals respired through the skin; and the skin is even now, in man, intimately related to respiration. Then the fishes breathed through orifices called gills; and it is a curious fact, that man, in the earlier part of his development, has in his neck what is apparently a rudiment, or rather a vestige, of gills, as if the Creator intended to leave the signs or marks in the constitution, which indicate the successive stages above which man has risen to his present dignity. Next, animals breathed the air directly through the mouth and nose. The olfactory nerve in fishes is, of course, so arranged, that the water will impress it, and convey a sense of its odor; and in higher animals, it is so arranged that air, in passing through a nostril or orifice in the upper jaw to reach the lungs, shall impress the olfactory nerve. This nerve can be traced in some fishes to a direct connection with the oblongata; though in man it appears to be only connected with the cerebrum. This is an important fact, since it further justifies the conclusion, that the oblongata is the very seat of consciousness, and the centre of all nerves of sensation.

The Optic is the highest of all the nerves of the senses in creative rank, as it is certainly the most intellectual and complicated in its functions. A momentary glance of the eye can give more ideas to the mind than can be conveyed to it in an hour by all the other senses combined. The optic nerves are distinguished from all others by the complication of their ganglia, and by their numerous connections.

There are usually reckoned four optic ganglia, two upon each nerve; and from this circumstance, they are denominated the quadrigeminal, or four-branched, bodies. Their uses have hitherto been unknown; but I think that there can be little doubt that they are double in structure and in function, being both potentive and somniferous. They are enormously large in some low fishes, which can scarcely be said to sleep, and which move the eyes but little; but such animals guide nearly all their motions by sight. The comparative influence which the sense of sight has in the conduct of animals is in proportion to the development of these ganglia. For this reason I call them potentive. In higher animals, it is proved by experiments and diseases, that the third pair of nerves contain fibres that proceed from the optic ganglia, whose office is to adjust the eyes to the position required by sleep. I, therefore, regard these ganglia as being, in part, of a somniferous character, and as receiving restraining influences from the stomach and vital centre, whenever sleep is requisite. I shall explain this subject more particularly in the section upon the somniferous ganglia.

Physiologists have been puzzled with the fact, that mammals have two ganglia on each optic nerve, while lower animals have but one. But I have been led to conclude, from a great number of observations, that the posterior optic ganglia are related to the functions of the thalamus and the social organs, it being generally developed in proportion to the thalamus. This fact of comparative anatomy indicates that the Ipseals are brought into relation to the optic function, through the instrumentality of the anterior of the quadrigemina, and the Socials through that of the posterior. There are also two bodies, called geniculata, in man, about the size of coffee beans, which are connected with the optic ganglia, and, also, with the thalamus. No one has hitherto conjectured their use. May not these, also, be potentive ganglia through which certain distinct functions and organs of the brain are brought into special relation to the optic function?

The Motor nerves of the head are subject to the same law of progressive creation that the nerves of the senses are. The lowest and first created cranial nerve of motion is probably the hypo-glossal, which moves the tongue in speaking and eating. It may, however, be a question, whether some twigs of the accessory are not entitled to the precedence.

Some physiologists, especially *Solly* and *Carpenter*, consider this nerve as specially related to speech, because it relates to the motions of the tongue. That it moves the tongue in speech is not questioned; but this must be merely a small and incidental part of its office, for it is possessed in full development by fishes, which, of course, have no powers of speech; and, besides, there are but a very few human sounds in which the agency of the tongue is required.

The next in the creative order is associated with the lowest of the three branches of the trigeminus, and is commonly reckoned with it, though it is, physiologically, entirely distinct from it. It is called the motor branch of the fifth, or trigeminus; but it is really a distinct and independent nerve, whose function is to move the jaws in eating.

Next in order is the facial, which produces the movements of the face and mouth, in connection with the act of breathing, such as speaking, singing, gasping, and emotional expressions.

Next is the sixth, or abducens, which moves the eyes outward, in a way which is useful to the lower animals that can only see on one side with one eye.

Next is the fourth, or patheticus, which enables the eye to look a little inward and upward, as the higher fishes may be supposed to wish to look.

Finally, the third, or oculo-motor nerve, enables the eye to look inward, and upward, and downward. This is the only nerve which admits of the downward look, and indicates or implies that the animal has attained a more elevated position, with objects of interest below him, which require him to look down upon them.

Physiologists have hitherto been in vain endeavoring (see *Kirke and Paget's Physiology,*) to find a reason why the motions of the eye require three nerves, instead of one with branches. The progressive principle suggests the reason, which is, that the three nerves were created successively, as they were needed for the more complicated movements of newly created and higher animals; and thus it was, that the nerve called the sixth was the first motor nerve of the eye which was created; the fourth was next, and the third was the last.

In the study of progression, I consider the nerves of sensation as of much more importance than the nerves of motion, because the brain is superadded to the nerves of sensation, and is analogous to them in function; but the nerves of motion are subservient and subordinate to the functions both of the sensory nerves and of the brain. Man, with his large brain, experiences a greater variety and continuity of sensations than any other animal; but insects, without brain, perform a greater variety of motions than man.

The Spinal Cord is about seventeen inches long, and a little less than an inch in diameter, being rather larger in the places where the nerves are given off to the upper and to the lower limbs. About one-eighth of the bulk of the cord is composed of corpo-neurine, which is enclosed within a tube of nerve fibres. The spinal cord is in two longitudinal halves—a right and a left—which are united by means of two commissures, one of which is white, and the other gray. The corpo-neurine is continuous from one end of the cord to the other, instead of being separated into a series of distinct ganglia, as it is in insects. There is no doubt, however, that it physiologically consists of a series of thirty-one centres, one for each pair of nerves that proceed from the cord. The fibrous part of the cord is partially divided into a posterior and an antero-lateral portion.

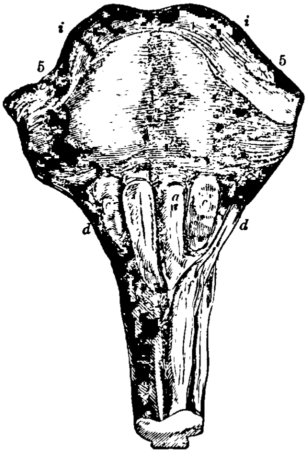
There has been, and still is, much difference of opinion among physiologists, concerning the functional divisions of the fibrous columns of the cord. *Sir Charles Bell* demonstrated, by experiments, the accuracy of which has been confirmed, that the posterior column of fibres is sensory, and the anterior, motory; but the functions of the intermediate portions are yet unsettled, though *Bell* believed them to be devoted to the respiratory motions.

In justice to Dr. Hall, I give the following concise account of his peculiar views, which are now generally adopted.

Dr. Marshall Hall has proposed a division of the nervous system, which is calculated to explain many of the anomalous circumstances we so frequently witness. He proposes to divide all the nerves into, 1, The cerebral, or the sentient and voluntary; 2, The true spinal, or excito-motory; 3, The ganglionic, or cyclo-ganglionic — the nutrient and secretory. If the sentient and voluntary functions be destroyed by a blow upon the head, the sphincter muscles will still contract when irritated, because the irritation is conveyed to the spine, and the reflex action takes place to the muscle so as to throw it into contraction. But if the spinal marrow be now destroyed, the sphincters remain entirely motionless, because the centre of the system is destroyed. Dr. Hall thinks that a peculiar set of nerves constitute, with the true spinal marrow as their axis, the second subdivision of the nervous system; and as those of the first subdivision are distinguished into sentient and voluntary, these may be distinguished into excitor and motory. The first, or the excitor nerves, pursue their course principally from internal surfaces, characterized by peculiar excitabilities, to the true medulla oblongata and medulla spinalis; the second, or the motor nerves, pursue a reflex course from the medulla to the muscles, having peculiar actions concerned principally in ingestion and egestion. The motions connected with the first, or cerebral subdivisions, are sometimes, indeed frequently, spontaneous; those connected with the true spinal are, he believes, always excited. Dr. Hall thinks, too, that there is good reason for viewing the fifth, and posterior spinal nerves, as constituting an external ganglionic system for the nutrition of external organs; and he proposes to divide the ganglionic subdivision of the nervous system into, 1, The internal ganglionic, which includes that usually denominated the sympathetic, and probably filaments of the pneumo-gastric; and, 2, The external ganglionic, embracing the fifth, and posterior spinal nerves. To the cerebral system he assigns all diseases of sensation, perception, judgment, and volition — therefore, all painful, mental, and comatose, and some paralytic diseases. To the true spinal, excito-motory, or reflex, nervous system, belong all spasmodic, and certain paralytic diseases. He properly adds, that these two parts of the nervous system influence each other, both in health and disease, as they both influence the ganglionic system.—*Dunglison.*

The preceding quotation gives a good general idea of the present state of knowledge and of ignorance in regard to the nervous functions. Excepting Gall and Bell, no investigator of modern times has made discoveries in this department as valuable as those of Dr. Marshall Hall, concerning the reflex or aconscious spinal centres; but both Bell and Hall have fallen far short of their capabilities, by neglecting to avail themselves of the light shed upon the subject, by the discovery of the illustrious Gall; for to my mind nothing is more demonstrable, than that any system of nervous physiology must be sadly defective, that ignores the main principles of phrenology. We have already seen that the functions of the body, and, also, of the brain, are divisible into three classes of functions. Of course, the nerves that mediate like telegraph wires between the brain and the body must be divided into three classes, to correspond in function with the organs which they thus connect. Keeping this principle in mind, we shall find that the spinal cord is related to the conscious Social functions, just as the vagus is to the conscious Ipseal functions, and the external senses to the conscious Directive functions.

FIGURE 20. FIGURE 21.



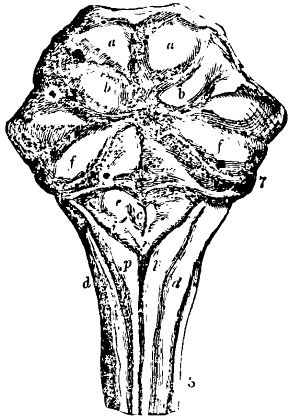


FIGURE 20. An anterior view of the medulla oblongata. *a*, Anterior pyramids. *c c*, The olivary bodies. *d d*, Restiform bodies. *f*, Fibres shown by Solly to pass from the anterior column of the cord to the cerebellum. *P*, Pons Varolii. *i*, Its upper fibres. 5 5, Roots of the trigeminus.

FIGURE 21. A posterior view of medulla oblongata. (See Fig. 13, *A*.)

The Oblongata is not to be considered, as itself, a special organ, or as performing any definite function, but as a centre to which all the conscious functions converge: here the vagus terminates, bringing sensations from the stomach, lungs, and other nutritive organs; here, also, the nerves of external sensation from the face terminate, bringing impressions from the external world; the fibres of the brain, also, all seem to be directly or indirectly connected with this important centre; from hence, in response to sensations, or volitions, the motor nerves send their influences to the voluntary muscles; it is palpable, therefore, that if the mind has any central location, here must be its seat. All the nerves of sensation have potentive ganglia upon some part of their course, to give them influence in the centre. Some of these ganglia, as the optic and olfactory, are at a distance from the oblongata; others, as the auditory and the vagus, have potentive ganglia so imbedded into the oblongata as to be confounded with the fibres and ganglia of other nerves which terminate near them. In some animals, however, these ganglia are distinct.

A posterior view of the oblongata, Fig. 13, *A*, shows, at its upper part, *a* and *b*, the optic ganglia; below this, *f*, the fibres that connect with the cerebellum, and bring it into communication with consciousness, called, by *Solly*, the inter-cerebral commissure; below this, 7, is a set of white fibres with ganglia connected with them, which belong to the auditory nerves; lower yet, and more centrally situated, is a small mass of corpo-neurine, *e*, connected with the nerves of taste and touch from the face — namely, the glosso-pharyngeal and trigeminus; still lower, is a large mass of corpo-neurine, constituting the central portion of the oblongata; here is where — between *i* and *v* — the nerves from the stomach and lungs appear to terminate. The conscious centre seems to be between *i*, *e*, and *c*; for it is here that the first created sensations gave birth to the first conscious animal motions; *e* and *i*, being the terminal points of the nerves of sensation from the mouth and the stomach and lungs; *c* and *v*, the commencements of the motor nerves of the tongue, throat, and lungs. Below all these are, *P*, the posterior pyramids, as they are foolishly denominated, consisting, as I think, of fibres that relate to the parental impulse. Below these, again, or rather nearly parallel with them, is the restiformia.

FIGURE 23.

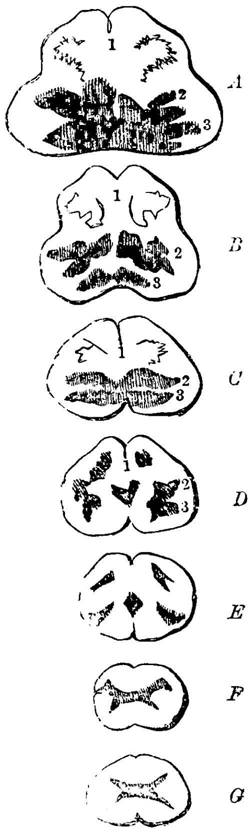


FIGURE 22.

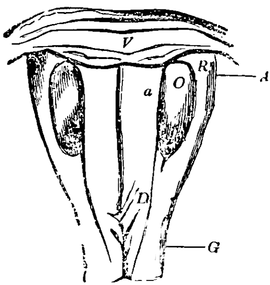


FIGURE 22. Front view of the oblongata. *a*, Anterior pyramid. *O*, Olivary body. *D*, Decussation of the fibres of the two halves. *R*, Restiform fibres. *V*, Pons Varolii. *A*, Place where the highest sec-

tion is made, which is represented in Fig. 23. *G*, Place where the lowest section is made, which is described in Fig. 23.

FIGURE 23. Showing the appearance which, according to Solly, the oblongata presents when a series of sections are made, commencing at *A*, and ending at *G*, Fig. 22. At *G*, and *F*, the corpo-neurine is arranged nearly as in the spinal cord; further up, at *E*, there is a central mass of corpo-neurine, and an anterior and posterior one. This division into three portions is maintained until we reach *A*, where 2 and 3 become blended together, as if they had a common function. This is the point where the nerves of the face and the body concentrate, and terminate their fibres, to communicate with the mind. At 1, we see the dentated, or tooth-like appearance, produced by a section of the corpus-olivaria. At 2, the vagus is said to terminate; at or near 3, the auditory nerve is believed to terminate.

In the anterior view of the oblongata, we see its upper part covered by the transverse fibres of the pons Varolii, the commissure of the cerebellum. Below this, the central anterior portion is called the anterior pyramid; it is composed of fibres which relate principally to voluntary motion. The middle portion contains the olivary bodies, which are functionally related to the vagus and nutritive organs below, and to the middle cerebral lobe above.

The Submenta are next to be described, consisting of parts which may be considered as links that connect the oblongata with the cerebrum. There are no portions of the nervous organism the anatomy and physiology of which are less understood. The names applied to them by anatomists are fanciful, and indicate their ignorance of the functions which they perform; but when we apply the principles of phreno-physiology, already explained, both their structure and functions are greatly simplified.

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FIGURE 24.

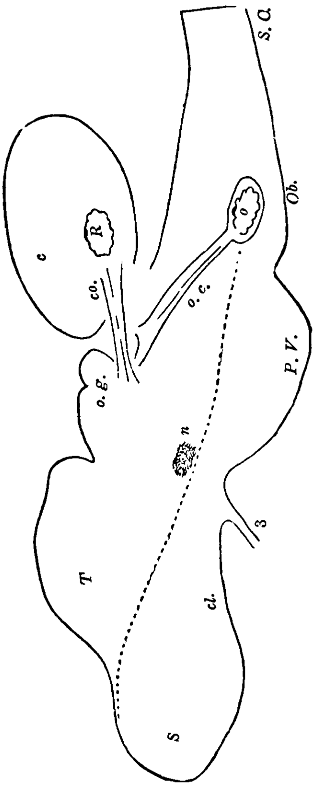


FIGURE 24. Diagram of a longitudinal section of the oblongata and submental organs, altered from Solly. *S. C.* Upper part of the spinal cord. *Ob*, Oblongata *o*, Olivary body. *o c*, Olivary column, as it is called by Solly; but I regard it as principally a continuation of the optic nerve. *o g*, Optic ganglia. *c*, Cerebellum. *R*, Rhomboideum, or proto-conscious ganglion of the cerebellum. *co*, Commissure, or set of fibres which connect the cerebellum with the

sensorium. *P. V*, Pons Varolii. *n*, Locus niger, or proto-conscious ganglion of the thalamus, and parental impulse. *T*, Thalamus. *cl*, Claustrum, or posterior and latteral part of the striatum. *S*, Striatum. 3, Place where the third cranial nerve leaves the brain, to go to the eye. The dotted line is to show the division of the Directives and Ipseals from the Socials — the Socials being the posterior and upper portion — while the Directives and Ipseals are the anterior and lower. The region between the olivary and the thalamus is called the crus, or leg, of the cerebrum.

FIGURE 25.

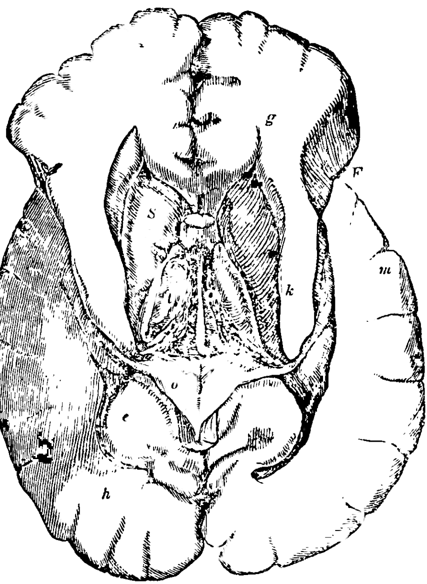


FIGURE 25. Horizontal section of the cerebrum showing the striatum, *S*, the claustrum, *k*, separated from the cerebrum, *m*, by the descending cornua. The thalamus, *t*, enclosed by the striata, *S*. Between *e*, and *h*, is a sulcus, or fold, of the posterior lobes, caused by the pressure of the cerebrum down upon the cerebellum, which is

beneath. This sulcus is called the posterior cornua. *g*, Is the anterior cornua, which is a fold of the cerebrum, caused by the form and development of the striatum. *o*, The posterior pillars of the fornix, turned back. *F*, Fissure between the anterior and middle lobes, called the fissure of Sylvius, showing that the anterior lobe is developed from the anterior part of the striatum, *S*, and the middle lobe from the claustrum, *k*, or posterior part of the striatum.

Above the oblongata, are the crura, as they are called, or legs of the cerebrum and cerebellum. They are, in reality, fibres connecting the oblongata with the parts above. The rhomboideum, *R*, Fig. 24, is in the middle of the crus-cerebell; and the niger, Fig. 24, *n*, in the middle of the cerebral crus. All the other parts of the crura may be regarded as mere connecting fibres, which are situated between the oblongata and the brain, just as the trunk of a tree is between the roots and the branches.

Developed out of the oblongata are five distinct masses, which constitute what I call the submenta. Beginning before, and proceeding backward, they may be denominated as follows:

1. The striatum, Fig. 24, *S;* the posterior part of which is called, 2, the claustrum, *cl;* 3, the thalamus, *T;* 4, the verm, or central part of, *c*, the cerebellum; 5, the lobulus, or lateral part of the cerebellum.

Above these five submental organs, the cerebrum is developed, which, in man, entirely covers the submenta, and, excepting a part of the cerebellum, it entirely conceals them, until they are exposed by dissection. I regard the submental series as a kind of second brain; the oblongata being the first, or proto-conscious brain, and the cerebrum, the third, or supermental brain.

The submental organs are all connected with the oblongata through the crura-cerebri, see Fig. 24, excepting the cerebellum, which has connections, or crura, of its own. With the oblongata and spinal cord the cerebellum is connected by the restiform, or rope form fibres. These are mostly sensory, from the lower parts of the body and the limbs; but, according to *Solly*, about one-fourth of the restiformia are motor fibres, which proceed from the cerebellum to the anterior column of the spinal cord. I deem this a very important discovery by *Solly*, for it enables us to understand that the cerebellum has motor fibres of its own, distinct from the voluntary nerves. The cerebellum also has a connection with the sensorium, by means of a set of fibres which *Solly* calls the inter-cerebral commissure, Fig. 24, *co*. They seem to communicate with the optic ganglia, and with the locus niger, and other parts of the sensorium; but there is no evidence nor probability that the cerebellum communicates with the cerebrum, except through the medium of the conscious centre. The two halves of the cerebellum are connected by means of a remarkable band, or bridge of fibres, called the pons Varolii.* This pons is not known to possess any peculiar power, and the probability is, that it is a mere commissure of fibres, that enable the two halves of the cerebellum to act harmoniously, and that it is analogous to the corpus-callosum,

*The pons Varolii is, in some respects, a remarkable structure, being composed of alternate layers of transverse fibres from the cerebellum, and longitudinal fibres which connect the brain with the oblongata. In birds there is no pons; in the lower mammals there is a very simple one, with scarcely any longitudinal fibres intervening among its transverse fibres. But, as we rise to man, both orders of fibres increase in number and in complication. They remind us of a series of geological formations, one of which was made by deposition at one period, and another added afterwards. Are these alternate crossings indicative of successive periods of development — each transverse layer of fibres marking a distinct step in the progress of cerebral creation?

that unites the two halves of the cerebrum in a similar manner. There are several other commissures, or bridges, which connect the submental organs of opposite sides; but they are all comparatively small. One is called the *anterior* commissure, and unites the two halves of the striatum, or rather, the two striata. Another is called the *posterior* commissure;—it unites the two thalami. Between these is a soft *middle* commissure, which seems to be principally composed of corpo-neurine. The optic ganglia are united in the middle line by a commissure of their own. The little body about the size of a pea, called the pineal gland, seems to perform the part of a commissure, and of a ganglion also, though its nature can only be conjectured.

In the very centre of the base of the skull is the pituitary gland, situated in the place in the skull called the *sella Tursica*, or Turkish saddle; connected, or associated with this gland, is a small mass of corpo-neurine, called *tuber cinerium*, and another the *infundibulum*, or funnel. These hard names must not frighten us, for no one pretends that they have any meaning, or that the uses of the parts thus named are understood. The most reasonable conjecture is, that the pituitary gland and the tuber cinerium are designed for the nourishment of the striatum and cerebrum, and are related to sleep, as a kind of substitute for it. This idea is confirmed by the fact that these parts are largest in animals that have the smallest brains, and that sleep the least.

FIGURE 26. Diagram by Mayo, showing the fibrous structure of the brain, and the direction of the principal fibres, as they appear when carefully dissected. *O*, Olivary body. *D*, Rhomboideum, or central ganglion of the cerebellum. *C*, Cerebellum, showing the arbor vitæ, or tree-like structure, produced by alternations of white and gray neurine. *T*, The fibres that connect the cerebellum with the

FIGURE 26.

crura cerebri, or upper part of the oblongata; they have been called, by Solly, the inter-cerebral commissure. *F*, Olivary column, or optic nerve, connecting the optic ganglion with the olivary body. *N*, *B*, Optic ganglia. *G*, Two geniculate bodies, which seem to belong to the optic ganglia. They are about as large as coffee-beans. *P*, Anterior pyramids, or columns of fibres, that connect the oblongata with the brain. *V*, Pons Varolii. *a*, Anterior lobe. *q*, Posterior lobe. *R*, Restiform, or rope-form fibres that connect the spinal cord and oblongata with the cerebellum.

FIGURE 27.

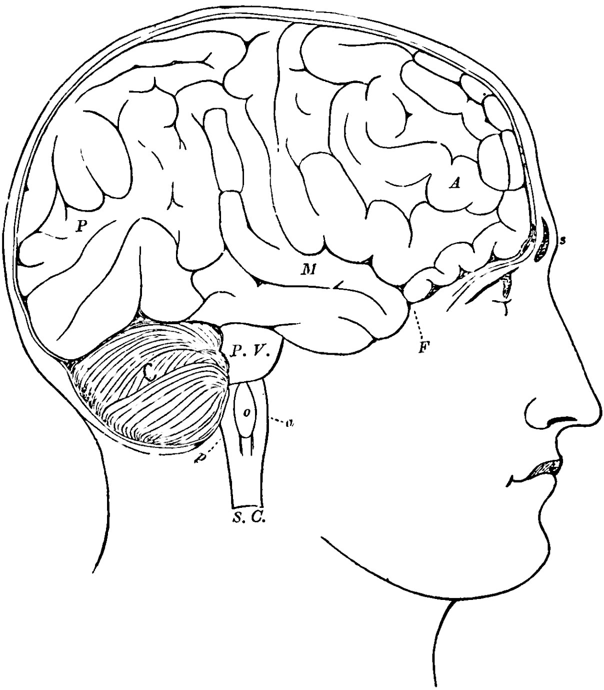


FIGURE 27. Side view of the brain, in its true position, showing the convolutions, or folds of its surface. *A*, Anterior lobe. *M*, Middle lobe. *P*, Posterior lobe. *C*, Cerebellum. *P. V.* Pons Varolii *o*, Olivary body in the oblongata. *a*, Anterior column of fibres. *p*, Posterior column of fibres. *S. C.* Upper part of spinal cord. *s*, Frontal sinus — a hollow between the outer and inner tables of the skull, which, in some cases, renders craniological indications uncertain. *F*, Fissure of Sylvius, which separates the base of the anterior from the middle lobe.

The disposition and direction of the convolutions, or folds of the brain, indicate that the brain was first compressed laterally, to make longitudinal convolutions, such as we see in lower animals, and afterwards compressed antero-posteriorly, or from front to back, so as to shorten the brain; this is evident in all the convolutions, but particularly in those over the eyebrow, over the letter *M*, and over the cerebellum.

The Cerebrum is enclosed in the skull, and corresponds with it in general form. It is sometimes said that we can not judge by the external form and appearance of the head what is the shape of the cerebrum, or the size of its parts. The varying thickness of the integuments and the skull are supposed to render it difficult, if not impossible, to determine, with the requisite accuracy, the development of the phreno-organs. I can testify that it is a real difficulty, in some cases, where the head is nearly balanced, and it is desirable to apply phrenology practically in an individual case. But so far as establishing the truth of Phrenology is concerned, the difficulty is entirely imaginary; for when we are at liberty to resort to extreme cases, we can easily prove to the satisfaction of any candid person the reality of a large majority of the organs which I have set down as established. Those persons who still talk about phrenology not being true, are, of course, to be treated with reasonable charity and courtesy; but it is difficult to resist the disposition to intimate to them that such opinions belong to an age that has passed away, and are no longer deserving of respectful attention.

There has been considerable dispute among anatomists, as to the best mode of dissecting a brain, to learn its true structure — the old school preferring to commence by slicing off sections, until the callosum, and then the submenta, come into view. The new, or phrenological school, on the other hand, contend that the brain should be dissected from the oblongata upwards, to the convolutions. The truth seems to be, that human brains may be examined in both ways, with ever so much skill, without their actual structure or functions being ascertained, unless the simpler brains of other animals are made to perform the parts of alphabetical interpreters of the more complicated language of the human brain. Take a human brain out of the skull, and place it with the base downwards, and we see nothing but the cerebrum, with a part of the cerebellum, enclosed in a tough membrane, called the *dura mater*. Removing this, we come to a very delicate membrane, which dips down between all the folds of the brain, and seems to sustain the bloodvessels. This is called the *pia mater*. Between the pia mater and dura mater, if we are very observing, we can see a delicate web-like membrane, which has been called the *arachnoid*, or spider's web. The surface of the brain is folded like a piece of thick cloth that has been crowded into a small box. Cut into the brain, and we find that it is composed of two substances, the outside being corpo-neurine, or cortical substance, extending to the depth of half or three-fourths of an inch, and below this is the white substance, composed of fibrous neurine.

Looking at the brain from above, we notice that it is in two equal halves, like a bean, with a deep fissure between; and when we attempt to separate the two halves, by pulling them apart, we observe about an inch and a half below the surface of the top of the head that there is a white bridge of fibres passing across from one side to the other, as if intended to unite them into one apparatus.

FIGURE 28.

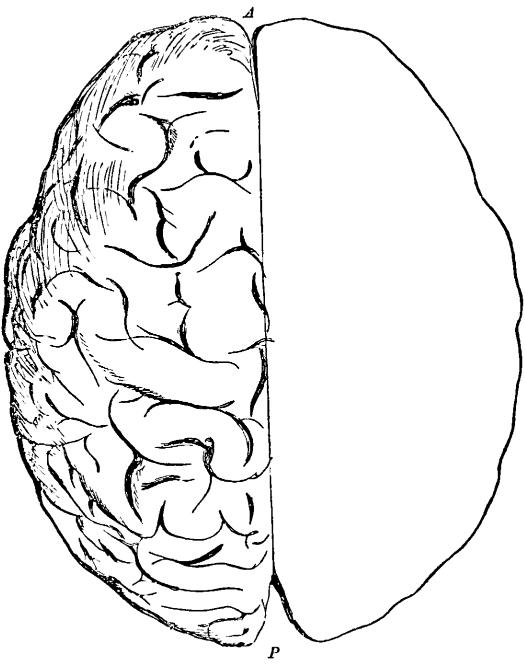


FIGURE 28. Top view of the brain. *A*, Anterior. *P*, Posterior extremity. On the left side, the convolutions are represented, showing that most of them are transverse; whereas, in the side view, most of them are longitudinal. In the lower animals the convolutions at the top of the brain are nearly all longitudinal. This is accounted for by the upper part of the brain being more exposed to antero-posterior pressure, and not being as well protected by the skull-bones.

FIGURE 29.

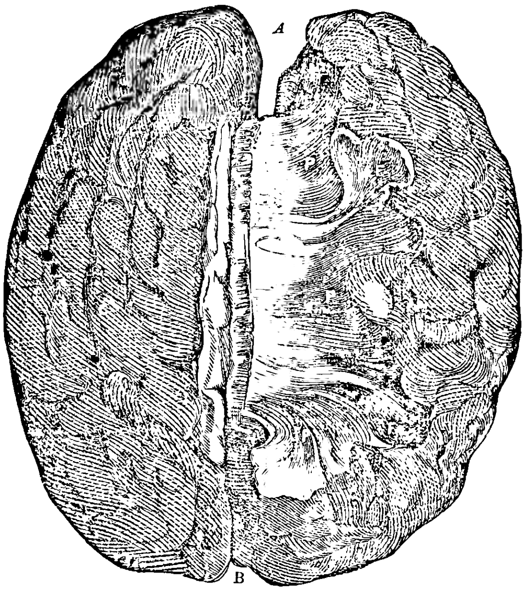


FIGURE 29. Top view of the brain, from Solly, with the right half dissected away, down to the callosum, to show the fibres of this great commissure, extending across from one side to the other, and terminating in the convolutions. The left half of the brain, *C*, remains undisturbed. *P P P*, Fibres of the corpus callosum radiating into the right hemisphere. *F F*, Fibres, terminating in the convolutions. *A*, Anterior lobe. *B*, Posterior.

This bridge is called the corpus callosum. The structure and connections of the callosum are yet unsettled. *Foville* declares that it is not connected with the convolutions, but that it proceeds from the crura of one side across the median line to the crura of the opposite side;

thus making a kind of arch, which is analogous to the pons Varolii, that connects the two halves of the cerebellum. *Solly*, on the contrary, contends, that the callosum does not connect directly with the crura, but that it connects the convolutions of one side with those of the other. Most anatomists agree with *Solly;* but *Dr. F. S. Grimes*, while a student at the Berkshire Medical College, dissected the brain of an ox, which had been prepared, with much care, in camphene and alcohol, and then partially dried, and he found that the callosum was composed of two horizontal layers of fibres; the superior layer could be distinctly traced to the convolutions of the lateral part of the brain, as described by *Solly;* but the inferior layer was disposed in the manner described by *Foville.*

FIGURE 30.

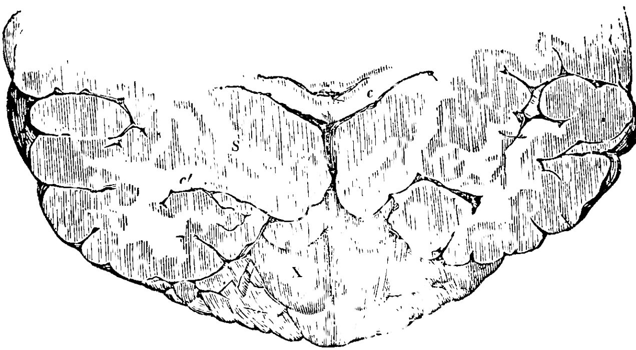


FIGURE 30. A transverse section of the middle lobes of the cerebrum, from Solly. The parts above the callosum, *c*, being sliced away by a horizontal incision: the posterior parts of the brain, *X*, are seen beneath in perspective. *S*, Section of the striatum, from which the anterior lobe is developed. *c l*, Section of the claustrum from which the middle lobe is developed. *c*, Section of the callosum. *B*, Fissure of Sylvius.

If we cut down through the corpus callosum, in the median line, we come to the lateral ventricles, or sacs, of the brain; not that the brain is hollow, but that the halves may be compared to two empty sacs, with their mouths opposite each other in the median line.* The callosum, with the parts above it, constitute the roof or upper half of these sacs. If we cut the upper half away, by a horizontal incision, we find a complicated tissue of bloodvessels attached to a membrane, called the plexus choroides, and which is a continuation of the pia mater into the ventricles. In the lower half or floor of each sac, in the anterior part, is the striatum and claustrum. Immediately behind these, we find the thalamus, covered by the fornix; behind the thalamus, are the optic ganglia; behind these, the cerebellum. The optic ganglia are between the thalamus and the cerebellum, and have connecting fibres, bringing them into relation with both, and also with the little round, pea-shaped, and pea-sized body — the pineal gland.

The Fornix is composed of fibres that proceed from the middle and posterior parts of the cerebrum, and unite

*Some metaphysical reasoners have lately attempted to explain what they call the duality, or doubleness of the mind, by the division of the brain into halves; but I see no good evidence that the mind is double. All the important facts that go to show that it is so, if thoroughly weighed, equally tend to show that it is triple, or quadruple. The fact that a person can, in one state of health and mind, remember things which he forgets in another state, would have considerable weight, were it not that some persons are capable of being in five or six different states of mind, and have no recollection in one state of what they experienced in the others. The experiments in mesmerism can easily be made to demonstrate this fact. A more reasonable explanation of these facts is, that memory or recollection requires a state of mind essentially similar to that in which the recollected ideas were originally received.

in a centre at the base of the brain, called the *corpus mammillare*, from whence some of the fibres may be traced to the oblongata. The striata and thalami are situated, with reference to each other, very much as the wings of a bird are to its body — the two thalami being enclosed in front and on the sides by the striata. If we dissect the striatum, we find that its anterior and upper portion is composed of corpo-neurine, which seems to be striated with fibres that come from the crura and base of the brain. Its posterior lateral portion is evidently connected with the middle lobe, while its anterior portion is connected with the anterior lobe. The dividing line between that part of the striatum proper which belongs to the anterior lobe, and that part called the claustrum, which belongs to the middle lobe, can easily be seen in man, by separating the convolutions, around the fissure of Sylvius, which divides the anterior from the middle lobe; and upon opening it, we discover a wedge-shaped or pyramid-shaped projection. The base of the pyramid is in the striatum, and its apex projects into the fissure between the anterior and middle lobes. This pyramid is called "the Island of Riel." If we cut into it, we find a dark layer of corpo-neurine, called the claustrum, which evidently belongs to the middle lobe, just as the striatum proper does to the anterior lobe.

The extra-ventricular portion of the striatum which lies somewhat lower than the inner portion, is situated between the radiating peduncular fibres and the Island of Riel, and may be exposed by dissecting the hemisphere from the Fissure of Sylvius. In this dissection, the convolutions of the island are first removed: beneath the white matter of those gyri, a thin layer of grey substance is met with which has been named the claustrum. (Burdach.) If the brain be cut through in a plane perpendicular to the surface of the island, the section of the grey layer named the claustrum appears as a narrow, dark line, situated between the island and the corpus striatum. *Quain and Sharpey's Anat.*, *Vol.* 2, *p.* 238.

FIGURE 31.

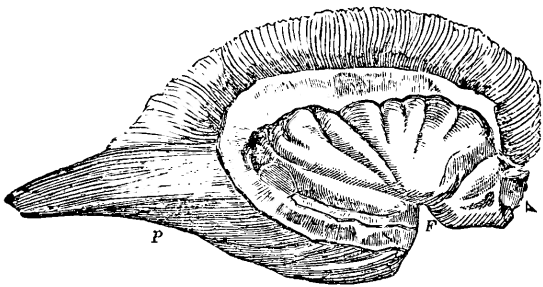


FIGURE 31. Island of Riel, according to Foville, as seen when the convolutions around the fissures of Sylvius are dissected away, to expose it to view. This is an interesting portion of the brain, as it appears to be the submental germ of both anterior and middle lobes, and is situated between them, in a peculiar manner. *A*, Anterior part connected with the anterior lobe. *P*, Posterior part, connected with the middle lobe. *F*, Fissure of Sylvius.

The Convolutions are folds of the cerebrum, which are only found in those animals in which the head is relatively large, compared with the pelvis; and the direction and depth of the convolutions are, in different classes of animals, precisely such as to harmonize with the hypothesis that they were expressly designed to adapt a large head to a comparatively small pelvis. This accounts not only for the peculiar direction of the convolutions, but for their continually increasing depths, as brains become larger. It also accounts for the fact, that it is not the most intelligent animals that have the convolutions, for birds and beavers have none; but it is the size of the head, compared to the pelvis, upon which the existence, direction, and depth of the convolutions depend.

SECTION V.

PROGRESSIVE CREATION AND PHYSIOLOGY OF THE NERVOUS ORGANISM.

I MUST request my readers to bear constantly in mind, that, when we are pursuing the study of the nerves of the lowest animals in which nerves can be discovered, we are actually making ourselves acquainted with the functions which lie at the very foundation of the human constitution. It should, also, be known and remembered, that the study of the animal series, from the lowest to the highest, is the surest—indeed, it is the only—method by which to become acquainted with the laws of the human organization. I think it was the celebrated Cuvier who said that the lower classes of animals are so many experiments, ready prepared by nature, to illustrate the functions of man. To fully avail ourselves of these experimental lessons of nature, we must regard the whole animal kingdom as made up of successive creations, the essential parts of which are contained in man; and we must regard the human constitution as a progressive structure, the foundations of which are laid in the stomach, and the highest point of which is in the upper lateral front part of the human head, where the highest Ipseals, Socials, and Directives meet. (See the figure of the bust.) Since the discovery of some of the phreno-organs by *Dr. Gall*, comparative anatomy has made rapid strides, and important additions have been made to human physiology. *Bell* has demonstrated that the anterior part of the spinal cord, with the nerves that proceed from it, relates to voluntary motion; while the posterior part, with its nerves, relates to sensation. *Marshall Hall* has proved that the spinal cord contains a series of independent aconscious centres. *Tiedeman* and others have shown that the human nerves and brain develop gradually, from a condition which is permanent in fishes and reptiles, until, at birth, the human brain is scarcely superior to that of an ourang, and gradually improves until man arrives at maturity.

But it is remarkable that these discoveries and improvements have failed to throw any light upon the functions of the brain, or its relation to the powers of the mind, and the phenomena of human nature. It is still more remarkable, that, notwithstanding phrenology is unquestionably true, the facts of comparative anatomy have hitherto seemed to militate against it; and that those who have been most successful investigators of the brains of the lower animals, have been the most influential opponents of the true physiology of the human brain.

Dr. Carpenter, the most distinguished and able of the British physiologists, triumphantly holds up the brains of animals as unanswerable arguments against Phrenology. I do not wish to be understood as endorsing all the doctrines of phrenological writers; but, at the same time, I must beg leave to protest against the inferences which *Dr. Carpenter* and others have drawn, hostile to Phrenology, from the brains of the lower animals: and I am greatly mistaken, if these pages do not contain conclusive refutations of some of the errors of this distinguished and able author, and furnish the links, which all must admit have hitherto been wanting, to connect the phreno-organs of the human brain with the body, and with the nervous organisms of the lower classes of animals. Phrenologists have certainly determined, in some degree, the functions of the brain at its surface, by comparing its various developments with manifestations of character; and physiologists have determined the functions of the body, and of many of its nerves, by observations, and by experiments made upon animals; but, between the surface of brain and its junction with the spinal cord, there are some structures that have hitherto been enigmas to both phrenologists and their opponents.

In the course of the following pages, I think it will be made to appear that, by the aid of the principles of phrenology, comparative physiology, and of progressive creation, nearly the whole mystery will be cleared up. But once more I must insist, that the nerves and brain must be considered as developed *from* the body, and as superadded to it in a progressive manner, to specialize and economize its functions; and that no part of the brain is necessary, neither in man nor in any animal, for the performance of mere bodily functions.

If we search curiously for the lowest and simplest organism with which the animal creation commenced, we find it to be a mere aggregation of cells, which are all apparently as much alike as the cells of honeycomb; but they have the power of moving in response to stimulus, though, perhaps, they do so unconsciously. Motion is no longer considered as a distinctive characteristic of animals; for many undoubted vegetables have the power of moving, by means of cilia, or hair like limbs, in the same way as some animals do; nor is it by any means certain that all animals are conscious.

The next step in the organic progress brings us to an animal that has one part which performs the office of stomach, and another which occupies the place of a mouth. There are no nerves that can be perceived, yet the animal manifests the impulses that relate to nutrition, and moves as if it has the senses of taste and touch. The function of reproduction, or multiplication, in these low creatures, is performed after the manner of the lower class of vegetables.

FIGURE 32.

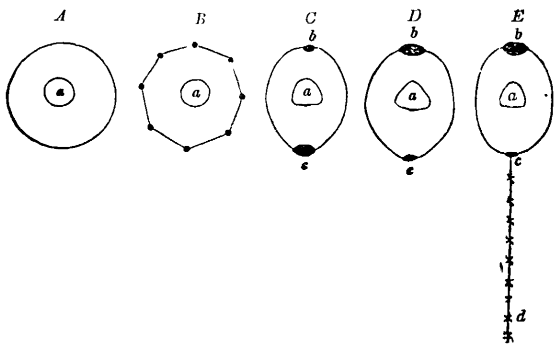


FIGURE 32. *a*, Mouth. *b*, Supra asophageal ganglion. *c*, Infra asophageal ganglion. *d*, Equivalent of spinal cord.

The lowest nervous apparatus that has been observed is in a species of radiated animals which have a simple ring around the mouth, *a*, apparently composed of corpo-neurine, with which nerves are connected, to regulate the motions necessary to get food into the mouth. This is illustrated by the diagram, Fig. 32; *A*. The common starfish, whose nervous organism is represented by the diagram, Fig. 32, *B*, has a similar ring around the mouth, *a;* but the corpo-neurine is concentrated into distinct centres, which all appear to be alike. No one centre among them can be regarded as a common centre.

Proceeding a little further upward in the scale, we come to the lower mollusks, a class of animals that have the corpo-neurine concentrated into two ganglionic centres, Fig. 32, *C*, *b* and *c;* the largest of which, *c*, is below the throat, *a*, and has nerve fibres which connect it with the digestive functions. The smaller ganglion of the two, *b*, is the centre of the nerves of the external senses. The two centres, together, constitute the homologue, or equivalent of the human oblongata, and therefore are worthy of particular consideration—see the figures of the acidia mammillata, and of the crabfish, Fig. 36–37.

In the next stage of progression, Fig. 32, *D*, we find another class of animals—the higher mollusks, such as the nautilus—in which the ganglion, *b*, above the throat, *a*, in which the external senses terminate, is larger than the ganglion, *c*, below the throat, in which the nerves from the stomach and body terminate.

One step higher, we have a class of animals—the articulates, such as the caterpillar—in which there is a series of aconscious centres, Fig. 32, *E*, *d*, for locomotion, appended to the oblongata. This is the homologue, or equivalent of the spinal cord of man and other vertebrates.

Before we proceed to speak of the vertebrated division of the animal kingdom, let us remark, that hitherto the progression has been of the nature of concentration—*A* representing the corpo-neurine diffused equally through all parts of the ring; in *B*, it is concentrated into a series of distinct ganglia; in *C*, it is concentrated into two ganglia only; in *D*, the upper ganglion is comparatively the larger; in *E*, it is larger still, and there is an addition of a series of aconscious spinal centres.

It should be stated, that in the lowest animals in which the spinal cord is observed, the corpo-neurine is diffused equally throughout its whole course, as in the ring, Fig. 32, *A*. In higher classes of articulates, the corpo-neurine is concentrated into a series of ganglia equally large, as in Fig. 32, *E*, *d*. In all vertebrated animals, including man, the corpo-neurine is contained in the spinal cord in a continuous body, from its lowest (posterior) part to the oblongata; and though its quantity is greater in some parts of the cord than in others, it is in no instance broken up into distinct masses, or ganglia.

It should also be stated that there is, in the invertebrated animals, a continual tendency, from the lowest to the highest, to concentrate the two masses above and below the throat, Fig. 32, *E*, *b* and *c*, into one mass, or centre. In the very highest invertebrates, they approach very near each other; and when we come to the vertebrated animals, even in the lowest fishes, the two masses are so perfectly fused into one, that no physiologist has hitherto treated the upper and lower parts of the oblongata as distinct parts fused thus together, but differing in function.

It should also be observed, that, in the articulated animals, the aconscious spinal centres, Fig. 32, *E*, *d*, are more numerous and smaller in the lower species, and they continue to concentrate, becoming fewer but larger, until, in some of the higher articulates, as the spider or the crabfish, Fig. 37, 2, the whole spinal cord is concentrated into one ganglion of wonderful potency, which is greatly in contrast with the numerous but weak ganglia of the centipede, or the worm. The reader will not fail to remark the beautiful illustration which this progression presents, of the great law of economical concentration.

There is another most important circumstance that must be referred to, respecting the invertebrated animals, which is, that some of the highest of them have potentive ganglia on their nerves of special sensation, particularly upon the optic nerve; and, furthermore, they have homologues, or equivalents of the pro-vital, or sympathetic nerves. Indeed, the highest invertebrates may be said to have every essential part of the nervous organism that the lowest vertebrates do, except the brain proper, and that they do not possess.

We now come to speak of the vertebrate division of the animal kingdom, which is, of course, exceedingly interesting, from the fact that man belongs to this division; and, having seen the invertebrates progressively rising, until they approach the lowest vertebrates, let us now commence with the lowest vertebrates, and observe how they gradually progress, until they culminate in the highest parts of the human brain.

The lowest known vertebrate is a fish — the amphioxus — which, although it is constructed upon the vertebrate plan, and on that account takes rank above all the invertebrates, it is, notwithstanding, very much inferior to many of them. This creature has a spinal cord, enclosed in a rudimentary vertebra; it also has most of the cranial nerves terminating in an oblongata, but is entirely destitute of anything like a true brain. This animal is an object of great interest and curiosity to physiologists; standing alone, as it does, among vertebrates, in being destitute of brain, and ranking at the bottom of the series of which man constitutes the head. From this starting point, let us proceed to observe the development which distinguishes the next higher fishes.

FIGURE 33.

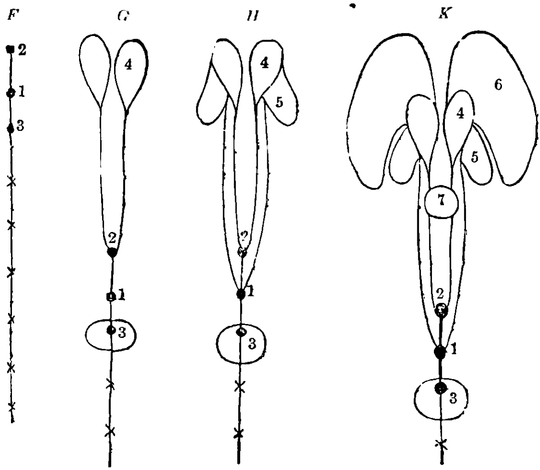


Fig. 33, *F*, is the first of a series of diagrams, intended to illustrate the vertebrate progression. The series of crosses represent the aconscious spinal centres in the spinal cord; above these are the three centres in the oblongata, which lie at the foundation of the three great divisions of the brain, being also the terminating points of the three classes of nerves from the face and body which relate to the three classes of functions — Directive, Ipseal, and Social. The most anterior centre, 2, is the terminus of the external senses in the oblongata. The middle centre, 1, is the terminus of the vagus nerve from the stomach and lungs. The most posterior, 3, is the terminus of the posterior column of the spinal cord. This diagram is a good representation of the principal centres possessed by the amphioxus, which has a spinal cord, oblongata, and nerves, but no brain.

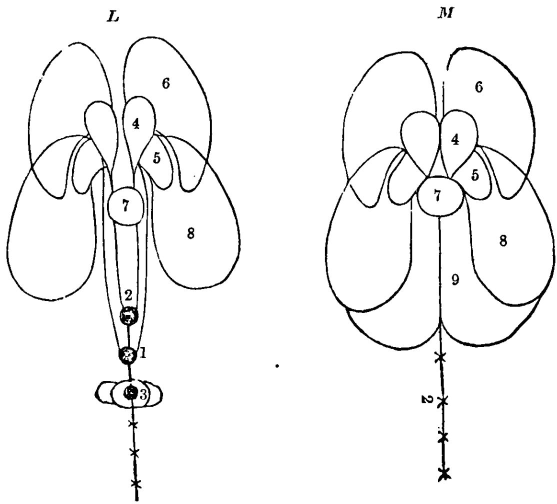
The next diagram, Fig. 33, *G*, represents the base of the brain in its lowest and simplest form, as possessed by all the lowest fishes, except the amphioxus. Around the centre, 3, is developed a small cerebellum, which is related to social movements. The rudimentary brain, or striatum, 4, is represented as developed out of 2, the part of the oblongata in which the nerves of the external senses terminate. It is presumed that the whole of the brain proper of the lower fishes, 4, is related to the functions of the external senses, and constitutes the foundation, or germ, of the Directive class of the phreno-organs of higher animals.

Diagram, Fig. 33, *H*, represents all the parts that diagram *G* does, with the addition of the claustrum, 5, which is developed from the centre, 1, in the oblongata in which the vagus terminates, and constitutes the foundation of the Ipseal class of phreno-organs. This diagram represents the degree of development reached by most of the higher fishes, as the sharks and skates.

The diagram, Fig. 33, *K*, is the same as *H*, with the addition of a rudimentary cerebral lobe, 6, developed from 4, the striatum, and, also, the addition of, 7, a rudimentary thalamus. This is a representation of the degree of development reached by the brains of reptiles.

The diagram, Fig. 34, *L*, is like the diagram *K*, with the addition of 8, the middle lobes, developed from 5, the claustrum. The cerebellum, 3, has also received the addition of a lateral part, or lobulus. This is a good illustration of the degree of development which characterizes the brains of birds.

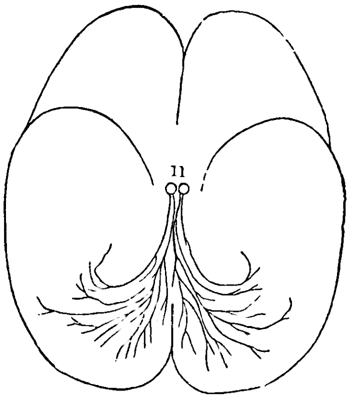
FIGURE 34.



The diagram, Fig. 34, *M*, is like the diagram *L*, with the addition of posterior lobes, 9, which develop from 7, the thalamus. The cerebellum is left out of this diagram, to give a better idea of the manner in which the posterior lobe of the cerebrum is developed backward. It will be observed that the anterior lobe, 6, and the middle lobe, 8, are also represented as developed, from the point of their origin, backward.

The diagram, Fig. 35, shows the fornix — a branching system of fibres, developed backward from 11, the two small round mammillary bodies, and also from the thalamus, which is left out of this figure. It will be seen that the fibres of the fornix not only develop backward, but they also turn again, and develop forward at their extremities.

FIGURE 35.



These last two diagrams of the base of the brain are representations of the parts as developed in man and other animals of the class mammalia.

There is a curious law which regulates the creation of new organs, and the development of old ones, as animals rise in the scale of organization, which may be expressed thus: new organs are always small in the animals of the class in which they first make their appearance, and, also, in the class next above them; but in the third class above that in which they first appear, they are always large. The following are some of the illustrations of this law:

1. The aconscious central ganglia, commenced in the radiates, were larger in the mollusks, and unequaled in the articulates.

2. The potentive optic ganglia, commenced in the mollusks, somewhat increased in the articulates, and are unsurpassed in the fishes.

3. The verm of the cerebellum and, also, the striatum

commenced in fishes, are not large in any of the reptiles, but in birds are comparatively larger than in any other animals.

4. The thalamus, and anterior and middle cerebral lobes, commenced in reptiles, are not large in birds, but in the porpoise, and other cetacea, are enormous.

I know of no instance in which a new nervous organ is introduced and brought to perfection in the same class of animals, nor in the class immediately above them.

Another law is, that instincts originate in the bodies of lower animals, and are transferred to the brain in higher classes of animals.

1. The lowest animals have no nerves nor brains, yet they manifest some of the very same instincts that animals do which have brains. Of course the instincts of such animals must reside in the bodily organs: thus the faculties, phrenologically named Alimentiveness, Amativeness, Sanativeness, and the senses of taste and touch, are manifest in the lower radiated animals, though they have no perceptible nerves, and certainly no brains.

2. The higher invertebrates, though they have nervous systems that are highly developed, are entirely destitute of those parts which, in man and other vertebrates, are called brains. They have no cerebrum nor cerebellum, and only a spinal cord and oblongata, with nerves of external and internal senses. It must be evident that the impulsive faculties which they manifest reside in the bodily organs, and have not yet been transferred to a brain.

FIGURE 36.

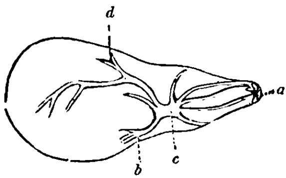


FIGURE 36. Ascidia mammillata, an animal a little lower in the scale of progression than the oyster, and is essentially a mere stomach, into which food enters at the mouth, *a*, and if not used, passes out at *b*. *c*, Is the homologue or equivalent of the oblongata of higher animals. Below the oblongata, *is d*, a stomach-nerve, or vagus. Above is a mouth-nerve of taste and motion.

Let us reflect a moment upon one of these brainless animals, which have only a series of central ganglia, and afferent and motor nerves, connected with them. One of their central ganglia, which does not apparently differ from the others, is located in the head, and is the terminus of nerves from all parts of the body. This is, doubtless, the conscious centre of the senses, and affords a perfect demonstration of the proposition, that a single centre contains the principle of consciousness, and that all sensory nerves, of all kinds, must terminate in one centre. It occupies precisely the situation which the oblongata does in man — namely, in the head, at the top of the spinal cord. It receives all the nerves of the external senses, and all the nerves of the internal senses; and it sends forth all the nerves of voluntary motion. Some of these animals manifest quite as much intelligence as any of the fishes, and a much greater variety of instincts. It seems to me that the conclusion is irresistible, that the bodily organs themselves are the local habitations of the instinctive impulses of these animals, and that brains are not *neces-*

sary, therefore, for their manifestation. A nerve from the stomach can convey, like a telegraphic wire, an alimentary impulse from the stomach to the conscious centre in the head, and, through the motor nerves, cause a motion of the limbs and mouth, which will result in obtaining what the stomach needs. This is the impulse of Alimentiveness, and it resides in the stomach, though the capability of consciousness resides in the head. So, too, the optic nerve can convey impressions from the external world to the conscious centre, giving the animal the idea of form, distance, and color, to guide its motions with quite as much accuracy as those animals manifest that have the largest brains.

FIGURE 37.

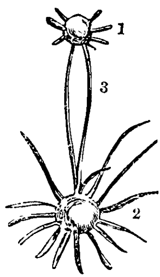


FIGURE 37. Nervous system of the crab-fish. 1, Is the cephalic, or ganglion of the senses, which is situated in the head, above the throat. 2, Is a ganglion in which all the nerves relating to locomotion centre. This is situated in the body, and connected with the ganglion, 1, in the head, by two slender nerves, 3, which, with the ganglia, constitute an oblong nervous ring. The ganglion, 2, is, in effect, a whole spinal cord concentrated into one aconscious ganglion, which surpasses in size the conscious centre, or oblongata, 1, in the head.

The spider has a similar nervous system; but animals which are lower in the scale of organization, such as the caterpillar, earthworm, and centipede, have a great number of spinal centres, and limbs, which produce the same results in a much less powerful, concentrated, and economical manner.

We must not forget nor neglect the important lesson that we learn here, which is, that a brain is not necessary to the existence and manifestation of the perceptive faculties, nor the instinctive propensities; that no organs are necessary, but nerves, and a minute conscious centre, not larger than the head of a pin. That consciousness does reside in this centre, and in no other, is proved by cutting off the head, and observing that the head still manifests consciousness and intelligence, but that the body moves without intelligence: though its movements appear to indicate a purpose, they are, really, only automatic, or mechanical.

The highest articulated animals differ from the lowest, in having fewer central ganglia; but what few they do have possess a greater quantity of corpo-neurine. There are no animals in existence that have such large central ganglia in proportion to the size of their bodies, or in proportion to the other parts of the nervous organism. The highest animals of this class differ from the lowest in another important circumstance; and that is, in the possession of potentive ganglia, especially upon the optic nerves.

The optic nerve, in these animals, terminates in the oblongata; the ganglion is near the eye, leaving a long stem or stalk between it and the oblongata.

When we proceed from the highest articulate animal to the lowest fishes, we find, first, the amphioxus, manifesting whatever faculties it possesses, without brain; and the next higher fishes, (Fig. 10, perch,) with brains, indeed, but so small, imperfect, and rudimentary, that we are at once reminded of the ability manifested by the invertebrated animals that dispense with brains altogether, and yet manifest more instincts than those fishes. I have no idea, that even the faculties of the fishes are restricted to their small brains, while a scorpion surpasses them without any; and a porpoise, without much more variety of talent, has a brain many times larger than that of the largest and most intelligent fish. By the same reasoning which enables us to account for the manifestations of invertebrates without any brains at all, we can surely arrive at the conclusion that the fishes are not entirely dependent upon what little brains they are endowed with, but derive some part of their impulsive manifestations from the same bodily source from whence the articulates derive all their instinctive powers; and that the mammals have the same powers transferred to a brain, and there modified and somewhat elevated in their character.

Before we can be prepared to understand the functions performed by the imperfect brains of the lower animals, and the reason why they are increased in size and complication in higher animals, we must recognize another law of the nervous organism: which is, that in the series of animals, *the development of the organs of the brain follows that of the corresponding organs of the body, and does not, in any instance, precede it.* When we see any class of animals manifesting an instinctive faculty, without any corresponding organ of the brain, we shall find the organ developed in some degree in the brains of the class above them, and in the highest degree in the third class above them. We often see animals with bodily organs adapted to certain faculties — such as nutrition, or reproduction—while the mental organs that relate to them in the brain, are either undeveloped or comparatively small; but we never find a class of animals in which a mental organ is developed in the brain, and the corresponding bodily organs wanting. On the contrary, the brain keeps, in point of time, continually behind the body, until we come to man, the very highest of animals, when, indeed, the body is frequently surpassed by the brain in its degree of development, especially in the highest order of men.

FIGURE 38.

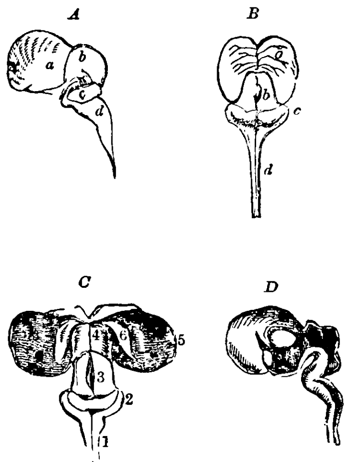


FIGURE 38. Four views of a human brain, six months before the time of birth. *A*, Side view. *a*, Cerebrum. *b*, Optic ganglion. *c*, Cerebellum. *d*, Oblongata. *B*, Top view — references same as *A*.

C, Top view, with the hemispheres reflected, or pushed back, to show the submental organs. 1, Oblongata. 2, Cerebellum. 3, Optic ganglion. 4, Thalamus. 5, Cerebrum. 6, Striatum, imbedded in the cerebrum, as it is in birds.

D, A longitudinal section in the median line, showing that the spinal cord and oblongata are hollow, as in fishes. It will be observed that the cord has the appearance of being bent up in a serpentine manner, as if to shorten and accommodate itself to the small space into which it is crowded. We can easily understand from this, that the parts in the back and front of the human brain are crowded out of their natural places, to make them occupy a shorter skull.

It is one of the most eurious and instruetive discoveries that has ever been made, that the organisms of all the higher animals, before birth, pass through a series of progressive stages of development; so as to resemble, sueeessively, all the animals of the same type that are below them in the organie scale. It is not only true of the animal as a whole, but of each and every organ of which the animal is eomposed. Human brains, for instance, commenee by assuming a form like those of the lowest fishes; then like those of reptiles; then, sueeessively, like the birds, the lower mammals, the higher, then monkeys, savages, and eivilized men. At its birth, the head and features of an infant remind us of the ourang; then, gradually it improves for at least twenty-five years. The process of gradual development, which commenees long before birth, eontinues till full maturity, under the operation of a regular law of our nature. I have sometimes thought that children and youth naturally manifest the imperfeet eharaeters which their savage aneestors did ages ago; and that, just as before birth they suceessively resemble the different degrees of animal development, so, after birth they go through the different stages of human historie progress, and do not acquire the peculiar charaeteristics of their times, until they arrive at full maturity.

I am certain that those phrenologists are mistaken, who teach that the exercise of eerebral organs will cause them to grow so as to become sensibly larger in a few years or in a lifetime. But a long series of observations have led me to the conclusion that some eireumstances, which are, in a great measure, under our own control, can cause development to be arrested before it has consummated its work, and leave the individual far inferior to the ancestors from whom he derived his organization. On the other hand, circumstances may be made to favor certain developments, so as to carry them to a point equal to the highest capabilities of any of the ancestors, and éven somewhat higher. If the seeds of a plant and the eggs of an animal are to be regarded as the concentrations, or coiled up representatives, of the plant or the animal itself; and if each successive generation transmits to the next the impressions which it receives, then we may regard the development of one of our children as the gradual uncoiling of our ancestral panorama, with the privilege, by means of educational impressions, of varying the lights and shades of the picture according to the suggestions of experience.

The brain of man is developed in three stages, as if it were three distinct brains of different degrees of dignity. 1, The proto-conscious, consisting of potentive ganglia on the course of the nerves of sensation, some of which are so imbedded into the oblongata as to seem to be a part of it. The conscious centre is the terminus of all these nerves. The proto-conscious potentive ganglia on the nerves differ from the higher organs of the brain in being on the lower, or body side of the conscious centre. 2, The submental organs are, physiologically, continuations of the nerves of sensation up into the skull. They relate to the same functions as the proto-conscious nerves, from which they are derived, and are, as it were, projected from them to the upper side of the conscious centre. 3, In the same way the cerebrum is a still higher projection, or development, from the proto-conscious senses and the submental organs. We may convey the idea by comparing the whole brain to a pyramid three stories high, with its apex downward. The lowest, or proto-conscious story is the oblongata; the second, the submenta; the third, the supermenta, or cerebrum. The figure of the pyramid will convey the idea still better, if we conceive that the three stories are all devoted to the same purposes, but that the higher are more commodious, and command more extensive views. The lowest story, or oblongata, was possessed by the invertebrates; the second, or submenta, by the fishes; and the third, or supermental cerebrum, by higher animals.

Let us enumerate all the essential contents of the crania of mammals, according to the order in which they appear to have been created:

1. The oblongata, with the vagus and glosso-pharyngeal nerves — as represented by the ascidia mammillata. (See Fig. 36.)

2. All the other nerves that are connected with the oblongata, including the spinal cord — as in the lower articulates.

3. The potentive ganglia on the optic nerves — as in the higher articulates.

4. All the other potentive ganglia, and the verm and striatum — as in the lower fishes.

5. The claustrum — as in the shark and skate.

6. The thalamus, and anterior and middle cerebral lobes — as in the reptiles.

7. The lobulus of the cerebellum — as in birds.

8. The fornix, and the posterior optic ganglia — as in the birds and the kangaroo.

9. The callosum, or commissure of the cerebrum — as in the rodents, or gnawing animals.

10. The ourlet, or superior longitudinal commissure, and the posterior lobes — as in the higher mammals.

11. The highest phreno-organs — as in man — which constitute the convolutions.

FIGURE 39.

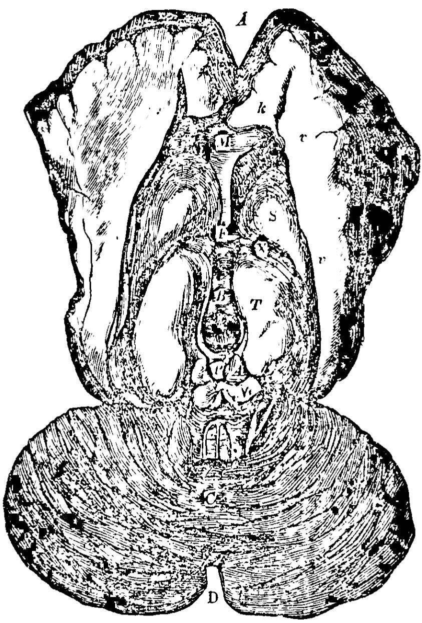


FIGURE 39. Top view of submental organs; the cerebrum above being cut away. *A*, Anterior. D, Posterior part. *S*, Striatum. *T*, Thalamus. *C*, Cerebellum — the letter is on the superior vermiform process. *v v*, Parts of the cerebrum around the great lateral ventricles. *k*, Anterior cornua, or continuations of the ventricles. *X*, Tenia semicircularis. *F*, *Anterior* pillar of the fornix, where it turns down to form the mammillaria. *B*, Middle commissure. *A*,

N, Optic ganglia. *P*, Pineal gland, with its peduncles, or connecting fibres. *M*, Place where the fornix unites with the callosum in front.

This figure gives a good idea of the relative positions of the cerebellum, thalamus, striatum, and the cerebrum; and it enables the student to understand how the ventricles can be formed by the cerebrum developing over the submental organs.

The submental organs all have this in common, that they each represent a distinct class of bodily functions, and each receives, through the oblongata, stimulating impressions from its own department of the body, by a special class of nerves.

Let us enumerate them in their order of arrangement, from before, backward :

1. The striatum represents the external senses, and receives stimulus from them through the nerves of those senses.

2. The claustrum represents the nutritive viscera, and receives stimulus through the vagus, and through those nerves of common sensation which relate to immediate bodily preservation.

3. The thalamus represents the organs of the body which relate to offspring, and receives stimulus from them through the posterior column of the spinal cord.

4. The lobulus, or lateral portion of the cerebellum, represents the sexual department, and gives the conjugal impulse. It receives its stimulus through the posterior and lateral parts of the spinal cord.

5. The verm, or lower central portion of the cerebellum, represents the lower extremities, and receives impressions from them through the posterior column of the spinal cord.

FIGURE 40.

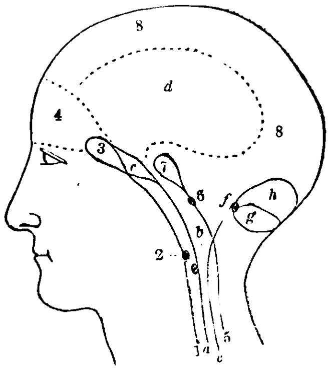


FIGURE 40. This is an ideal representation of the whole brain, showing its three progressive stages of development, proto-conscious, submental, and cerebral. 1, Anterior column. 2, terminus of the nerves of external sense in the oblongata. 3, The striatum, which is related in function to the external senses; and also to 4, the anterior lobe of the cerebrum, which is developed from 3, the striatum. *a* is the vagus, or Ipseal nerve, which terminates in *b*, the oblongata just below 2. *c* Is the claustrum, which is related in function to the vagus, and to the Ipseal class of cerebral organs, d, developed from the claustrum and the middle lobe. 5, The posterior pyramid of the oblongata. 6 is the niger, or lowest ganglion of the parental impulse. 7 is the thalamus, which is also related to the parental impulse. 8 Is the social class of cerebral organs, developed from the thalamus. *e* Is the restiform column of the oblongata. *f* Is the rhomboideum, or lowest ganglion of the cerebellum related to the social instincts. *g* Is the submental organ of Equi-motion. *h* The submental organ of Amativeness.

This figure illustrates my idea of the whole anatomy and physiology of the brain. 1 2 3 4 Represents the whole Directive class, progressing from 1 to 4 in the anterior part. *a b c d* Represents the Ipseal class and its progression. *e f g h* Represents the locomotive and sexual department. 5 6 7 8 Represents the parental and higher social department.

The Cerebrum commences distinctly, first, in reptiles, to develop from beneath the striatum. In birds, it extends upward and laterally, but confines itself to the region of the striatum and claustrum. In birds, and the lowest mammals, it commences forming connections, by means, in part, of an apparatus of fibres, which is called the fornix. In proportion as the bodily organs that relate to offspring become developed, the thalamus, fornix, and posterior part of the cerebrum, increase.

I here introduce a series of brains of different animals, progressing in development from the codfish to the baboon, showing the manner in which they rise in organization.

FIGURE 41. *A*, Brain of a codfish, dissected to show the continuation of the spinal cord up into the oblongata, and then still further up, to unite with the olfactory nerve. *o*, Olfactory nerve. *m*, Striatum. *x*, Optic ganglion. *a*, Cerebellum, *c*, Oblongata. *s*, Spinal cord.

B, Brain of the carp, seen from above. 1, Potentive ganglion on olfactory nerve. 2, Striatum. 3, Optic ganglion. 4, Ganglion, function unknown. 5, Cerebellum. 6, Auditory ganglion. 7, The ganglion of the vagus. This fish is remarkable for the distinctness of its potentive ganglia on its nerves of special sense, and yet its striatum and cerebellum are very small. 8, Oblongata. *s*, Spinal cord.

C, Brain of the skate, seen on its under surface. 1, Olfactory nerve, terminating in, 2, the claustrum, or lateral part of the striatum. 3, The striatum proper. Below 4, is the pituitary gland, which is very large in fishes. 5 Is the oblongata, which is very large, compared with the rest of the brain. 6, Optic ganglion.

D, Brain of a tadpole, or young frog, from Grant. 1, Striatum 2, a small thalamus. 3, Optic ganglion. 4, The cerebellum, which is very small. 5, Spinal cord.

E, Side view of the brain of the turtle. 1, Olfactory nerve, with a large potentive ganglion on it. 2, Cerebrum, in which is inclosed a striatum and thalamus. 3, Pituitary gland. 4, Optic ganglion. 5, Cerebellum. 6, A part of the oblongata.

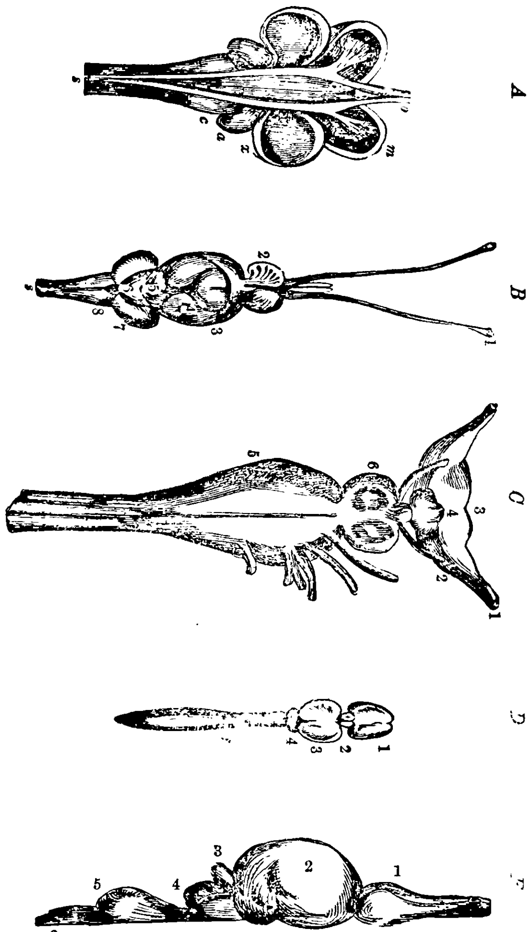


FIGURE 41.

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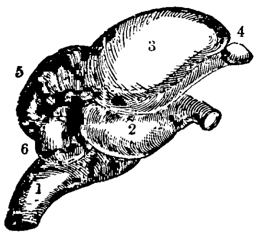
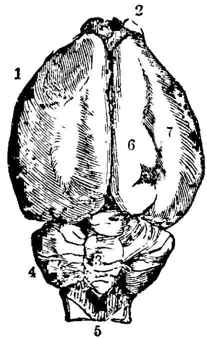
Fig. 42. *F*, Side view of the brain of a bird. 1, Oblongata. 2, Optic ganglion. 3, Cerebrum, which conceals a striatum and thalamus 4, Olfactory potentive ganglion. 5, Verm of the cerebellum. 6, Lobulus of the cerebellum.

FIGURE 42.

F.



G.



G, Top view of the brain of a beaver. 1, Region of Constructiveness, where the beaver is full and the rabbit is narrow. 2, Olfactory ganglion. 3, Verm of the cerebellum. 4, Lobulus of the cerebellum. 5, Oblongata. 6, 7, Between these figures is a small rudimentary convolution, indicating lateral pressure.

It is an interesting fact, in regard to both animals and men, that, when they change from a pastoral to a mechanical mode of life, or from the condition of wanderers to that of citizens and builders, they become wider in the temporal region. Ethnologists have lately made the observation, that the first inhabitants of England were not mechanics nor warriors; and their skulls are narrow. The next were warriors, and their skulls are wide at the base behind; those of the present industrial ruling race are wide above in front. Phrenology will give a solution of all these various problems, and I commend it to the consideration of those learned ethnologists to whom we are indebted for these curious observations.

FIGURE 43, H.

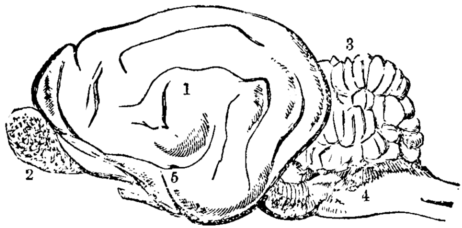


FIGURE 43,H. Side view of the brain of a common cat. 1, Cerebrum, showing simple convolutions, or folds in the brain, such as would be naturally produced by pressure from side to side, and afterwards from front to back. 2, Olfactory ganglion. 3, Verm of the cerebellum. 4, Oblongata. 5, Fissure of Sylvius.

FIGURE 43, I.

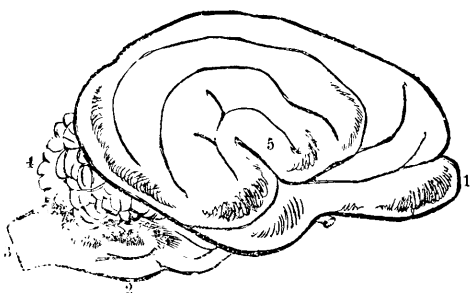


FIGURE 43,I. Side view of the brain of a fox. 1, Olfactory ganglion. 2, Oblongata. 3, Spinal cord. 4, Cerebellum. 5, Cerebrum. The brain of the fox is very much like that of the cat, but larger, and a little more complicated in its convolutions.

FIGURE 44.

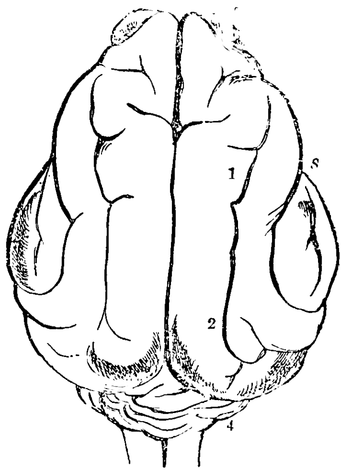
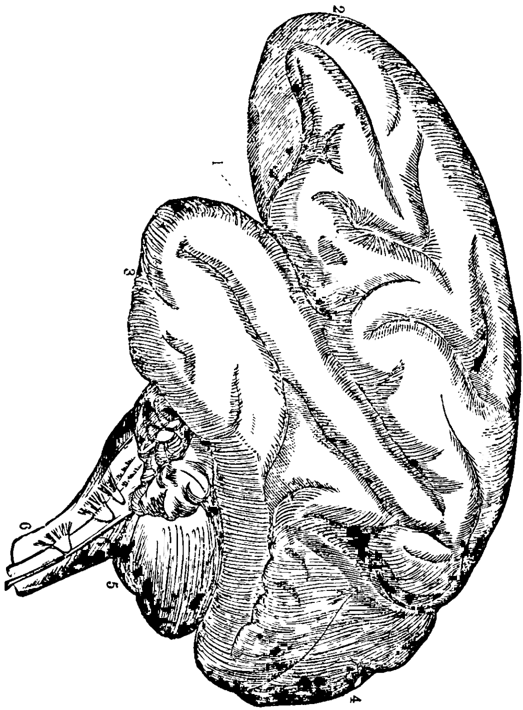


FIGURE 44. Top view of the fox's brain. *S*, Fissure of Sylvius. 1 2, Longitudinal convolutions — the transverse convolutions being merely rudimentary. 3, Olfactory ganglion. 4, Cerebellum.

FIGURE 45. Side view of the brain of a baboon. 1, Fissure of Sylvius. 2, Anterior lobe. 3, Middle lobe, enormously developed. 4, Posterior lobe, developed beyond the cerebellum. 5, Cerebellum. 6, Oblongata.

I know of no animal that has the base of the anterior, middle, and posterior lobes, so strongly marked, while the upper part is so low. Nature, in no case, perfects the higher organs, until she has developed the lower organs to their highest point in lower animals; and this brain of the baboon is an illustration of the law. Perhaps it would be more correct to say that higher organs are not added until the lower are expanded to excess.

FIGURE 45.



In this section, I have treated of the progressive creation of the brain and its parts, in a general manner, and given a series of comparative illustrations; but it is necessary to review the same parts again more particularly, and consider some difficult questions concerning cerebral physiology, from a new point of view. This will occupy the two following sections.

SECTION VI.

PHYSIOLOGY OF THE SUBMENTA,

INCLUDING THE STRIATUM, CEREBELLUM, CLAUSTRUM, AND THALAMUS.

I HAVE ascribed to the striatum a functional connection with the external senses and, also, with the anterior cerebral lobe; and there appear to be abundant reasons for doing so. It is the first developed submental organ anterior to the cerebellum; and we find it to be a rule without exception, that those bodily organs of the lower animals which are in the most perfect state of development, are, in the progress of creation, first represented in the nervous organism and brain. If we apply this rule to fishes, the animals in which the striatum makes its first appearance, we find the external senses of sight and smell quite as perfectly developed as in any of the higher animals; which can not be said of any other organs possessed by fishes. Next to these two senses, are the organs of locomotion; accordingly, the largest nervous masses in these animals are the spinal cord, and the ganglia of sight and smell. The cerebellum of the fish is unquestionably superadded to the spinal cord, and especially to the posterior column of the cord. This is demonstrated by the fact that the restiform (rope-form) bodies, as they are called, directly connect the posterior spinal column with the cerebellum.

The prevailing notion among physiologists is, that the cerebellum is the centre of locomotion, and the striatum, of voluntary motion. I must oppose these ideas, when expressed in this form, for the reason that I can not admit, that any ganglion, or mass of corpo-neurine, is exclusively motor in its function. Even if a central ganglion may be denominated a motor, because it *mediates* between sensation and motion, it must still be considered as relating to a sensation, quite as much as to a motion. It is surely unphilosophical, to speak of the striatum as the exclusive ganglion of one kind of motion, and the cerebellum as the ganglion of another, if there is no such thing as a purely motor ganglion; and nothing is more certain than that the physiologists who have spoken of motor ganglia *per se*, have merely *assumed* their position, without even an attempt to establish it by evidence. It is well that they did so, for there is not a shadow of evidence that any exclusively motor ganglion exists. It seems to have been a favorite idea of physiologists, that the corpo-neurine of ganglia generates a nervous force, which acts upon muscles, and that the vigor of muscular motion is proportionate to the quantity of corpo-neurine which is developed at the commencement of a motor nerve. This erroneous theory, having taken possession of their minds, infects all their physiological explanations of the nervous organs. Thus, *Solly*, finding a large ganglion (*locus niger*) in the cerebral crus, near the origin of the third motor nerve of the eye, presumed it to be the ganglion of that motor nerve; and *Dr. Carpenter* adopts the suggestion. Again, finding a large ganglion in the oblongata, (the olivaria,) situated near the root of the motor nerve of the tongue, *Solly* deems it quite probable that it is the ganglion of the motor of the tongue. By the same kind of reasoning, physiologists have brought themselves to conclude, that the striatum is the ganglion of voluntary motion, because the anterior columns of the spinal cord appear to be connected with it.

The truth appears to be, that one part of the brain is related to motion as much as another, and that each part is related to some *modification* of motion. Is it not palpably unphilosophical to speak of one organ, the striatum, being devoted to voluntary motion in general, and another, the cerebellum, to voluntary locomotion in particular; a third, the locus niger, to eye motion, and a fourth, the olivary body, to tongue motion? Let us recur to the simple alphabet of physiology, and learn to correct this erroneous interpretation of the language of nature.

The lowest nervous organisms, in the radiates and articulates, exhibit central ganglia, equally related to afferent and motor functions. No potentive ganglion is any where, in any animal, found upon the course of a motor nerve; but they are found upon sensory nerves. Does not this single fact speak to us in the plainest possible terms, and say, that ganglia are more intimately related to nerves of sensation than to those of motion? The ganglia upon the nerves of sight are larger, in some of the fishes, than all their other ganglia and brain combined; yet these animals are remarkable for their powers of locomotion and voluntary motion. But where are the ganglia from whence those motions proceed? and why should the ganglion of sight be larger than all the ganglia of motion combined? If the striatum is the mere ganglion of voluntary motion, and the cerebellum, of locomotion, then the fish that has no brain beside the striatum and cerebellum, must have his whole brain devoted to motion only, and have no room for any other mental function. Surely no one will pretend this. But it is said, that the central part of the cerebellum is proved to be specially related to locomotion, by being large upon animals that are most remarkable for their locomotive exploits. This is true; but it is not sufficient proof that the cerebellum is the ganglion of locomotion; or, if it is, it equally proves that the striatum is devoted to the same function: for there is not an animal that has the central "verm" of the cerebellum large, that has not the striatum large, also, and at the same time a large development of either the optic or olfactory ganglion.

The advocates of the locomotion theory claim, that certain experiments which have been performed by mutilating the cerebellum are unanswerable arguments in favor of their views; but the reply is sufficient, that—1st, insects perform quite as great exploits of locomotion, without any cerebellum, as birds, or any other animals, do, with one. The manifestations of insects prove, indeed, that the brain is not necessary to any motion whatever. It neither combines nor coördinates the muscles, nor gives them voluntary nervous energy. 2d, It is notorious that experiments by mutilation are exceedingly liable to lead to erroneous results in all cases; and, also, that locomotion is disturbed by the mutilation of almost any part of the brain. But *Dr. Carpenter* contends, that, after making all due allowances, the experiments show, that more disturbance of locomotion and the power of combining the muscles to preserve the equilibrium, is produced by an injury of the cerebellum, than by any other part of the brain. If we admit that this is true, the effects described by experimenters are more indicative of the disturbance of the *sensation* upon which locomotion depends, than of the power of locomotion itself.

THE BRAIN IS AN ORGAN OF SENSATION.

Its office begins and ends where its development does, and that is in the oblongata. It receives no nerves into any part of its substance, except those of the special sensation of sight and smell; and it gives origin to no nerve of motion whatever. The brain acts upon the oblongata, and that communicates motion to the nerves of motion. If the brain were an organ of motion, the larger the brain, the greater would be the vigor or continuance of motion; but the contrary is the fact; and we find that the men with the largest brains are the least inclined to muscular exertion, but spend most of their time in merely exercising their brains, and comparing their various impressions and memories with each other. The combination or condition of bodily organs which is least favorable for bodily exertion, and yet healthful, is most favorable for long continued and various, but not energetic, exercises of the brain. The use of the brain is, to prepare for bodily action, by preliminary sensations, recollections, and judgments. The more time there is spent in useful preparation, the fewer but more effective are the muscular exertions. The office of the brain may, therefore, be said to be, to economize muscular action, and to accomplish the requisite results with the fewest movements of the body, the feet, the hands, and the tongue. The lowest animals move constantly, but with little skill. As animals rise in organization, they move less constantly, but more skillfully, and economize nutriment by spending more time in sleep. Brains were added to the nervous organs of animals, not to increase the vigor, variety, nor continuance of their motions, but of their sensations and ideas. The motions of an opossum are as various as those of a dog; but his brain is not half as large, in proportion to his size. Man excels other animals in none of his motions—neither in their speed, complication, nor strength—but only in the results which he produces, as a consequence of his superior reasoning powers.

Any practical observer can soon satisfy himself, that the lower and central parts of the forehead are, in function, related to the external senses—to the memory of things felt, tasted, smelt, heard, or seen. This being settled, the next step is, to examine the anterior cerebral lobe anatomically; and when we do so, we find it directly developed out of the anterior and central portion of the striatum. Proceeding next to compare those parts in different animals, we find that the cerebral lobes become less and less, until we come down to the lower fishes, when we find that they have no cerebrum at all, but they have the striatum. Of course, we must conclude, that this striatum performs, in a limited degree and a general manner, the same functions which are performed by the anterior part of the cerebrum, in a more specialized manner. When we look into the heads of animals still lower than the fish, we find, that even the striatum is gone, and its place is occupied by a nervous mass, in which the external senses terminate, called the supra-œsophageal (above the throat) ganglion. (Fig. 32.) This simple ganglion, then, is the germ of the striatum, and of the intellectual organs in the human forehead. Let no one suppose, that the ganglion above the throat of the scorpion, or any other insect, is equivalent or homologous to the striatum, for it is not. What, then, in the human brain, is the equivalent of the insect brain? I answer, the oblongata.

If any good comparative anatomist will study the relative positions of these three centres in the heads of the highest invertebrates, and then consider the relative positions of the principal centres in the human oblongata, he will perceive that the part of the human oblongata where the trigeminus and glosso-pharyngeal terminate, is homologous or equivalent to the part where the nerves of taste and touch, in the invertebrate, terminate; the lower part of the human oblongata, where the vagus teminates, is analogous to the part where the stomach nerves of the invertebrate terminate; and that the posterior part of the human oblongata, which connects the spinal cord with the cerebellum, is homologous to the part in invertebrates where the locomotive nerves connect with their centre. The circumstance which renders it difficult to make correct comparisons between the vertebrates and invertebrates is, that the latter have all their internal organs apparently bottom upwards, so that, to make a proper comparison with the vertebrates, we must imagine them inverted—thus, they have the spinal cord under the belly, and the motor columns occupy the posterior part of the spinal cord, instead of the anterior, as they do in higher animals. Take the spinal cord, nerves, and brain of a scorpion, separate them from his body, and put them bottom upward into the empty cranio-spinal cavity of a mouse, and then crowd or concentrate the centres of the head so as to bring the supra and sub-æsophageal ganglia together, and we shall find, that we have almost a perfect vertebrate spinal cord and oblongata, with the principal centres in their proper places, as they were in the living mouse. Place the brain of the mouse back again into the skull, and we shall find that even the optie ganglia will be in the right plaee, nearly as they were in the original mouse, before the change was made. The brain of the fish is essentially like that of the scorpion, but has a rudimentary striatum and eerebellum added; and the nervous centres, which, in the seorpion, occupied the whole head, are, in the fish, concentrated into the oblongata.

ILLUSTRATION OF THE LAW OF ECONOMY.

The student will naturally inquire, why a striatum, or brain, was added, if animals could perform the same motions without brains. I answer, that the evident design of the Creator was eeonomy.

Let us announee and illustrate again the organie law, that economy of motion and nutriment is the object of all organie elevation. Just as the steam-engine whieh can produee greater results with less expenditure of fuel is superior to others, so is one animal superior to another on preeisely the same principle. Look at a centipede, and see the great number of feet whieh he uses for locomotion; then at a spider, with his eight legs, and see how nature reduees the number, to save the neeessity of nourishing them and moving them. This spider is fitted to live where the centipede would die. See the lowest fishes, devoting nearly all their time and bodily powers to motion, for the sake of nutriment; they give no time to regular, periodical sleep, for they have no leisure; they bestow no attention upon their young, for they require it all for themselves. Turn now to the reptile: he moves less, breathes less, eats less, and yet has a larger brain than the fish, and a more perfect organization in every way. This brings us to apply the principles of eoneentration and economy to the nervous organism. One of the most interesting illustrations of this progressive concentration is that furnished by the embryotic development of the highest of the class of articulate animals. They commence existence by assuming the most expanded and multiple form, and afterwards concentrate gradually, the centres becoming fewer but larger, especially in the head, until they reach the maximum. It will require but little reflection to convince any one, that each of these advances from multiplicity to unity of parts has economy for its object. The whole organization of the higher animal is calculated to make his movements fewer but more effective. For this reason, the ganglia and external instruments of the senses are made more perfect; the limbs are made less numerous, but stronger; the digestive apparatus is made more complicated, in order to render the process more economical, by preventing the waste and exhaustion of nutritive material. From the animals in which the digestive and respiratory organs are the most simple and imperfect, to those in which they are the most complicated and perfect, there is a regular progression in the arrangements for economy; and the obvious design of each advance is, to produce the greatest possible results with the least waste of exertion and expenditure of material.

The constitutions of all animals are divisible into two great systems of organs, namely, external and internal. The object of one is to perceive external objects, and act with reference to them; of the other, to receive the materials of nutrition, and assimilate them. Perfection in the nutritive system consists in producing the greatest quantity of good blood from the most crude and scanty materials, and keeping a quantity in store for future use. On the other hand, perfection in the volitional system consists in producing motions with the greatest possible results, under the most complicated circumstances, with the least exertion.

Now, once more, let us return to the brain, and consider its functions. After what we have found in the lower departments of the organism, we may confidently expect, that, if we rightly interpret this higher monument of creative wisdom, we shall find the same principle governing its developments and its functions, which is so apparent in the nutritive and motor organs—namely, economy

FIGURE 46.

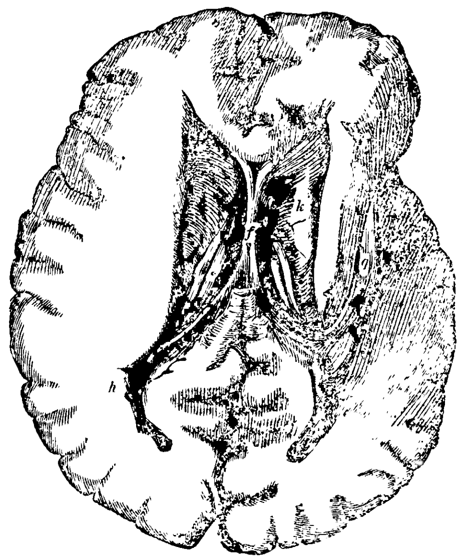


FIGURE 46. Horizontal section of the cerebrum. On the right side, the descending, or middle, cornua are seen. *k*, Striatum. q, Middle, or descending cornua. *s*, Tænia semicircularis. *h*, Posterior cornua, in which a part of the fornix can be seen, that devel-

ops directly back over the cerebellum. *f*, Body of the fornix. *q*, That part of the fornix which constitutes the floor of the descending cornua. The cornua, or horns, are merely valleys, or crevices, caused by the folding and pressing of the cerebrum against the sides of the submental organs.

ECONOMIC NATURE OF MEMORY.

The striatum is intermediate in function between the external senses and the anterior cerebral lobes, the external senses being lower, and the cerebrum higher in the scale. What economy was promoted by the addition of the striatum — the fundamental germ of the organs of memory—to the external senses? I answer, memory is economical. If we perceive an object, its form, size, color, and movements, and learn by experience, that it is injurious to us, and a year afterwards we see a similar object, we need not wait to learn again that it is injurious — memory saves us this trouble, not only so, when the object is far from our sight; we can call an image of it up in the memory, and take precautions with regard to it, as well as if it were present to our external senses. Memory is, therefore, economical of both motions and sensations, and prevents the necessity of their repetition.

This being so, the more this memorial region is developed and specialized, the less need is there for the development of the potentive ganglia upon the nerves of the external senses. In accordance with this philosophy are the facts of comparative anatomy — that is to say, the more the anterior lobe is developed, the less is the development of the potentive ganglia on the nerves of external sense. The porpoise, with his large brain, has very little more potentive ganglia than man. The fish has more than any other animal. The invertebrates, that have no brains, have large optic potentive ganglia; and I suspect, that, in these animals, the ganglia possess a low degree of the power of producing memory. Memory is the capability of being conscious of repetitions of impressions which have been previously made upon the mind. The power of reproducing impressions in this way appears to be exclusively the function of the fibres of the brain. The decomposition of the corpo-neurine probably causes a change in the structure of the nerve fibres, whenever they are impressed by an object for the first time. This change of the fibre becomes permanent, or chronic, so that, when the fibre is subsequently agitated by a new impression, it repeats the old one.

It is, however, impossible for us, at present, to understand the manner in which impressions are recorded in the brain, and afterwards again and again reproduced; but we can easily perceive the economical purpose which it serves, and that is the main object of the present enquiry. A potentive ganglion on a nerve is a contrivance for continuing impressions for a long time without exhaustion; in other words, it is a method of *repeating* them, while the object perceived is still present; but it is doubtful, whether it has the power of repeating those impressions in the absence of the object. Perhaps it has in some slight degree; for we see bees, spiders, and other brainless animals that have potentive ganglia, manifesting some degree of memory concerning the localities of their food and habitation. Memory is the basis of all experience, and the only means by which the past can be made a useful criterion and guide of the future course; this is true when applied to animals, and it is exceedingly important in relation to man, who has the memory of sounds or words in such wonderful perfection. The art of writing is an amazing addition to human power, when considered in this connection, as an aid to the memory, enabling man to record his experience for the benefit of his posterity. It renders the repetition of errors more avoidable, and unnecessary, for it teaches us that the same errors have been committed thousands of times before, and shows us the consequences. This is particularly true of social and political errors, which it requires ages for large communities to consummate, and ages more to atone. The highest organs of the directive or intellectual class—namely, Comparison and Causality, bestow a memory not so much of external things as of internal operations of mind, the memories of mental processes and conclusions. This is the maximum of intellectual economy, for it gives the power of remembering the concentrated generalities of the subject, instead of the minute expansion of special details; in a word, Causality is the highest centralization of intellect and memory; it bestows the power of distinguishing the essential from the unessential, remembering, and afterwards reproducing it.

It is the intellectual seed store, in which the individualities of the senses are generalized and concentrated in immense numbers and small space. Some men reproduce their ideas, as it were, by gemmation; they will give you a continual repetition of new things involving the same principle. Their thoughts are like the endless and fruitless vines that are continually extending by a repetition of similar parts. They claim to be prolific of ideas, and so they are; but, like the progeny of the fishes, one is a sample of the million. The man of independent spirit, with the higher reflective organs large and active, produces but few ideas; but those will lie in your mind, and expand, till your head aches.*

* There is a remarkable analogy between the nutritive organs and the mental, which deserves to be noticed. The mental functions are

The use of the brain, as a whole, is, to economize muscular movements, and yet secure the most important results. And here let it be repeated, that the brain was not created to *make* muscular movements, but, rather, to prevent the multiplication of them, by giving high qualities to those that it does permit. The animals that possess the bodily powers in the highest perfection produce the fewest young; but those to which they do give birth are the noblest in existence. So it is with those men who possess the mental organs in the highest degree of perfection: they make no false or useless movements; every step that they take brings them nearer to their home; every arrow which they discharge pierces the very heart of the subject; every word that they utter

divided into the Intellectual, or Directive, and the Impulsive. So, also, the nutritive are divided into the Digestive and Respiratory. The economic operations of the intellect resemble the digestive operations very closely. The perception of nerveless animals is parallel to the process of nutrition by absorption. The first created nerves are like the first created stomach, both destitute alike of differentiation. The first nerve centres are analogous to the stomach, with a neck above and an intestine below; the afferent nerve representing the neck, the central ganglion, the stomach, and the motor nerve, the intestine. The process of perception is analogous to that of eating; the process of comparison and memory, to digestion and assimilation; and of the expression of ideas, to that of reproduction. The productions of the lower perceptive faculties resemble the offspring of the lower species of animals by gemmation; the productions of the higher faculties are like the offspring of the higher animals.

The economic operations of the impulses of lower animals are parallel to respiration by absorption; those of animals with senses, without brain, are analogous to respiration by trachea — as in insects without lungs. The impulses of animals with low brains are like respiration with gills; the impulses of animals with higher brains are analogous to respiration with air-breathing lungs.

produces the intended effect. It is the small and imperfect brain that permits the multiplication of similar and useless acts and words. Let me impress this important law upon the minds of those who teach, that certain parts of the brain are merely the organs and fountains of various kinds of motion, and other parts of sensation.

But the brain is certainly related to muscular motions, even if it is to make them less numerous and more effective; and, therefore, it is directly connected with the motor nerves and muscles. In what way is the brain related to motion? I answer, that it is related to motion, just as any nerves of sensation are. There is no doubt that the optic nerve is the principal guide and director of the locomotions of the lower animals, and, for this reason, its ganglia become developed to an enormous size. Some animals, as the shark, and some dogs, are directed in their movements by the nerve of the sensation of smell; but it would be a violation of language to say that, for this reason, these sensory nerves are nerves of motion. The sense of sight is related to motion, because, more surely than any other sense, it guides the animal to the desired object, and thus prevents the thousand useless movements that a blind animal would make before he could reach the same object. I consider the whole brain as a collection of organs of sensation, the object of which is to modify the motions of the viscera, blood-vessels, limbs, face, and tongue.

RELATIONS OF THE STOMACH, LUNGS, AND MUSCLES TO THE DIRECTIVES AND IMPULSIVES.

To understand the functions of the brain, and the principle upon which it is divided into two great classes of Directive and Impulsive organs, we must consider the nature of the muscular motions over which it presides. A muscle contracts in consequence of the union of oxygen with some of its carbonic constituents. The oxygen of the blood is derived from the lungs; the carbon of the muscle is derived from the digestive organs. Let us state this in other language: the digestive organs send carbon *into* the muscle; the lungs send oxygen to the same muscle; the oxygen and carbon unite, and thus produce muscular contraction; and it is over this process, or rather two processes, that the brain has an influence which we are to explain.

There are two classes of nerves that influence voluntary motions. One class is already well known; they proceed to the muscles from the sensorium in the oblongata. The other class, also, proceed from the oblongata, and are only known under the absurd name of "the sympathetic nerve." They influence muscular contraction by aiding to impel the blood to the muscles, and causing the lungs to act with a vigor corresponding with the urgency of the occasion. Each change in the muscle, under the influence of the *voluntary* nerve, causes it to yield a portion of the carbon, which it originally received from the digestive organs, to unite with the oxygen which the *supply* (sympathetic) nerves are impelling the arteries to send from the lungs.

These two classes of nerves are related to two distinct classes of organs in the brain — namely, the Directives and Impulsives. The voluntary nerves are related to the Directives, including the external senses, striatum, and anterior lobe. While the supply (sympathetic) nerves, are related to the Impulsives, including the cerebellum, thalamus, claustrum, and all the cerebrum, except so much of the anterior lobe as is appropriated to the Directives.

We are now prepared to state more definitely the functional distinction between the directive and impulsive organs. The Directives are intimately connected, in function, with the nerves of voluntary motion, and have the power of controlling and directing them. The Impulsives are directly connected, in function, with the supply (sympathetic) nerves, and have the power of controlling and regulating the nutritive functions through them. The action of the Directives, through the voluntary nerves, causes the expenditure of carbon; the action of the Impulsives through the supply nerves, causes the expenditure of oxygen. The carbon is derived from the stomach; the oxygen is derived from the lungs. There is, therefore, a functional relation between the anterior part of the head and nutrition, and between the posterior part of the head and respiration.

There is a curious analogy between the processes of nutrition, reproduction, and intellection; and we can readily perceive, that this analogy is not accidental nor fanciful, but that the two processes depend upon a common law of economic creative specialization, which the Creator has ordained and applied to all organized beings. The mental Impulsives and the respiratory organs are also functionally connected, just as the Directives and the nutritive organs are. When one of the impulsive mental organs is excited, the pulse is instantly affected, the respiratory movements are varied, the arteries contract or expand, the cheek reddens or pales, the mouth fills with saliva, or is parched; indeed, the whole vital system is affected; but no such effects are produced by the excitement of the Directive organs; on the contrary, there is a calm, deliberate precision of thought and action, which is in perfect contrast. The Impulsive organs not only influence the circulation, but they also indirectly control the intellectual process. The Directives are the mere servants of the Impulsives; they perceive the facts and results, and report them to the mind, but the dominant Impulsive decides the course of action, and compels the senses, memory, reason, and voluntary muscles, to seek only for ways and means to gain its desired objects. On one hand, an Impulsive acts upon the circulation to impel it to serve its purposes; and on the other hand, at the same time, the same Impulsive acts on the Directive organs, and forces them into its service, and *through them* it controls the voluntary nerves and muscles.

There is an important difference to be noticed between the influence of the Impulsives upon the voluntary nerves and upon the supply nerves, the difference being, that the voluntary nerves can only be excited by an Impulsive which is powerful and excited enough to control the whole intellect, to overcome other opposing Impulsives, and thus to constitute the *will;* but the supply nerves can be excited by any single Impulsive, independently of the will. For instance, an insult arouses anger, and causes the heart to beat more energetically, and the cheek to redden, whether we will or not; so a thought of delicious food causes the saliva to flow, even against the most determined will; but the hand nor the tongue never move normally, except by the consent of the whole mind; and, therefore, we justly hold the whole mind responsible for every act of the hand or the tongue. These facts indicate that the voluntary nerves and the Directive organs, including the external senses, are to be viewed as one apparatus, when considered in opposition to the Impulsives and the supply nerves. Any single Impulsive organ, being aroused by its appropriate stimulus, has the power to act, in some degree, at least, first upon the consciousness, which is believed to occupy the oblongata;

next upon the Directives, which are in the forehead; and, through them, upon the nerves of voluntary motion This harmonizes with, and explains, the pathological facts and the experiments which appear to indicate that the striatum is related to voluntary motion. It probably is so, but it is on the same principle that the external senses are also thus related. The Impulsive organs (see bust) represent action; the Directives represent perception, cogitation, and memory. The voluntary motor nerves are passive, until acted upon by the Directives; the Directives are passive, until acted upon by the Impulsives. The Impulsives are the main-springs of action in the brain, just as the arteries and oxygen are the main-springs of action in the body; and, just as the nutritive system furnishes material for the oxygen to act upon, without which it could do nothing; so the Directive intellect furnishes material for the Impulsives to act upon, without which they would be helplessly passive. Just as the food enters the stomach, is digested, assimilated, and then, upon any proper occasion, is acted upon by the oxygen, to produce motion; precisely so the Directives in the brain receive perceptions, digest them by reflection, assimilate them by memory, and then, upon a proper occasion, they are acted upon by the Impulsives, to produce voluntary motion.

I would again call the especial attention of the reader to the important conclusion, that motion of the body is produced, in all cases, only by union of material furnished by the stomach with material furnished by the lungs; and this motion is excited by the union, in the mind, of materials furnished by the intellect with others furnished by the Impulsives. This remarkable analogy will serve admirably to give our minds clear and just ideas of the distinction of the Impulsive from the

Directive faculties, and of the true nature of both. The Impulsive organs may be considered as the representatives of oxygen in the brain, and the Directives, of carbon; the united action of the two in the brain is instantly followed by the union of the other two in the body, to produce muscular contraction.

THE CLAUSTRUM.

I have, for the present, sufficiently explained the relation of the Impulsives to the Directives, and of both to the cerebellum and striatum, in their primitive and first created form. Let us now proceed to speak of the first additions which the striatum and cerebellum received. If we examine the striatum of a skate — one of the highest fishes — we may observe, that it has a lateral development which is distinct from its central and anterior parts. This lateral portion is readily distinguished, from the fact, that the olfactory nerve is joined to it. (See Fig. 8.) This is the claustrum, the commencement of the middle lobe of the cerebrum and the fundamental portion of the Ipseal class of mental organs. It is related to the vagus, just as the cerebellum is to the spinal cord, and the striatum to the external senses. The development of this portion of the brain is, in the higher animals, directly proportionate to their respiratory powers compared with their other bodily and mental functions. The porpoise — the most vigorous of all the cetacea — has it greatly developed. Birds have the claustrum, or lateral part of the striatum, larger, in proportion to the rest of the brain, than any other animals, and they are, also, unsurpassed in their powers of respiration. The birds are unequaled by any other class of animals in two particulars: one is, in the power of sustaining their equilibrium for a long time under the most difficult circumstances, and the other is, in their capability of using oxygen to produce locomotion. In perfect accordance with these facts, is the development of the cerebellum and the claustrum.

FIGURE 47.

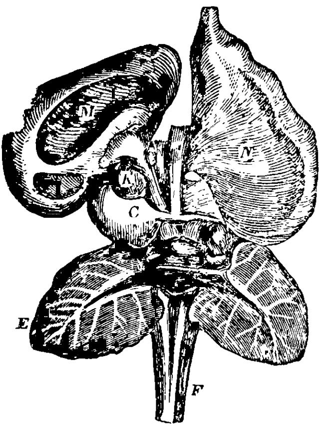


FIGURE 48.

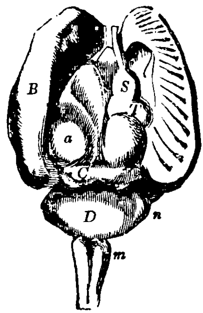


FIGURE 47. Dissection of the brain of a goose, which does not differ essentially from that of any other bird. On the right side, *N*, is seen a fan-like radiation of fibres, which are supposed to be rudiments of the fornix. On the left side, *M*, is the striatum and the claustrum, so enormously large as to constitute most of the cerebrum. *K* Is the small thalamus, which does not appear to be connected with the cerebrum; yet, in man, more than half of the cerebrum seems to be developed from the thalamus. *C*, Optic ganglion. *E*, Cerebellum. *F*, Oblongata.

FIGURE 48. Top view of the brain of a squirrel, the upper portion of the cerebrum being cut away, to show the submenta. *S*, Striatum. *T*, Thalamus. *a*, Anterior optic ganglion. *C*, Posterior. *D*, Verm of the cerebellum. *n*, Lobulus of the cerebellum. *m*, Oblongata. Here it will be observed, that the striatum is small, and the thalamus is comparatively large.

Practical Phrenology led to the discovery of the relation of this portion of the cerebrum to the faculty of respiration. I published, in 1838, the observation which I had made, that persons who are largely developed in the anterior portion of the middle lobe are more disposed to indulge in the luxury of breathing to the full extent of their capabilities. It is only in extreme cases of development or deficiency, that the external indications are available in determining the function of this organ, which I have called Pneumativeness; and the same remark is true of nearly all the organs situated at the base of the skull. The organ of Alimentiveness, or the impulse to keep the stomach supplied with food, is situated immediately behind Pneumativeness, and it will be readily understood, that the impulse to eat must be in proportion to the impulse to breathe, since respiration requires food, upon which to perform its functions.

LOBULUS OF THE CEREBELLUM.

If we look at the cerebellum of a bird, we see it composed, principally, of a central part, which, in higher animals, is called the verm, or vermiform process. In fishes and reptiles, this central verm constitutes the whole of the cerebellum; but, in birds, a lateral lobule begins to develop, one on each side of the verm, and the question has been considerably agitated, as to whether this lateral lobule is identical, in function, with the central verm. *Spurzheim* believed it to be so; but most phrenological writers, at the present day, among whom is *Solly*, incline to the opinion, that the cerebellum constitutes two organs, a central and a lateral, and that the central portion is related, in some way, to the locomotive organs, while the lateral portion is related to the sexual impulse. This is my own opinion, as already indicated — namely, that the central verm is related to the impulse of equilibrium, and the lateral lobes to conjugal union. This view is confirmed by the fact, that animals have the central verm in proportion to their skill in maintaining their equilibrium for a long time, while the lateral portion is developed, in all animals and men, in proportion to the *time* which they devote to amatory subjects.

It being remembered that the brain is exclusively constituted of organs of sensation, and that the organs are numerous, while there is but one mind; of course, the organ which is largest, if stimulated, will continue its operations the longest. Size is the measure of the power of continuance, all else equal. Apply this rule to the lateral portion of the cerebellum, and it will be found, without exception, among animals or men, to sustain the proposition that the time devoted to amatory subjects is proportionate to the development of the lateral portion of the cerebellum, which, for distinction, I have called the lobulus. I think, that it will be found, that, from the lowest animals to the highest, there is a gradual perfection of the organs that relate to conjugal union, and the development of the lobulus of the cerebellum regularly keeps pace with the other functionally related developments. Comparative anatomy abounds with interesting illustrations of this proposition. I do not mean to be understood, that no animals have any Amativeness, except those that have the lobulus developed, for that would be to deny that the faculty is possessed in any degree, by fishes, and reptiles, which only have the verm of the cerebellum, and no lobulus. This ganglion unquestionably follows the same law that every other does, in presenting itself, first, in a general and simple form, and when it is sufficiently advanced to divide, or specialize its functions, it does so for a long time before it presents any appearance of an anatomical division, or differentiation. Birds are the first animals that present lateral lobules, and they are the first in the progressive scale that distinctly manifest a decided disposition towards voluntary conjugal union. The amatory manifestations of reptiles are but little above the aconscious, or reflex character. Rodents are far superior to birds in this respect. they (particularly the beavers,) have the lateral lobulus well developed, constituting more than half of the cerebellum. The porpoise has a very small vermiform process, but the lobulus is enormous — it is larger in proportion to his whole brain than that of any other animal, and, accordingly, he is remarkable for the perfection of his organization in these respects. Man has the lateral lobules developed (absolutely, not relatively,) more than any other animal, and the central verm proportionately smaller. It can not be denied that man spends a large portion of his time in thinking over subjects related to conjugal union. The student will now begin to perceive the great practical importance of the law that the size of a mass of corpo-neurine is indicative of its power of continuance, rather than of its brief energy — for, by the aid of this law, we can explain many otherwise difficult problems in phreno-nervous physiology.

The Thalamus is the next submental organ to be considered. It is not so much developed as to be unquestionably distinguished in any of the fishes; in reptiles it is very small; in birds it is still small, though rather larger than in reptiles; in the lowest mammals it is twice as large as in the birds which I have examined. In the cetacea — the porpoise, for instance — it is actually larger than the striatum! In the highest mammals and men, it is rather smaller than the striatum, because the posterior lobes are its vicars and substitutes. *Gall* discovered, that the posterior lobes of the cerebrum are related, in size, to the parental function; and his observations have been confirmed by those of thousands of others. If we dissect the brain, we find these lobes developed directly out of the thalamus and fornix. Man has the posterior lobes, as he has every other part of the brain, absolutely more developed than any other animal of the same size has; but when we descend from the human brain to those of other animals, there is nothing which is so striking and remarkable as the falling off of the posterior lobes.

FIGURE 49.

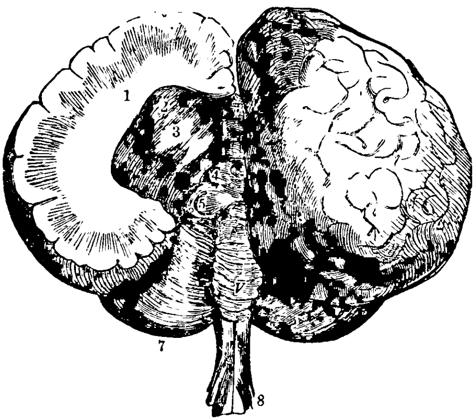


FIGURE 49. Top view of the brain of a porpoise. 1, On the left side, the upper part of the cerebrum is cut away, to expose the submental parts beneath. 2, The striatum, which is comparatively small. 3, The thalamus, which is very large. 4 5, The optic ganglia — the posterior, 5, being the larger. The verm of the cerebellum, V, is exceedingly small, while the lobulus, 7, is very large. 8, Spinal cord. This animal, and, indeed, all the cetacea, are remarkable for the great size of the thalamus and cerebellum, and the deficiency of the posterior lobes.

This seems at first to be directly opposed to Phrenology, and has never heretofore been explained. When we get down as low in the scale as birds, the posterior lobes are entirely gone, though the thalami, from which they grow, are left; but they, also, are small, and unconnected with the cerebrum. Descend to reptiles, they are smaller yet—to the lower fishes, and they are gone.

Fishes manifest but little regard for their offspring, though more than their brains indicate: this may be explained, as it is in the case of the invertebrates that have no brains, by supposing the instinct to reside in the body, and that it has not yet risen to the brain. In reptiles, there is little more regard manifested for offspring, than by fishes, if there is as much as by some fishes. The cerebellum is small, and the thalamus is very small, in reptiles; the only parts of the brain which are developed in a more remarkable degree than in fishes is the cerebrum, which is developed out of the striatum and claustrum, and of course elevates and advances those functions. Here, again, I must remark, that it would be impossible to show, that the functions of the cerebrum are manifested more vigorously by reptiles than by fishes, but it is not difficult to understand that they are manifested more continuously; for man himself is a sufficient proof that continuity and variety of sensation is not necessarily accompanied by uncommon vigor of motion, since the most profoundly contemplative and large brained men are notoriously gentle and quiet. Let the reptiles, therefore, enjoy all the honor of superiority to the fishes, to which their larger cerebral lobes entitle them. In birds, there is not a great advance beyond fishes and reptiles in the development of the bodily organs that relate to offspring; but there is some advance, and in just about an equal degree is the thalamus larger in birds than in reptiles.

But mark: in the very lowest mammals the body undergoes a decided change, and develops new organs that relate to offspring. The ornithorynchus, which belongs to a class of animals that resemble birds more than any other mammals do, and from this very resemblance have been named monotremata — this animal has the ability to nourish its young with milk, which is the distinguishing peculiarity of the mammalia; and with the peculiarity is a development of the fornix and thalamus greater than in any bird. The marsupials, of which the opossum is an example, and which are next to the lowest mammals, have the fornix and thalamus larger yet. Some of the rodents have them both, nearly as perfect as man. This remark is particularly true of the beaver, which has, in some degree, every essential organ of the brain that man has, except those recognized only by phrenologists in the upper part of the cerebrum. The beaver manifests nearly as much regard for its young as man does, though no animal continues it as long as man, nor exercises it as intellectually by providing for a long succession of future generations. The cetacea, particularly the porpoise, are remarkable for the extraordinary development of the thalamus, having it larger than any other animal in proportion to the striatum; and this fact, under the peculiar circumstances, confirms my views of its function as the fundamental organ of the parental instinct; for the porpoise has enormous middle lobes and cerebellum. The only part of its brain that seems to be deficient is the posterior lobe, and it would seem that the thalamus, being an inferior organ of the same function, is developed to its utmost extent, as if thus to compensate for the deficiency of its cerebral auxiliary.

I believe that this will be found to be true in respect to all the higher mammalia, particularly the carnivora, that, when the posterior lobes are large, the thalamus is comparatively smaller than in the porpoise and some other carnivora that are deficient in the posterior lobes.

In this place I will remark, that most authors have fallen into an error, in regard to the size of the posterior lobes, by measuring their development backward, compared with the cerebellum. *Carpenter* speaks of the posterior lobes disappearing altogether in the lower mammalia, and even the middle lobes being entirely wanting in birds, reptiles, and fishes; but if *Dr. Carpenter* will take the brains of a beaver, a dog, a sheep, and a man out of their skulls, divide them all in the median line, and place them in a row, he will probably be a little surprised to find, that they all have the posterior lobes developed from the thalamus and fornix in the most demonstrable manner. If we look at the thalamus in man or in any of the higher mammals, it is so intimately incorporated above with the posterior lobes, and below with the crura cerebri that it is difficult to understand that it is a distinct organ. Many anatomists speak of the fibres of the crura cerebri passing up through the thalamus to reach the striatum. It is certain, that, in birds, no such fibres pass; and it is certain, no fibres from the thalamus are necessary to the function of the striatum nor the anterior lobes. In the common fowl, the thalamus is small, being only about one fourth as large as the potentive ganglia upon the optic nerve. It is developed out of the posterior part of the crura, immediately before the optic ganglia. A glance at this organ, in the lowly form in which it is possessed by the fowl, will convince any one, that it is distinct, in its function, from the striatum, and anterior and middle lobes; but, as soon as we find the fornix and posterior lobes developed in any degree, we find the thalamus intimately connected with them.

CEREBELLUM AND STRIATUM.

We have certainly a very suggestive object of contemplation in the skull of an apparently insignificant fish, for it contains the two young organs which have been sent to herald and prepare the way for the two great classes of Directives and Impulsives. We should not pass carelessly by these two little organs, thus humbly floating in their lowly cranial ark, containing the germs of the future mental world. One is situated in the stern of the ark: it is easy and natural for us to conclude that this is, in function, related to locomotion, if it is only to keep the moving vessel trim and equally poised in its watery element. In the bow, sits the striatum, the solitary young pilot, viewing the horizon with the restless and eager eye of inexperience.

The Impulsive organs of the perfect and fully developed brain of man are divided into two great classes, Ipseal and Social; but these two pioneer organs do not appear to belong unquestionably to either. Why, then, do they precede them in creation? The answer is obvious, that a properly balanced position, when in motion, is the first want of an animal body, next to its nourishment; and that the power of perceiving surrounding objects is absolutely necessary, to distinguish the animal from the vegetable, and to enable the animal to move successfully among the innumerable objects around him. It is instructive to observe, that the instincts which belong to the vegetable—Alimentiveness and Amativeness—are not those which are represented in the first created brain, but those which first distinguish the animal *from* the vegetable—namely, Perception and conscious Equi-motion.

SECTION VII.

PHYSIOLOGY OF THE CEREBRUM, OR SUPER-MENTAL ORGAN.

THIS is the highest organ which creative wisdom has made, within the boundaries of human knowledge; and it is, on every account, the most important object of scientific research to be found upon the earth. It may, therefore, be deemed a matter of wonder, that it excites so little interest in the minds of those distinguished men who have associated themselves for "the advancement of science." For some time past, Astronomy and Geology, and the sciences which are supposed to be kindred to them, have received the almost exclusive attention of those who have devoted themselves to unprofessional science. We may hope, that, when it is demonstrated, as in this treatise I think it is, that Phreno-Physiology is intimately connected with the fashionable sciences, it will receive a more respectful and serious consideration. Let us examine the representation of the section of the brain, or encephalon, in Figure 50, from a geological point of view.

The oblongata, which is the lowest, or proto-conscious, region of the nervous organism, corresponds with the lowest, or proto-zoic, region of the earth, which was formed prior to the creation of fishes; and, at that period, it was the highest nervous organ that existed. The submenta corresponds with the geological period and strata which is remarkable for the reign of fishes, and was created at that time. The anterior cerebral lobes were created in the reptilian, or carboniferous, period; the middle lobes, in the new red sandstone, or period of birds; and the fornix and lower part of the posterior lobes were created in the oolitic, or commencement of the period of mammals. The parts above these were created during the period which elapsed between the oolitic and alluvial periods. These successive stages of progression in the brain, corresponding with periods in the progress of the earth's creation, suggest many important inferences, and support the idea, that there has been, in geologic ages, a succession of grand convulsions of the earth, produced by efforts to concentrate its crust more closely and economically around its molten nucleus; that each convulsion produced new conditions of climate, soil, water, and atmosphere, destroying the animals that could not withstand the changes; and modifying, specializing, and, in accordance with the Divine will, re-creating those which were in the most exposed situations, thus giving origin to higher and more economic organisms.

FIGURE 50. *F*, Spinal cord. *B* is between the semicircularis and the peduncle. *G*, Mammillaria. *L*, Fibres of the fornix. *t*, Fibres of the anterior pyramid. *r*, Fibres of the olivary, or optic, tract. *S L*, *Ourlet*. *P*, Striatum. *K*, Thalamus. *M*, Section of the middle commissure. *O* Is callc'd the peduncle of the pineal gland; parallel with it is tenia semi-circularis, a white, semi-circular skein of fibres, running in a furrow between the thalamus and striatum. *D C*, Optic ganglia. *U*, Section of the posterior commissure. *J*, Pituitary gland; just above which is the divided optic nerve. *a*, Olfactory ganglion. *N*, Crus cerebri, or leg of the cerebrum. Between *N* and *J* is the mammillaria, *G*, a loop formed by a twist of the fornix, proceeding from the thalamus. 4, Fourth ventricle. 5, Iter a tertio ad quartum ventriculum, or passage from the third ventricle

FIGURE 50.

to the fourth. These ventricles are of no account. *S*, Section of olivaria. *X*, Section of pons. *E*, Section of cerebellum.

The figure affords some evidence in favor of the theory, that the fornix pursues the same course that the social fibres do, and that it is, probably, related to them; for it can be traced, according to some good authorities, among whom is *Foville*, from the posterior pyramids to the niger: thence, according to *Solly*, to the thalamus. From this point, the figure represents it as proceeding forward and downward, forming a loop, or twist, and coming up and proceeding backward, over the thalamus, to the posterior and middle lobes; the tenia semi-circularis being one of its branches, and the peduncle of the pineal gland, another; the ourlet, which passes over the callosum, being a continuation of it to the higher social organs. This idea is well illustrated by Figure 53. The object of these serpentine turnings of the cerebral band is, obviously, to accommodate itself to the size and compact form of the skull; and, in this respect, it is analogous to the alimentary canal, which, though several times longer than the body, is so arranged as to occupy a small abdominal cavity.

If this view is correct, it indicates, that the progress of organization was very slow between the different periods, and may, under some circumstances, have remained stationary, or even, as *Hugh Miller* has suggested, may have retrograded; but when the earth underwent one of its periodic convulsions, "and the fountains of the great deep were broken up," destroying whole races of the inhabitants of the earth, a new condition of things was produced, which adapted the earth to a higher order of beings, constructed upon more economic principles, with more labor-saving brains, limbs, and viscera.

It is natural for us to exercise our ingenuity in the endeavor to describe the circumstantial manner in which the new races of animals were probably created by the earth's changes; but it must be admitted, that, at present, it is not as easy to do so, as to assume that, at each convulsion, a miracle of creation gave birth to new and higher organisms.

The special functions of the different parts of the cerebrum will be explained in the section on Phrenology. It is peculiar, in being more independent of the body than any other parts of the nervous organism are; for, although it acts in concert with the bodily organs whenever it receives impressions from them, it often acts independently of them, producing long trains of thought, reveries, and dreams unaccompanied by any bodily sensations or movements. The nerves of the senses are so connected with the organs of the body and face that they must necessarily act in concert; and the submental organs, being little more than mere continuations of the functions of the nerves of sensation, are so intimately associated with the bodily organs as to be almost necessarily excited simultaneously with them.

The cerebrum has a higher power, a more isolated structure, and a more independent function. The impressions which it receives through the senses may be recorded in its fibres, and furnish material for future thoughts, when the body and senses are at rest. The larger the cerebrum is, compared with the body, the more power it has of thus engendering trains of thought, combining, separating, and arranging, in every possible manner, the ideas which it has acquired by observation, experience, or reading, without being disturbed by present impressions from the external or internal senses; on the contrary, the smaller the cerebrum is, compared with the body, and especially the lungs, the more difficult it is for the brain to act independently of present and immediate bodily sensation, and the more instinctive the character of the mind becomes — in other words, the more the mind is confined and limited to immediate bodily promptings. I can not too strongly insist upon this peculiar isolation of the cerebrum; for it accounts for many of the mental phenomena which are otherwise inexplicable.

The cerebrum is not superadded to produce immediate actions in response to present sensations. This is the office of the central oblongata. The cerebrum is related to the past and the future, rather than the present; and, therefore, the larger and more perfect it is, the more it bestows memory of the past, and judgment concerning the future. This is the reason why memory of past experiences, and the ability to act by its guidance, is found to distinguish animals that have a cerebrum, from those which have not, and to be most remarkable in those that have the cerebrum most developed, especially in its higher parts. This is also the reason why the cerebrum acts most perfectly when the body is quiet and all present exciting causes of sensations excluded. This is the reason why persons who have the cerebrum highly developed need varied and extensive knowledge and experience to enable them to manifest their capabilities; while those who have it small, especially in its higher parts, have ready, intuitive, practical talent, but are not good thinkers.

MORAL RESPONSIBILITY AND WILL.

The moral character depends upon the cerebrum and its independence of the body. In proportion to its development, compared with the body, its possessors have the power to restrain and postpone the instinctive tendencies to immediate bodily indulgence. On the other hand, as some compensation, they enjoy more vividly the contemplation of future enjoyments, and they are also more capable of acting in a way to secure their future gratification. While the cerebrum is thus endowed with the power of restraining the activity of the lower instincts, it has also the power of uniting with them, and thus adding to their energies, and directing them to their objects. This controlling power of the cerebrum constitutes the will; and what is called the "freedom of the will," consists in the ability which the cerebrum has of indulging or restraining the activity of the lower sensual and voluntary functions. In a healthful condition of the whole constitution, the cerebrum has the controlling power over all the voluntary, and even the involuntary movements of the limbs and features, and it is upon this ground that the individual is deemed to be morally and legally responsible for his conduct in society. The experience of the whole world is, that, normally, any human being can act in obedience to the moral laws, and restrain himself from injuring his fellows. Not only man, but many of the lower animals, can thus "govern themselves." Some persons are so well instructed, and so favorably organized, that they need no legal restraints, but are a "law unto themselves." A large majority, however, require the fear of detection, resistance, and punishment, to prevent them from violating the rights and privileges of others. The legislative power of every community has, therefore, found it necessary to enact laws, and impose penalties for their violation. The very basis of these laws is the assumption founded upon universal experience, that each member of the community is capable of restraining himself, obeying the laws, and avoiding the penalties. Experience and history demonstrate that men are not only capable of obeying just laws, but of quietly submitting to regulations which are exceedingly oppressive and unjust, provided they are educated to do so, and are overawed by the certainty of prompt and immediate punishment, if they transgress or rebel.

Experience and history also show, that in every community, a great majority habitually obey the laws — not from a knowledge or belief of their justice, but from habit and the fear of punishment; for it is found that laws which are the most palpably unjust and outrageous are, even in this Christian country, not only submitted to by the millions who suffer the injustice, but are loudly applauded and firmly upheld by millions more, for no other reason than because they cannot perceive that their own interests are directly concerned in their abolition.

The ability of human beings in general to obey laws, and the disposition of most persons to violate them, when they can do so with impunity, being both demonstrated, it is natural that the friends of social order should insist upon the prompt punishment of offenders, as a warning and example to others; and it is also natural that they should look with suspicion, and listen with indignation, to any evasive and special plea, in favor of one who is accused of a great crime. We accordingly find that the plea of insanity is admitted with great reluctance in courts of justice, as a bar to conviction.

The violators of law may be divided into: 1. Those whose organizations are as good as those of the average of the community, but who give way to an unfortunate combination of tempting circumstances; although such persons are to be pitied, they must also be punished, or the laws will be virtually abrogated.

2. Those whose natural organizations are equal, or superior to those of the average of the community, but who have acquired habits and principles of immorality by vicious and degrading associations and indulgencies, until they have become morally diseased and depraved, so that slight temptations will lead them to commit crimes which are inconsistent with their original characters—such persons must be objects of commiseration to all philanthropists, and are especially interesting, because they are, in many cases, susceptible of reformation; but if they were allowed to go unpunished, all experience shows, that their numbers would soon increase, until all social order would be destroyed. The intemperate and licentious habits which led them into crime, instead of being any excuse or palliation, only aggravate their

guilt; and their punishments may be regarded as the natural consequences of their vices, rather than of the crimes in which the vices resulted.

3. There is a class who are defective in the superior parts of the cerebrum, while all the lower organs are fully developed. Such persons are almost certain to commit crimes, unless they are brought up in habits of industry, reading, and temperance. Ordinary temptations, with habits of idleness and ignorance, will, almost inevitably, lead them into the commission of crimes. In these cases, their defective cerebral organizations can not be allowed in bar of conviction; on the contrary, it is an additional reason why they should be punished with severity, as an example and warning to others of the same class. To allow them to go unpunished, would be to give a license to the worst class of the community to violate the laws which others are required to obey. In these cases, benevolence will be best manifest by rendering the prison a place of instruction and reform, as well as of punishment.

4. It is universally admitted, that, when the accused is proved to be insane, he ought not to be held responsible for acts which, otherwise, would be punished as criminal; but it has been found, hitherto, quite impossible for the court to distinguish between criminal and insane conditions of mind. Strictly speaking, perhaps almost every one is, in some degree, insane — that is, his organs of sensation, memory, and judgment are not in a perfectly healthful condition in every respect. If, therefore, the court would allow this plea without limitation, every criminal would be protected under it. In practice, therefore, the real question is, whether the accused is so far insane as to be excusable for his conduct, and whether

the rule by which he is to be exonerated is such as not to operate injuriously to the community.

Notwithstanding all the light which science can shed upon this subject, it must always necessarily be one of very great embarrassment to courts of justice. One of the most important advances which modern science has made, in respect to insanity, is, to demonstrate that it is frequently partial; so that a person may be insane, and talk and act irrationally on one subject, while he is perfectly sane in respect to others. This being so — the fact being proved, that a man acts rationally, for several days in succession, and in reference to a variety of matters — it can not be inferred, with perfect safety, that he is not insane upon the subject matter concerning which he is accused, unless he has been tested with special reference to that also.

The progress of science tends to show, that there are a great many distinct organs, not only in the brain, but in the body, the diseases of which may produce insanity. But the subject of which we are now treating — namely, the independence of the cerebrum — leads us to the conclusion, that insanity, in some degree, and of some kinds, may exist, without the cerebrum losing its controlling power. We have seen that instinctive faculties reside in the body, and when the brain, as in many animals, is small, they rule the mind, and render the cerebrum subordinate; but when it is large, it controls all below it. In many cases insanity produces effects which are analogous to instinct, for the organs of the body become so conditioned that their sensations control the cerebrum, producing a peculiar species of monomania. This is particularly the case with hysteria and melancholy. In other cases, the cerebrum itself is the seat of disease, producing such an excitement, of a limited portion, as to give it a controlling influence in the mind, in opposition to all the lessons of experience, the judgment of the intellect, and even the affections, and the conscience. In many of these cases there is no lesion or fault in the intellect, *per se*, which is situated in the forehead, but the disease is in the region of the moral Impulsives. They produce the same effect upon the mind of the patient as that which is produced in the mind of a mesmeric subject, or spiritual medium, when the cerebrum is deranged and in a dreaming state. The present doctrine, that insane persons may, in all cases, be held guiltless of criminal actions, requires to be greatly modified, if not altogether abandoned; for, in a strictly scientific sense, it may be easily shown that a majority of habitual criminals are the subjects of chronic diseases, which impel them, though not irresistibly, to act in a criminal manner. It can be shown that this criminal tendency is stronger in some states or conditions of the health than in others, and that it may be aggravated by slight causes or temptations; but it by no means follows that the person is irresponsible, and that the mere fact of having an *insane disposition* to do a certain class of acts, ought to be held, in a court of justice, as a sufficient excuse for the commission of such acts! There are some naturally benevolent men who can labor under an insane disposition to commit violence, and yet behave more amiably, even under provoking circumstances, than others who are in perfect health. Shall they not be held responsible for their conduct? Is it just to punish a poor wretch whose parents and grand-parents were criminals, and whose education has been acquired in dens of vice and poverty, without taking into account the criminal tendencies which he must have inherited, and the corrupting examples by which he has been surrounded; and then excuse a much greater offence, when committed by a person who has a slight insane tendency to commit such acts, but whose organization, education, associations, and pecuniary circumstances are fortunate?

There has been lately much complaint, that the modern scientific doctrine concerning insanity tends to increase crime. This is not, however, the fault of science, but of the legislation and jurisprudence which ignores the existence of insanity in cases where it is palpable to science, and, when its existence, in any degree, is admitted, allows it, in certain cases, to excuse the most outrageous deeds. Those who have charge of asylums for the insane know very well, that, in many cases, they are powerfully restrained by the fear of punishment. Why, then, should the legislature or court take this restraint entirely away?

The true question in a court of justice should be, whether the insanity is of such a character as to justify acquittal, and not, merely, whether there is some degree of a certain species of insanity.

The body can perform its functions independently of the nerves; but the spinal aconscious nerves may, nevertheless, overrule the bodily functions; and, in turn, the proto-conscious nerves, from the oblongata, may overrule the spinal aconscious; and, again, the submental organs may control the oblongata and its proto-conscious nerves; and, yet again, the higher cerebral organs may overrule all the four degrees below them, and guide the voluntary functions to more distant and important objects, and more successful results. This is the peculiar function of the cerebrum — to connect the past with the future, in the contemplations of the mind, and in the guidance of the actions. A fish, without a cerebrum, remembers the objects which injured him, when next he sees them, and, accordingly, avoids them, and shuns the hook by which he has already been injured, or seen others injured; but, in the absence of the injurious objects, he takes no precautions to avoid them in consequence of his former experience. He does not carry in his mind such a memory of past events of his own life, and observations of the conduct of others, as to have any effect whatever upon his conduct with reference to things not present to his senses.

But the most interesting mode of illustrating this truth, concerning the preliminating character of the cerebrum, is that which is afforded by a careful review of the three classes of phreno-organs. Commencing each class at the base, and proceeding, according to the arrangement marked upon the figure of the bust, to Causality, of the Directives, Hope, of the Ipseals, and Credence, of the Socials, we shall find, that the very nature of the advances, from the lower to the higher organs, is such as to imply a continual extension of the sphere of action and the field of vision, the lowest organs relating to the lowest animal necessities, and the highest relating to philosophy, faith, and hope of the future.

RELATION OF MEMORY AND HABIT TO THE CEREBRAL FIBRES.

I am by no means satisfied that the cerebral fibres are merely conductors of nervous influence; they are, also, probably, the organs of memory. *Prof. Draper* ascribes memory to the corpo-neurine; but memory is something enduring, as the fibres, and not continually changing, as the corpo-neurine is, with every temporary change in the condition of the circulation. Memory seems to be excited by the action of the corpo-neurine; and so is motion; but it does not follow, that either memory or motion reside in it. On the whole, I must conclude, that memory is the exclusive function of the fibres of the Directive organs, in the anterior lobe. But, if we dissect the brain, we can see no difference between the structure, color, or consistence, of the anterior lobe and the other parts of the cerebrum. The question, then, occurs, do the impulsive organs, which constitute seven-eighths of the brain, perform any functions analogous to memory? I answer, that habit is to the impulsive organs what memory is to the Directives. What we call the instincts of animals, are their hereditary habits and memories, the results of the experiences of their ancestors, transmitted to them, and stamped upon their organizations. There is scarcely an organ of the whole constitution, which is not liable to this kind of memory, habit, or repetition of its movements. There are habits of mind, or brain, just as there are of body; that is to say, the organs that have been forced, under powerful stimulus, to act in a peculiar manner, always have a natural tendency, when but slightly excited, to take on the same mode of action as they have experienced before. This we call a habit. . The impulsive organs, then, are the storehouses of habits, just as the Directives are of memories. For this reason, when we call to mind a former train of ideas, which relate to an interesting subject, the old prejudices, affections, aversions, and pleasures, come up at the same time, from the impulsive fountains, in which they have long been dormant. This renewal and repetition of old impulsive feelings is unquestionably analogous to the renewal of old memories of words, forms, opinions, and theories. I conclude, then, that habit is but the memory of the Impulsives, and memory but the habit of the Directives, and that both reside in the fibres.

FIGURE 51.

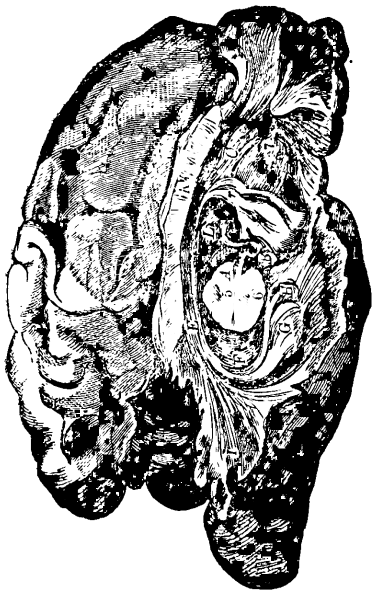


FIGURE 51. This is a section of the cerebrum in the mesial line, as far down as the callosum, but below that it passes to the left of the mesial line, so as to show distinctly the direction of the fibres of the fornix below the callosum, *K*. *L*, Thalamus. 5, Section of the crus cerebri. 6, Niger. 7, Striatum. *A*, Fibres proceeding from niger to *B*, mammillaria, where the fibres turn down and up again, and proceed to *r*, called the anterior pillar of the fornix. *C* is the septum lucidum, which is an extremely thin sheet of fibres proceeding from the anterior lobe. *E*, Trunk of the fornix. *F*, Fibres of

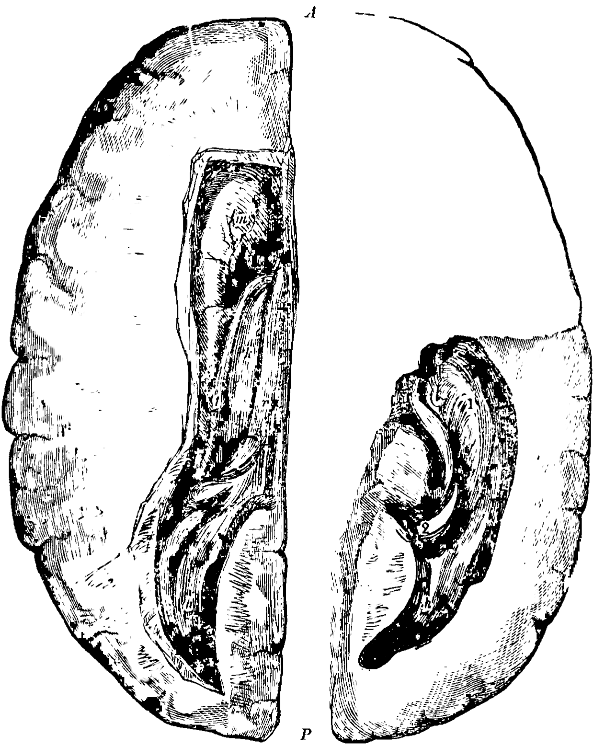
fornix descending to *G*, hippo campus major, and *H*, hippo campus foot in the middle cerebral lobe. *I*, Fibres of the fornix in the posterior lobe, passing over the hippo campus minor.

FORNIX AND OURLET.

There is a branching system of cerebral fibres, the lower part or trunk of which is called the fornix, on account of its vaulted form, and the upper branch is contained in a convolution between the hemispheres, above the callosum, called the ourlet. The root of the system may be traced to the oblongata through the niger and crura. The unprofessional reader will be much puzzled to understand the connections of these fibres as they are usually described by mere anatomists. But my idea of them and their function is easily expressed, by comparing the whole system to a vine which has its roots in the spinal cord and oblongata, its trunk running forward and turning to constitute the twist called the mammillaria, and then bending backward, upward, and forward over the callosum in a serpentine manner, giving forth branches as it proceeds, one of which is known as the semicircularis, another as the peduncle of the pineal gland, a third running to the middle lobe forming a part of what is foolishly called the hippo campus major, a fourth to the posterior lobe forming a part of the hippo campus minor, a fifth forming the septum lucidum. The course of this cerebral branching band, or vine, may be understood at a glance of figure 53; but its details will be best learned by the other figures.

FIGURE 52, modified from Solly, represents the fornix in a very perfect manner. *A*, Anterior lobes of the brain. *P*, Posterior. The figure gives a good view of the interior of the brain, it having been sliced away from above, so as to expose the great lateral ventricle. *M*, Striatum. *K*, Thalamus. *T*, Tenia semicircularis. r, Body

FIGURE 52.



of the fornix. *H*, Hippo-campus minor, a part covered over by the fibres of the fornix, which extend to the posterior lobes. 1, An internal eminence, which somewhat resembles a horse's foot, and has, therefore, received the name of pes hippo-campus, or horse's foot. 2, Fibres of the fornix, which after proceeding backward, and winding over and around the thalamus, proceed forward to connect with the internal part of the base of the middle lobe.

No one has, hitherto, been able to suggest even a plausible theory of the functions of these fibres. Some have said that they connect the various parts! But why connect parts that are otherwise well connected? To my mind, it is evident, that this serpentine system of fibres is anatomically a continuation of the spinal cord which winds about in the skull to economize space, and, physiologically, it is intended to give the cerebrum an independent connection with the mind, so that the mental operations of the cerebrum may proceed without necessarily involving the functions of the submental or bodily organs. It is certain, that the cerebrum has two distinct sets of fibrous connections: one of which weaves it intimately with the submental organs below it, as shown in Fig. 26, and the other set, now under consideration, which winds around in a remarkable manner to constitute another connection, that is nowhere confounded with the first. Now let the physiologist reflect that the cerebrum is capable of acting in two distinct modes; for it sometimes acts in concert with the senses and the body, and it is also capable of acting alone — independently — as in contemplation, reverie, and dreaming. This last mode is that in which the higher animals excel to a degree equal to the size of the cerebrum, and the perfection of the fornix and ourlet. The fornix, as it is represented in the brain of the goose, Fig. 47, can be seen in the mesial line of the brain of a common fowl, proceeding directly to the mammillaria at the base, in a manner which shows clearly its separate and independent nature.

One of the most remarkable facts connected with the structure and functions of the brain are, that the directive and ipseal organs seem to be developed from before, backward. Anatomists teach, that the whole cerebrum is thus developed; but the social class of cerebral organs is developed from before, backward, only until the posterior lobes are commenced, and then from behind, forward, on and between the middle lobes, to the anterior lobes.

FIGURE 53.

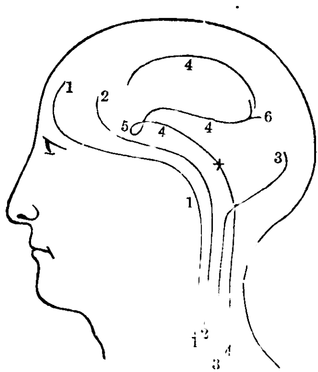


FIGURE 53. An ideal and simple representation of what I believe to be the general course of the fibres, and phreno-organs, from the spinal cord through the oblongata, submenta, and cerebrum. 1 1 1, Anterior column of the spinal cord, extending upward to the forehead, to constitute the anterior lobe of the cerebrum, and the directive organs. 2 2, The ipseal fibres, proceeding behind the Directives, 4 4 4, The social fibres proceeding behind the ipseal to 5, where they make a turn which constitutes what is called "the corpus mammilare" or twist of the fornix. At 6, I have represented, that the continuity is broken and recommenced in the posterior cerebral lobes. I have also put a cross at the place where the locus niger is supposed to be connected with the social chain of development. 3 3, Represents the fibres which go from the spinal cord, to constitute the cerebellum.

For this reason, the order in which the directive and ipseal organs are arranged and numbered, from the lowest to the highest on the bust, is from before, backward and upward; but the social organs are arranged and numbered from behind, forward. (See bust.) This difference in the development of the Socials from that of the Ipseals is well illustrated by the figure, p. 197, and it sheds a flood of light upon the relations of the fornix and ourlet to the cerebrum, by showing, that this band of connecting fibres pursues the peculiar course that it does, to conduce to the development and convenient location of the higher organs of the social class.

We shall naturally be asked, why were the social organs developed from behind forward, when the Directives and Ipseals were developed from before backward? I answer, because it is more economical of space; for, if the anterior organs had continued to develop forward, as they began to do, (see the brain of the skate,) they would have been in the way; or, if the social organs had developed backward, the head would be nearly twice as long as it is now, without being any wider. To avoid these inconveniences, the present compromise was made, the Directives and Ipseals developing backward, and the Socials and fornix rising up over and forward between the Ipseals and the Socials, thus giving the head a form which is well adapted to the conditions of birth, and the form of the pelvis.

SECTION VIII.

ARRANGEMENT, RELATIONS, AND FUNCTIONS OF THE NERVE CENTRES.

There are four series of nerve centres, or ganglia, in the body, arranged in lines nearly parallel with each other:

1. The axial, or spinal, series, in the centre of the spinal cord—represented in the figure by crosses.

2. The somniferous series, situated upon the posterior roots of the spinal nerves—and represented in Fig. 54, by small circles.

3. The moderating series, situated upon the intercord, or sympathetic nerve—represented by dashes, in the same figure.

4. The prevertebral series of ganglia; these are anterior to all the others, and disposed, in an irregular manner, in the face and near the viscera, in the thorax and abdomen. Their location is indicated in the figure by letters, from *a* to *j*. They are, doubtless, of a moderating character, as there appears to be no occasion for any others in that region.

Physiologists have overlooked this arrangement of the ganglia into four series, and nothing can be more vague and contradictory than the explanations which they have given of their functional relations.

FIGURE 54.

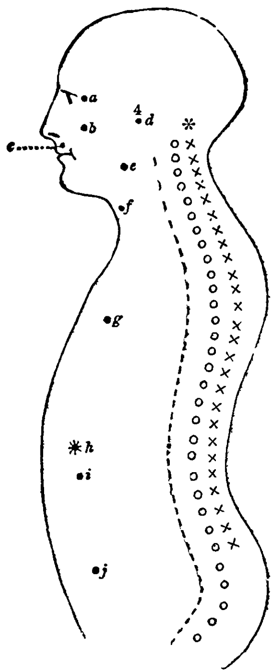


FIGURE 54. Diagram showing the principal nervous centres, their relative positions and arrangements. *The posterior series*—the crosses—represent the centres placed *in* the spinal cord; one centre being reckoned for each vertebra.* *The middle series*—distinguished by being made, in the diagram, in small circles—represent the somniferous centres, which are placed upon the posterior, or sensory, roots of the spinal nerves, where they emerge from between

* The lowest part of the spinal cord evidently contains the centres for the six lowest pairs of nerves, concentrated into one mass, for more convenience and economy of space.

the vertebræ. There are just thirty-one of these, being one on each spinal nerve. *The anterior series* — the dashes — represent the moderating ganglia, which are attached to the intercord, or sympathetic nerve.* The star at the top of the series of crosses indicates the place of the conscious centre. The letters and dots in the face, and in the anterior part of the body, represent the moderating ganglia which are specially related to the vital functions in their immediate vicinity. *a*, The situation of the ophthalmic, or lenticular, ganglion. *b*, Spheno palatine. *c*, Naso palatine. *d*, Otic. *e*, Submaxillary. *f*, The place of the pharyngeal plexus. *g*, The cardiac. *h*, The solar plexus and vital centre. *i*, The renal plexus. *j*, The hypogastric.

Leaving all arguments for another place, I will here briefly indicate the conclusions at which I have arrived.

The function performed by the spinal series is, to produce those motions requisite for self-preservation, over which the mind has no necessary control — such as shrinking, sneezing, swallowing, coughing, and breathing in sleep: their diseases produce convulsions and paralysis. My own opinion is, that every muscular motion that can be made by the will can be made, if necessary, by aconscious centres, without the will; and that their use is to act in place of the will, or against it, when self-preser-

* The moderating ganglia generally correspond in number with the somniferous, except in the neck, where there are but three moderating ganglia — known as the superior, middle, and inferior, cervical ganglia of the sympathetic nerve. In this case, as in the lower part of the spinal cord, the number of *actual* centres is evidently the same as in the other two series; but the centres are congregated, so as to give the appearance of only three masses, while there are really eight centres. On the same principle, some of the moderating centres appear, in some cases, to be wanting, when they really exist, associated with others. No part of the nervous organism is as unsystematical, or irregular in its development, as the provital, or sympathetic, ganglia, being often different on the two sides, and in different individuals.

vation requires them to do so. At the top of this series, Fig. 54, is the conscious centre in the oblongata.* Each of the motor nerves in the cranio-spinal system is composed of two sets of fibres—one set has an aconscious centre in the spinal cord, and the other has a conscious centre in the oblongata; and, as the motions that the will makes through one set may be made, without the will, through the other, it must often be impossible to determine whether a motion, in any given case, proceeds from the will, or from an aconscious centre. Even those motor nerves which proceed from the oblongata probably have two centres there, one conscious and the other aconscious.

The second series of centres are those which are situated upon the posterior roots of the spinal nerves. I have already explained, that each spinal nerve is connected with the spinal cord by two roots, as they are called, one of which is attached to the anterior, and the other to the

* There are good reasons for concluding that the higher centres, or phreno-organs of the brain, terminate in lower centres, or phreno-organs, and these, in turn, transmit the influence of both centres to a still lower centre; and finally, the joint influence of all is transmitted through one fibre to the oblongata. This will account for the fact that the fibres of the brain all converge towards the oblongata, and all influence its functions, and the character of the motions which proceed from it; yet only a few of the fibres of the brain finally reach the oblongata, to communicate the influences from all the phreno-organs to the mind, and to the motor nerves.

Upon the same principle, it may be, that some of the aconscious spinal centres are occasionally influenced by fibres from the brain, which terminate in them, and overrule their functions. This would, apparently, be a more economical arrangement than to have two distinct sets of fibres, one from the brain to the muscles, and another from the spinal cord to the muscles. The anatomy of the brain, supporting this doctrine concerning its functions and analogy, would lead us to believe that the spinal cord is constructed upon similar principles; but anatomy leaves the matter in considerable obscurity.

posterior part of the cord. The fibres which constitute the anterior root are devoted to the transmission of motor influences to the muscles, but the fibres which constitute the posterior root are devoted to sensations. As each nerve has a ganglion located upon it, there are as many as there are spinal nerves — namely, thirty-one. I have ventured to denominate them *somniferous* ganglia, because I conceive that their principal function is to receive impressions from the stomach and vital centre, the effect of which is to check the nutrition of the nerves, and thus to occasionally produce insensibility and sleep. The connection between the vital centre, *v*, and the somniferous ganglia, is made through the medium of the intercord, commonly called the sympathetic nerve.

The third series of centres are denominated, in this treatise, the moderating ganglia, because their office appears to be to moderate mental influences, and prevent the vital viscera and arteries from being fatally disturbed.

The *intercord* is commonly called the trunk of the sympathetic nerve, and is principally composed of fibres that connect the vital viscera and arteries, with the ganglia and the brain. When the mind contemplates an act, the vital viscera and arteries instantly sympathize and aid the mind in its design, and it is through the intercord that the mental influence, in such cases, is transmitted.

The diagram, Fig. 55, is like Fig. 19, on p. 92, with the addition of the series of moderating ganglia attached to the intercord, to give a general idea of the anatomical relations of the three regular series of nerve centres. The crosses represent the spinal aconscious centres; the ganglia on the posterior roots of the spinal nerves are the somniferous; those on the intercord are the moderating; those arranged on each side of the brain represent, in a general way, the facial moderating ganglia; the actual positions of which are better observed in other figures.

FIGURE 55.

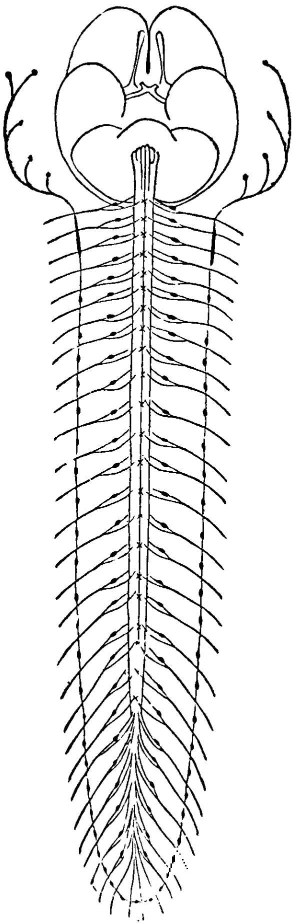


FIGURE 56.

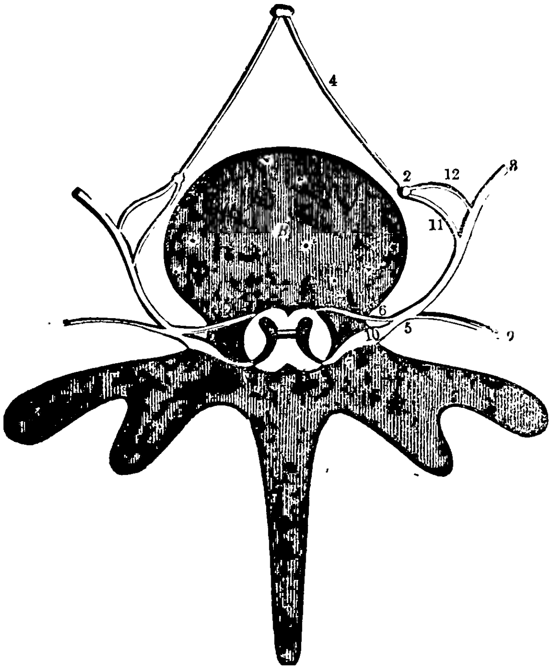


FIGURE 56. Ideal transverse section of the vertebra, spinal cord, intercord, vital centre, and spinal nerves, to show their connections. *B*, Bone of the vertebra. 1, Section of the spinal cord. 2, Section of the intercord. 4, Splanchnic nerve that connects the intercord with the vital centre. 5, Trunk of spinal nerve. 6, Anterior, or motor root of spinal nerve. 7, Posterior root, showing the place of its connection with the spinal cord. 10, Ganglion on posterior root. 8, Branch of spinal nerve, going to be distributed in front. 9, Posterior branch, going to be distributed to the back. 11 and 12, Short cords that connect the spinal cord with the intercord.

The white and gray commissures are very imperfectly represented in the figure, connecting the two halves of the spinal cord. This figure gives a perfect representation of the relative anatomical positions of the three ganglia: axial, (1;) somniferous, (10;) and moderating, (2.)

To prevent the fatal consequences which would be produced by the uncontrolled influence of the mind and brain upon the vital organs, the moderating ganglia are instituted and placed upon the intercord. The fibres from the moderating ganglia, and from the brain, are distributed together to the same parts, so that wherever the mental power extends, there, also, the moderating power is represented, to protect the vital organs. The intercord is evidently composed of three sets of fibres; one set proceeds from the brain to the arteries, and to the viscera in the chest and abdomen. This set is entirely motor—it moves the arteries and vital organs in sympathy with the mind and brain. Another set proceeds from the moderating ganglia upon the intercord to the same parts; these are also motor, but aconscious—instead of acting in sympathy with the brain, they oppose its influence. A third set mostly proceeds in the contrary direction, that is to say, from the vital centre and stomach, up through the intercord to the somniferous ganglia upon all the nerves of sensation, internal and external; but their effect is especially observable upon the functions of the sense of sight. The fibres which connect the vital organs and the brain with each other, can be seen passing between the spinal nerves and the intercord, in the form of two short cords, to each spinal nerve, called communicating cords. One of the short cords contains nearly all fine gray fibres; this appears to proceed from the intercord to the somniferous ganglia. The other short cord contains mostly white fibres, which are believed to proceed from the brain to the intercord.

It is remarkable, that the short cords directly communicate only with the *anterior* branches of the spinal nerves. This is, probably, because it is only through these branches that the mind has occasion to manifest so much energy as to require moderating.

The fourth series of centres includes:

1. The Moderating ganglia in the face. See Fig. 54, *a b c d e.*
2. The Pharyngeal plexus, Fig. 54, *f.*
3. The Cardiac group, Fig. 54, *g.*
4. The Solar group, Fig. 54, *h.*
5. The Renal group, Fig. 54, *i.*
6. The Hypogastric or pelvic group, Fig. 54, *j.*

The *Facial moderating ganglia*, are:

The Lenticular which regulates and moderates the nutrition of the eye.

The Spheno-palatine which relates to the olfactory sense.

The Naso-palatine which probably relates to the same sense.

The Otic which relates to the auditory sense.

The Submaxillary which relates to the nutrition of the submaxillary gland. Besides these, are several minute ganglia which are sometimes absent.

There is also a ganglion upon the facial nerve which evidently belongs to this class, for I believe it is the only instance, in the whole constitution, in which a ganglion is found upon a motor nerve, and it may be remarked, that no voluntary nerve is so much under the influence of the mental impulses. This is evinced by its manifestations in laughing, crying, and in oratorical expression.

The ganglion on the trigeminus called the Gasserian, belongs properly to the somniferous class.

2. The Pharyngeal plexus, undoubtedly, relates to the vocal powers.

3. The Cardiac group: the three highest ganglia of the intercord, (see Fig. 54,) send branches to the cardiac plexus and to the heart, and the great bloodvessels near the heart. The great pneumogastric, vagus, or ipseal nerve, forms intimate and numerous connections with this group. The three cervical ganglia send fibres to the arms and to the face, and probably to the brain.

4. The Solar plexus is a name given to a very complicated group of plexuses, of which the semilunar ganglion seems to be the centre. Each of the organs concerned in the various processes of digestion, assimilation, and egestion, receives offsets from this group. The most interesting offset is that which is called the cæliac plexus, and which seems to be specially devoted to sustain and continue the powers of life, and is, in the body, just what the organ of Sanativeness or Vitativeness is in the brain, a natural guardian of the vital powers.

The solar group may justly be considered what its name indicates, the great vital nervous centre of the whole nutritive system.

5. The Renal, and 6, the Hypogastric groups, all relate to the excretory and reproductive organs, as their positions indicate.

The Prevertebral ganglia seem to be placed in the region of the viscera, to protect them specially from the encroachments of the mental and animal (ultra vital) powers; and the ganglia on the intercord seem to be specially devoted to the nerves that are distributed with the spinal nerves, to the different parts of the periphery of the body.

The cardiac and solar groups are, like the heart and stomach to which they belong, related to the *general* nutrition and circulation, while the ganglia on the intercord, and in the face, and the pelvis, are related to local and *special* functions. To illustrate: the nutrition of the eye and the salivary glands may be slightly increased, or checked, by the influence of the brain, without, in any degree, affecting the great viscera. Each of the ganglia on the intercord is related to some limited locality, which occasionally requires extra supplies or restraints. If there were no moderating ganglia, except the cardiac and solar, the whole nutritive system would have to be excited or depressed, to accommodate itself to each and every petty local function. To prevent this, each distinct locality has its own set of impulsive fibres from the brain, and has, also, a distinct moderating check devoted to its special use.

The prevertebral nerves are remarkable for the number of plexuses which they form; these must not be confounded with centres, or ganglia, for a plexus is merely a mesh of fibres, produced by a great many nerves meeting and interchanging fibres. A true centre has a greater or less quantity of corpo-neurine in it, and this distinguishes it from a plexus. In some cases, a plexus and a centre are combined.

SECTION IX.

THE IMPULSIVE SUPPLY NERVES AND MODERATING GANGLIA, AND THEIR RELATIONS TO THE ARTERIES, HEART, AND STOMACH.

By impulsive supply nerves, I mean the motor nerves which connect the impulsive organs of the brain with the heart, arteries, stomach, and other viscera, and convey mental influences to those bodily parts. I speak of them as impulsive nerves in contradistinction from the voluntary nerves, which transmit the influence of the will to the muscles of the limbs, the face, and the body. I regard the brain as constituted of two classes of organs, Impulsives and Directives. Each sends to the body its own motor influences, through its own peculiar and appropriate class of motor nerves. The directive organs constitute but a small part of the brain; (see the bust;) yet the voluntary motor nerves which proceed from this class, are apparently much more bulky than those of the impulsive class. The reason of this seems to be, because the voluntary nerves have the bones and the larger muscles to move, and, therefore, require larger and more numerous nerves than the Impulsives do, that have only the delicate muscles of the arteries and the viscera to move. The smallness of these nerves, together with the fact that they are generally bound up and distributed with voluntary nerves, has caused them to be hitherto overlooked or confounded with voluntary nerves. Another fact that has contributed to the neglect of the impulsive supply nerves is, that they move parts that are mostly concealed from external view, and are not, therefore, as subject to observation and experiment, as the voluntary motor nerves are. It is not until we begin to notice, and reflect upon, the effects which different states of mind produce upon the circulation, respiration, secretion and digestion, and consider the utility of these effects, that we can appreciate this class of nerves. I denominate them impulsive *supply* nerves, to convey my idea of their actual uses — namely, to regulate the supply of blood to the parts of the body or face, which the mind requires to act. In regulating the supply, they sometimes increase the quantity of blood in a part beyond its ordinary amount, and, under other circumstances, they diminish it, to bring it into correspondence and harmony with the condition of the mind.

When the mind is excited and prompts to action, three classes of motor nerves are brought into requisition; 1. The voluntary motor nerves, under the direction of the external senses and the directive organs of the brain. 2. The impulsive supply nerves, which, under the influence of the impulsive organs of the brain, cause the senses to *attend* to the subject. 3. The moderating ganglia and their motors, that restrain the excessive action of the voluntary powers.

If all the various departments of the constitution required a regular and unvarying quantity of nourishment, there would be no need of impulsive supply, nor of moderating, nerves. The circulation and the vital organs could easily be so adapted to such a regular demand as to supply it regularly. But the various departments are not regular in their operations: the locomotive organs, for instance, will occasionally be inactive, and require no blood for hours together, and then, suddenly, be called upon to make the most violent exertions, requiring, for their maintenance, all the blood that can be spared. Under these circumstances, if there were no moderating pro-vital ganglia, there would be nothing to prevent the locomotive department from using up all the blood, and producing immediate death. The same reasoning applies as well to the reproductive, the mental, or the manual, departments, as to the locomotive. This is, in fact, the true explanation of the prostration of the vital energies, produced by the overtasked minds of intellectual and of business men.

The impulsive supply nerves are so commingled with volitional nerves that they cannot be anatomically separated, and it is, therefore, only by physiological evidences that they can be distinguished. It is fortunate for my present purpose, that it is admitted by all modern authors, that there are nervous connections between the brain and the vital viscera and bloodvessels, though their nature and uses are by no means understood. The best explanation that can be found in the works of the ablest physiologists, is, that the sympathetic nerve is, in some unconjectured way, the medium through which the vegetative functions are brought into harmony with each other, and with the mind. This vague and barren admission is the only result of all their labors in this department. I have not been able to find, in the works of any author, even a plausible conjecture as to the uses of the two series of ganglia which I denominate moderating and somniferous.

The impulsive supply motor nerves proceed from the oblongata to the face, along with the facial and trigeminal nerves, and to the body, through the vagus and the spinal cord, along with the other spinal nerves, and, with them, they leave the cord, to go to their respective termini. I would remark, that some nerves, and especially the vagus and upper branches of the trigeminus, though usually regarded as exclusively sensory, undoubtedly contain motor fibres of the impulsive supply nerves.

Let us describe one spinal apparatus, with its connections, and that will be a sufficient account of the whole. Each spinal nerve is attached to the spinal cord by two roots, one of which connects with the anterior, and the other with the posterior, column. On the posterior root is a ganglion; immediately beyond the ganglion the two roots unite into one trunk, and mingle their fibres, and then divide into two *branches*, an anterior and a posterior; the posterior branch is distributed to the muscles and integuments of the back; the anterior branch forms a connection with the intercord, or sympathetic nerve, by means of two very short cords of communication, and then is distributed to the bloodvessels of the limbs, the skin, the glands, or the muscles of the body. What is the nature and composition of the two short cords? The microscope has reflected some light upon this subject; for it has revealed the fact, that they are composed of white fibres, which appear to proceed from the spinal cord to the intercord, and others which are gray and fine, and appear to proceed from the intercord to the somniferous ganglia. Besides these, a third set pass to the anterior branch, to be distributed, with it, to all parts of the body, to moderate the mental influences. (*See Quain and Sharpey's Anatomy; and Kolliker's Mic. Anat.*)

Perhaps we can acquire the clearest ideas of the impulsive supply nerves, and their relations to the moderating ganglia that are associated to antagonize them, by regarding them as perfectly analogous to the cerebral voluntary motor nerves and the spinal centres, and differing from them, principally, in being distributed to the arteries and viscera, instead of the large voluntary muscles. We must not allow our minds to be distracted by the numerous ganglia which the nerves encounter on their way to their places of destination, but we must regard each ganglion as the centre of a distinct and independent nervous apparatus, with which no other nerves have any necessary connection.

There are three separate series of independent ganglia that are interposed between the organs of the body and those of the brain, and there are three corresponding sets of nerve fibres that connect the brain with the body and face. Each of the three classes of nerves is obliged to run the gauntlet, so to speak, through that one of the three series of ganglia to which it is related in function, and by which it is moderated or checked.

1. The voluntary nerves, which convey from the brain the influences of the will, are associated, anatomically, with the series of centres situated in the spinal cord, which act independently of the will, and often against it.

2. The impulsive supply nerves, that convey from the brain the influences of the emotions to the arteries, are associated with a series of moderating ganglia, which are located upon the intercord or sympathetic nerve. The moderating ganglia produce the same kind of movements as the impulsive supply nerves do, upon which they are situated, and, in this respect, they are perfectly analogous to the voluntary and spinal nerves; but, though the movements are of the same kind, they are antagonistic.

3. The somniferous ganglia, and their fibres, on the

sensory nerves, are analogous to the sensory nerves themselves in this, that they receive their impressions from the body below, and send them upward; but they differ from them in proceeding to independent aconscious centres, instead of the conscious centre.

The three parallel series of centres have this in common, that they all act in opposition to the mind, for the benefit and health of the body: thus, the spinal centres produce sneezing, coughing, swallowing, and shrinking, against the will; the moderating ganglia act against the will in restraining or impelling the flow of blood in the arteries; and the somniferous ganglia check the functions of the nerves of sensation, and thus force the mind into quietness and repose, against the will.

When the mind only requires a local and limited excitement or restraint of a particular organ, (for instance, the salivary gland,) the supply nerves have the power of acting directly and specially upon the local capillaries of the parts concerned; but when the mind requires a general excitement of all the organs of the body, the impulsive mental influence passes not only to the small arteries, but to the large arterial trunks and the great nutritive viscera. The intercord is the great barrier, the ne plus ultra, beyond which no mandate of the will has permission to pass, to disturb the vital organs that hold court within the great cavities of the body; but along this same cord, and into these vital cavities, the impulsive powers of the mind have authority to enter and petition for increased supplies for the distant ultra vital parts which they represent. The impulsive powers, however, in entering these sacred precincts, must not presume to exercise sovereign power; for the pro-vital moderating ganglia and nerves are there, ever vigilant and jealous of all foreign influences.

FIGURE 57.

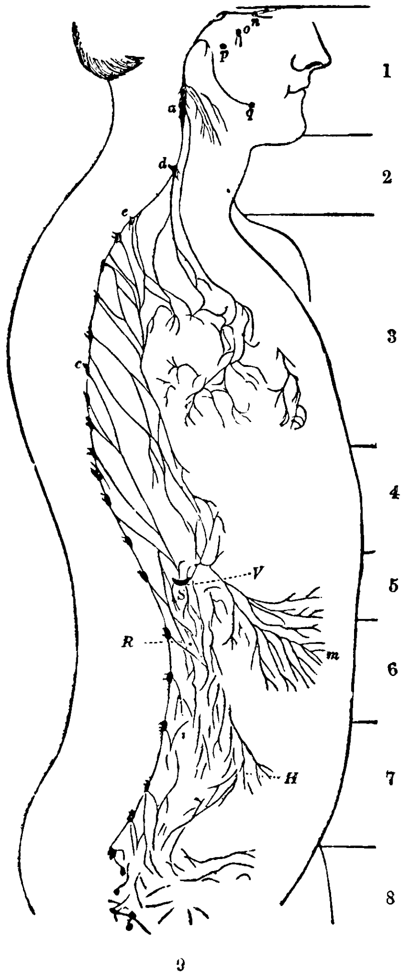


FIGURE 57. Side view of the pro-vital intercord, or sympathetic nerve, with its series of moderating ganglia, extending from the lower part of the trunk of the body, where *b*, the ganglion impar, as it is called, is situated, to *n*, the ophthalmic ganglion, below which are *o*, spheno-palatine ganglion; *p*, otic, *q*, submaxillary. *a*, Superior cervical ganglion, remarkable for its connections with the vagus and the trigeminus, and its influence on the nutrition of the facial nerves of the senses. (See *Brown Sequard's* Treatise.) *a d e* These three moderating ganglia are on the impulsive fibres that proceed from the brain to the heart and lungs, along with the vagus. From *c* to *S* are the moderating ganglia, that restrain the influenees of the mind upon the digestive organs. The cords that proceed anteriorly from the ganglia to the semilunar ganglion, *S*, are called the splanchnic nerves. *V* is the situation of the stomach, and in connection with *S*, is the vital centre from which the whole organism is developed, and on which it depends. The nerves in the vicinity of *S* are called the solar plexus. *m*, Mesenteric plexus, an offset from *S*. *R*, Renal plexus. *H*, Hypogastric plexus. The numbers, from 1 to 9, correspond with the same numbers in Fig. 12, p. 71, which illustrates phreno-physiology. The mesh of fibres between *e* and 4 is called the cardiac plexus and pulmonary plexus, and relates to the heart and lungs. Between *a* and *q* are fibres of the pharyngeal plexus that relate to the nourishment of the vocal organs.

The moderating ganglia, probably, have little or nothing to do, except when the voluntary powers are excited, and their office is then limited to antagonism. During sleep, according to this theory, the moderating ganglia must be entirely idle, though they probably facilitate the production of sleep. Wherever we find any part, the vital energies of which are liable to be overtasked by the voluntary exertions or involuntary functions, there we find, also, fibres from the moderating ganglia, like so many subtreasurers that guard the resources of our country, protesting against all unlawful expenditures, and ready to interfere, if necessary, with an effective force. Wherever impulsive fibres from the brain go to demand supplies, there the moderating fibres from the ganglia go with them, as it were, to watch them, and exercise a conservative and restraining influence over them. It will be noticed, that all the aconscious ganglia are conservative and economical in their operations—they tend to the maintenance of the functions unchanged.

FIGURE 58.

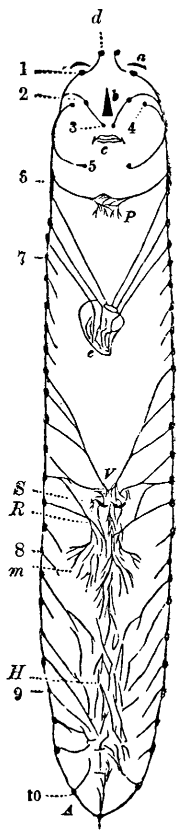


FIGURE 58. This diagram represents the intercords, or sympathetic nerves of the two sides, as drawn further apart than natural, to show the manner in which the nerves, or cords, from the brain and from the ganglia converge to the middle line of the body, to form the pre-vertebral plexuses. No drawing, that I have ever seen, gives as just and clear an idea of the moderating system, altogether, as this does; though, of course, the details are omitted.

a, Place of the eye. *b*, Place of the nose. *c*, Place of the mouth. *d*, Ganglion of Ribes, which is sometimes absent. 1, Ophthalmic ganglion. 2, Spheno-palatine ganglion. 3, Naso-palatine. 4, Otic. 5, Submaxillary. 6, Superior cervical. The two ganglia between 6 and 7 are the middle and lower cervical; and, from the three, it will be seen, that branches proceed from each side to the heart, to form *e*, the cardiac plexus. Thus it can easily be understood, that mental influences reach the heart through these three branches, and are moderated by the influences from the three ganglia. From 7 to 8, the ganglia are called the thoraic; from 8 to 9, the lumbar; and from 9 to 10, the sacral. Below 10, in the centre, is the ganglion impar, in which the right and left intercords unite. *P* Is the pharyngeal plexus, that supplies the throat. *V* Is the vital centre; and below it is *S*, the semi-lunar ganglion. *R*, The renal plexus. *m*, Mesenteric plexus. *H*, The hypo-gastric.

There are many interesting facts and arguments which may be brought to sustain my views of these nervous functions, but I have only room for a few.

1. The mutual relations of *all* parts of the nervous organs, is for the first time, rendered apparent, and a reasonable purpose can be seen in all the anatomical arrangements and connections. I refer particularly to the exclusion of the voluntary nerves from the vital cavities; the intimacy of the ganglia with the brain fibres, and yet, their functional independence of each other; the coincidence of the three series of centres parallel with the spinal cord; the connection of one series of ganglia with sensation, of another with voluntary motion, and of a third with mental-impulsive vi-motion: all these things,

and many others, are now, for the first time, accounted for in a rational manner.

2. There is satisfactory evidence furnished by the observations of *Carpenter*, and the experiments of *Brown Sequard* and others, that the vital functions are perfectly independent of nervous influence of any kind. We have, also, the fact, that animals that have the nutritive organs comparatively the largest, have the visceral nerves the least developed. This could not be so if the nerves were necessary to the performance of the functions of the vital viscera. But the truth is, that the nerves and ganglia cluster around the viscera, and interpose themselves between the arteries and the brain, in greater size and numbers, as the brain acquires more power. This is, itself, sufficient to prove, that the pro-vital ganglia are related to the functions of the brain, rather than to those of the viscera. My idea is, that if a superior animal could be made without moderating ganglia, he would act like any other animal, unless much excited, and then he would kill himself by over-exertion. But if he could be deprived of the power of uncommon exertion, he would feel no ill effects from the deprivation of his moderating ganglia.

3. Some physiologists have looked upon the moderating ganglia as foils, to deaden and absorb the influence of the brain, and prevent it from reaching the vital organs. They were led to this conclusion from noticing, that when the main trunk of a motor nerve was experimentally irritated, those branches of the nerve which are distributed so as to be disconnected from ganglia, immediately responded, by producing contractions; but those branches which passed through a ganglion did not thus respond. It is supposed, by some, that the mental influence is diffused through the ganglion, and thus prevented

from producing any effect. This is miserable reasoning. It might be asked of these authors, for what purpose the branches were sent to the ganglia, if their effects are to be thus altogether nullified? The fact seems to be, according to the latest and best observations of microscopists, and especially of *Kolliker*, that the fibres from the brain do not terminate in the moderating ganglia, but pass through, taking fibres along which originate in the ganglia. These facts perfectly agree with my views of the functions. *Bernard* found, that injury of the sympathetic nerve increased the warmth of the part to which it was distributed. *Brown Sequard* accounts for this very rationally, by supposing that the paralysis of the nerve caused the blood to flow in larger quantities to the part, increasing its nutrition, and thus increasing its heat. Adopting this explanation, it exactly agrees with this theory of moderating ganglia; for the paralysis of the moderating nerve fibre prevented the moderation of the function, and, therefore, the blood was wasted in producing an unnecessary amount of heat. I am inclined to think that fevers may, in some instances, be thus accounted for, by the debility of the moderating ganglia permitting effects almost equivalent to their paralysis, and allowing the blood to expend itself in producing unnecessary heat.

4. Experiments and observations have, also, proved, that the superior cervical ganglion, and also the Gasserian ganglion, is related to the nutrition of the face, and especially to the organs of external sense; for, although the eye and optic nerve may be uninjured, a serious injury inflicted upon the trigeminal nerve, or upon its ophthalmic branch, produces blindness, or serious disease of the eye. It was also found, by *Mr. Stanley*, that an injury of the trigeminus, so near the brain that none of

the ganglionic nerves would probably be involved, was still followed by a disorder of the eye. This indicates, that impulsive supply motor fibres are transmitted, through the upper branch of the trigeminus, to the eye, notwithstanding it is considered as exclusively a sensory nerve. *Dr. Radcliffe Hall* concluded, from his experiments, that the ophthalmic ganglion, and, also, the quadrigemina and the Gasserian, are concerned in the nutrition of the eye. I have no doubt of it.

5. The fact, that irritation of the spinal cord of an animal produces movements of the stomach, heart, and blood vessels, shows that the cord contains the impulsive fibres, by which such effects are produced.* The fact, that irritation of the ganglia on the intercord produces the same effects, indicates, that the same set of fibres extends from the spinal cord through the intercord to the viscera.

6. The fact, that certain states of mind, also, produce the same effects as the experimental irritations of the intercord and spinal cord, indicates, that the same fibres proceed from the brain, through the spinal cord and intercord, to reach and effect the viscera; or else that there are two sets of fibres which perform the same functions, one proceeding from the brain, and another from the ganglia. The fact, that the state of mind that affects the viscera and the circulation is merely impulsive or emotional,

* *Valentin* says, that experimental irritation of the cerebellum and cerebrum produces movements of the stomach, intestines, and other viscera. (*See Kirke and Paget's Physiology, p.* 327. I can testify to the truth of *Valentin's* observations, though they have been disputed by *Longet* and others. It must, however, be confessed, that physiological deductions, drawn from experiments, require to be received with much caution, when not confirmed by healthful and normal manifestations. The physiology of the nerves can only be understood, by bringing all the facts together, from every available source, and comparing them carefully.

and not volitional or intellectual, shows that the nerves that convey the mental influences to the viscera, must be distinct from those that convey volitional stimulus to muscles; and this is confirmed by the fact, that volition cannot directly excite the viscera nor blood vessels, while emotional impulses always can. Still further confirmation is found, in the fact, that no volitional fibres are connected with the viscera.

7. The fact, that when the directive will unites with the impulsive emotion, to guide it to a practical end, it is found that the bodily excitement which the mental impulse produces is precisely the one which is best calculated to prepare the bodily organs to execute the purpose of the mind — this demonstrates that the impulsive powers of the mind are connected with the organs of the body, for the express purpose of rousing the body to such a condition, as the state and purposes of the mind require.

The fact, that some impulsive faculties of the mind, as Combativeness, for instance, increase the vigor of the circulation, while others, such as fear, or Cautiousness, diminish it, proves that there must be two distinct sets of impulsive fibres — one conveying from the brain, a contracting, and the other an expanding influence to the arteries. This is confirmed by the phrenological fact, that persons in whose heads Cautiousness is large, and Hope and Combativeness small, are easily made pale, weak, and melancholy with anxiety and fear; while, on the contrary, those who have Hope and Combativeness large, and Cautiousness small, have, habitually, an expression of countenance and a gait which indicate an expansion of the arteries, and vigorous digestion combined with a consciousness of the ability to contend and to triumph.

Sequard remarks, in substance, that it is a fact, though unexplained, that the same arteries are contracted by nervous influence at one time, and expanded at another. We have then the fact, that the mind causes contraction and expansion of the arteries, and the fact that the nerves do the same. The inference from these two facts is legitimate, that the mind communicates two opposite influences, from two kinds of faculties, through two different sets of fibres, to the same arteries. It would seem, that the arterial muscular fibres are, in this respect, analogous to the voluntary muscles, which are divided into flexors and extensors.

8. The posterior branches of the spinal nerves do not appear to receive any impulsive fibres from the brain, and this agrees with the fact, that the branches are distributed to parts in the back which are in but little danger of being overtasked by voluntary exertion.

9. Another fact is, that the moderating (sympathetic) nerves seem to be plentifully distributed to the sensitive surfaces; and I assume, that the impulsive fibres go with them. This, also, accords with the present theory; for those parts which are endowed with exquisite sensibilities stand in especial need of having the arterial blood varied in quantity, to suit their various exigencies; and we actually find, that the blood does vary, in the skin or in the eye, in exact proportion as its sensibility is excited, or the mental impulses are called into action by the impressions conveyed from sensitive surfaces. Sanativeness, Cautiousness, Destructiveness, Combativeness, Amativeness, Parentiveness, and Adhesiveness, are easily roused and modified by impressions that reach the brain from the sensitive surfaces of the skin, or the eye; and this sufficiently accounts for the mental impulsive nerves visiting those surfaces. The same reasons which require the moderating fibres to be distributed to any other part

which is liable to be overtasked, requires that they should be distributed to the skin, the eye, the ear, the nostril, and to the mouth, as they actually are. There is sufficient proof, that a continued exercise of sensation occasions the expenditure of blood, quite as certainly as muscular exertion does; and the Creator of the organism made arrangements to supply the blood to the sensitive surfaces, according to their requirements.

10. I have found, that I can, by merely talking to a susceptible person, in a way calculated to excite the impulses of the mind, such as hope, pride, or anger, cause the pulse to beat in a full and vigorous manner, and the skin to become warm and florid; on the contrary, by talking to the same person in such a way as to excite the negative, or depressing, powers of the mind, such as fear, or Submissiveness, I can cause the pulse to beat as many as one hundred and fifty times in a minute, the countenance to become pale, and the extremities cold, while a clammy perspiration breaks out, and the patient complains of faintness and nausea. These facts led me to reflect upon the nervous connections which must exist between the brain and the vital organs, to allow of such effects being produced upon the viscera and skin, *through* the mind, but without the will. I further found, that the effects produced upon the vital functions varied greatly in different persons, both in degree and in kind.

There is scarcely any function of body or mind which can not be affected and varied, in some slight degree, in almost every person, by merely exciting the mind in an appropriate manner; but, in some peculiarly susceptible persons, the most powerful and decided effects can be produced upon any organ or function of the body or mind. By this means, the most astonishing cures are sometimes effected, of diseases which are caused by a derangement or sluggishness of the vital organs, or of the capillary vessels. Thus it is that swellings are reduced, rheumatic pains banished, as if by magic, headaches and toothaches, and irregularities of the circulation, relieved, and sorrow and melancholy driven from the mind. The persons who practice mesmeric biology and spiritualism produce all their real results in this way, and in no other, though they may not themselves be aware of it, and may give the credit to electricity, or to spirits, or to any other false causes.

11. The vagus, or pneumo-gastric nerve, is, in many animals, so intimately associated with the moderating ganglia and impulsive nerves, that some authors speak of them as one system; but the important distinction is, that the vagus relates to the procuring and ingestion of nutriment, and the impulsive supply (or sympathetic) presides over its distribution. From this, it is evident why they are at once distinct, and yet intimately associated. The vagus was the first created nerve in the body, and is the only nerve that exists in the bodies of many animals which have no signs of a sympathetic nerve.

The next created nerves *in the body* were those that relate to locomotion, and those that *moderate* the animal impulses. It is difficult to determine the functions of all the nerves in the lower invertebrated animals, but if we examine the most active and voracious of them, we find a system of moderating ganglia situated near their large salivary glands, and others near the stomach, as if to protect those important parts from the ruin which the vigor of their voluntary powers render imminent. The large, indolent mollusks, with enormous digestive and assimilating viscera, have the moderating ganglia but slightly developed or entirely wanting; but the vigorous and enterprising insects, whose digestive and assimilating apparatuses are reduced to their smallest possible proportions, have the moderating ganglia very large, particularly in connection with the large salivary glands of those that feed upon crude and green plants. In the lowest vertebrated animals, the pro-vital ganglia, both somniferous and moderating, seem to be scarcely perceptible, and they develop more and more as the animals rise in organization, until we come to man.

I consider it as a strong confirmation of these views, that all three series of centres — spinal, somniferous, and moderating, are gradually and equally increased, exactly as the brain increases in size, from the lowest vertebrated animal to man. Many of the lower animals have a larger spinal cord than man, but this is owing to the greater quantity of fibrous neurine which it contains. No vertebrated animal has as much corpo-neurine in the central part of its spinal cord as man, nor has any animal as large somniferous or moderating ganglia.

The vagus is principally a nerve of sensation, transmitting from the throat, stomach, heart, lungs, liver, and all blood making organs, such sensations as they require to make known their peculiar wants to the mind. These sensations are known under the names of hunger, thirst, faintness, depression of spirits, weariness, and pain; and to this may probably be added, sleepiness. It is, in a word, the great ipseal nerve of the body, whose office is to call upon the mind for whatever the body needs to sustain the health of the individual. I think it not unlikely, that the preference which animals and men feel for particular kinds of food, all depends upon sensations transmitted through this nerve: thus, sensations from the liver may produce a desire for alkaline food; from the pancreas, for acids; from the lungs, for sugars and fats

This subject is too extensive to be disposed of in a few paragraphs, and I cannot afford, in this volume, the space which its importance demands. I will, however, remark, that I am certain, from thousands of observations, that this nerve is associated, in function, with the ipseal organs on the side of the head, and that a disproportion of the development of the cerebral organs is always associated with a tendency to diseases of the functions connected with the vagus. Persons narrow through the head, just before the ears, have a tendency to dyspepsia, or debility of the stomach; those with very great lateral developments of the cheek bones, have a tendency to the irritation of the lungs; persons with a depression of the parietal bones at Hope, have a tendency to general debility of the nutritive organs, accompanied with melancholy.

That the vagus possesses impulsive vi-motor fibres, as well as sensory, is proved by the experiments published by *Sequard* and others. A sudden blow or a shock of electricity, applied to the vagus or to the oblongata, instantly stops the beating of the heart; a violent and sudden emotion, in a delicate constitution, does the same. *Sequard* reasons with great justice, that these effects are produced by the nutrition of the heart being suddenly suspended by the ábnormal condition of the nerves which connect the heart with the oblongata.

Prelimination.—There is nothing which distinguishes the functions of the brain from other nervous organs, as much as the fact that they tend to produce acts which are in their nature preliminary. This preliminating character of the phreno-organs is seen in all their manifestations, and in nothing more obviously than in the effects of the impulsive organs of the brain upon the body. The brain does not wait until the organs of the body are actually engaged in labor, and then commence impelling the blood to sustain them; but, as soon as the mind contemplates an act, the blood is sent to the parts of the body that have the principal labor to perform; and, if there is not blood enough made, the digestive organs are impelled to increase their movements. To illustrate: when we think of eating acid fruits, the mind causes the alkaline saliva to flow into the mouth, and thus prepare it for the reception of the fruit, and for swallowing it with facility and ease. So also, when Destructiveness and Combativeness cause the mind to suddenly contemplate an angry struggle, in which it is probable that personal exertion will be required, the blood reddens the cheek, and adds brightness to the eye by increasing the circulation in its parts, expands the lungs to obtain more air, and adds power to the blood; the heart swells and urges forward an increased supply to the limbs; and this is done, in many instances, before a word is said, or a single movement made. It is a preparation which the mind impels the body to make, *preliminary* to the struggle. The blood, in such cases, circulates more plentifully in the external organs of the senses, to qualify them to perceive, perfectly, the objects of action. It circulates in the face, and reddens the cheek, to sustain the mouth and jaws in their exertions to inflict injury upon the enemy. Human beings so seldom use the jaws and muscles of the face in battle with each other, except in speaking, that we are naturally led to overlook the primitive physiological relation of the face to Destructiveness, or anger; but when we consider the uses that carnivorous animals make of the jaws and muscles of the face in fighting, we shall perceive that we are justified in attributing the increased circulation in the face, during moments of anger, to the necessity of supplying the parts with blood, to sustain them in the animal struggle, which the anger suggests. This view of the physiology of anger is supported by its physiognomic expression, which is the same in man as in the carnivorous animals, and consists in a drawing down of the corners of the mouth, as if to expose the tearing teeth, and to prevent the under lip from being torn or injured. The movement of the mouth, in animals, indicates a preparation for battle; in man, it expresses hatred or dislike, which is, also, a prelude to a hostile course of conduct.

When we consider the important influence which the mental impulses and emotions have upon the face, and that they are exhibited there more than in any part, except in the cavities of the body, we shall be able to understand what has never hitherto been explained, and that is, why the moderating ganglia are so numerous in the face, (see fig. 58,) ministering to both motor and sensory organs.

Extreme fear, instead of exciting the arteries to increased action, contracts their coats, makes their calibre less, and decreases their capacity for conveying blood. The skin becomes shriveled, cold, and damp; "cold fearful drops stand on the trembling flesh;" digestion ceases, and the heart beats rapidly but faintly, as when death is near. This condition of the circulation is in harmony with the passive helplessness which it indicates. It is a preparation of body and mind, for organic suspension and death. It implies, that there is nothing to be done—action is useless, resistance hopeless, ruin inevitable. What blood there is in circulation, rallies around the heart to make a last expiring effort. In some peculiarly susceptible constitutions, this state of things,—excited by fear—actually produces the death which it apprehends, even when the subject is in a normal state of health. But, when really suffering from disease, the danger is very great, that the state of the mind thus produced will aggravate the existing symptoms, by operating through the impulsive supply nerves in a way which we can now readily understand, by the light of this physiology of the nerves and brain. We can, also, understand, how it is that the mind so often produces imitations of the symptoms of disease; and where there exists a slight predisposition, the imitation becomes a reality.

In sleep, when no acts are contemplated, the skin is comparatively cold, and the circulation inactive. In fear, when the mind contemplates danger which it does not seem that action can avert, and we wait in suspense for the catastrophe, conciliating the foe by submission, the mind influences the supply nerves and arteries, and so prepares the body that death itself is robbed of most of its agony by the preparatory process of despair. In this moment of deadly fear, let it be discovered, that the danger may be avoided by a vigorous exertion of the locomotive powers, and instantly hope and courage literally spring up in the heart, and give an impulse to the circulation; air once more rushes into the lungs, strength braces every limb and muscle; and energy is imparted to every function that can aid in the escape.

Similar reasoning may be applied to the emotions of love, and the effects of disappointment upon the heart, and all the nutritive functions. Happy and prosperous love operates, through the mind, to give increased energy to the nutritive functions; and disappointment produces the same effects as fear, but more lasting and continuous, and in delicate constitutions often produces fatal consequences. *Shakspeare* describes one

> "Who never told her love, but let concealment,
> Like a rose in the bud, feed on her damask cheek."

Had she burst forth with an indignant expression of anger, and made the whole circle of her acquaintances sympathize with her suffering, it would have been an indication, not that her love was less, but that her constitution was stronger, and her mind more hopeful. External manifestations of sorrow generally spring from the energetic and opposing parts of our nature, and indicate our ability to overcome it; but silence, retirement, and fasting, indicate the weakness and submission of hoplessness.

Shakspeare illustrates this well in the scene where Macduff first hears the terrible tidings, that the tyrant has caused all his children to be murdered. The effect upon him is so stunning that Malcolm becomes alarmed for his health, and exclaims:

> "Merciful heaven!
> What, man! ne'er pull your hat upon your brows;
> Give sorrow words: the grief that does not speak
> Whispers the o'erfraught heart, and bids it break."

The effects of the impulsive emotions upon the heart, salivary glands, and the face, are so easily observed that they need only to be mentioned, to be understood; but there are, undoubtedly, many other effects not quite so obvious, at first, that depend upon the same principles. When we contemplate wholesome food, not only does the saliva flow into the mouth, but the gastric juice is, unquestionably, secreted, and poured into the stomach in increased quantities; and the liver and pancreas increase their functional action. When agreeable thoughts occupy the mind, the impulses affect the stomach agreeably; but when disagreeable subjects are forced upon the attention, the digestive faculties are instantly disturbed. This is sufficiently illustrated by the effects of jealousy and anger. Anger produces a sour stomach; jealousy — the "green-eyed monster"— deranges the function of the liver; fear decreases the action of the skin, and increases that of the kidneys; grief gives "sorrow vent," and relieves the brain, through the lachrymal glands, in a "flood of tears," just as the electricity of the atmosphere is vented in a shower of rain.

12. The larger the brain is, compared with the other departments of the constitution, the greater is the influence of the mind over the body; and when the respiratory organs are large and vigorous, and the brain, also, large and well formed, while the limbs and features are small, and the pelvis and abdominal region of subordinate size, we may expect the capacity for powerful expressions of feeling, which an orator or actor requires. Such is the organization of Rachelle, the celebrated tragic actress. A large development of Firmness gives the power of controlling her own mind and external influences, so that she can call into operation any power she pleases; and when it is thus called up into the mind, it exerts its legitimate influence upon the circulation, producing its own natural expression of love, fear, hatred, jealousy, pride, or anger. Acting is not, merely, the imitation of the expression of passion; it is the power of actually giving the reins of the mind, for the time, to a ruling passion, and allowing it to exert its natural effect upon the nerves and muscles, upon the features, the voice, and the blood-vessels.

The talent of the orator, so far as manner is concerned, then, depends upon the power of bringing the mind into a state of artificial dreaming, or reverie, and allowing a definite train of thought and feeling, under the influence of a master passion, to occupy the mind in a certain order and succession; for it seems, that, although we can not call the blood into the cheek, or banish it, at will, we can indirectly accomplish the same object, by calling up in the mind certain trains of thought, and then the circulation of the blood will adapt itself to the sentiment as a natural consequence; and thus we can make the cheek redden with indignation, or we can make "cold, fearful drops stand on the trembling flesh."

Walter Scott somewhere says, that no man can be a successful impostor, without, in some degree, imposing upon himself. Doubtless, the reason of this is the same as that which makes it necessary for the actor to impose on his own mind, as it were, for the time, the sentiment which he represents. All this results from the fact, that we can not, by our will, control the circulation; but we can, by will, call up into the mind any train of thoughts we please, and then the blood follows the thoughts. We can not, by will alone, cause the saliva to flow; but we can, at pleasure, think of delicious fruits, and then it will flow abundantly; so also, though we can not raise the flush of indignation, or of modesty, at will, yet we can contemplate a situation, the thoughts of which will produce that effect, in a perfectly natural manner. Thus it is, also, that the thoughts of a disease which we understand will produce many of its symptoms, and if there is, in the constitution, a predisposition to it, the thoughts may produce the actual disease itself. So also, I have no doubt, disease is often cured, by the effects which the mind produces on the bloodvessels, and through them, on the causes of the diseases. In the same manner, a powerful orator produces in many of his auditors, not only a certain condition of mind, but a corresponding condition of the body. He causes the cheek to flush, or to grow pale, the eye to brighten, the heart to palpitate, the tears to flow, or the cold chills to creep over the flesh, at his pleasure, by forcing the mind to contemplate scenes which naturally produce such effects.

RELATION OF THE PHRENO-ORGANS TO THE CONTRACTION AND EXPANSION OF THE HEART AND ARTERIES.

The impulsive organs of the brain are divided, in the engraved bust, into Ipseals and Socials. Some of the Ipseals are expansive in their effects upon the bloodvessels and viscera, that is to say, they legitimately influence the bloodvessels to pour forth their contents freely, to redden the cheeks, and give vigor to the functions. Perhaps all the Ipseals may be justly included in this division, except two — namely, Secretiveness and Cautiousness. These two organs have a contractive effect upon the arteries, restraining their functions, or moderating their activity; so true is this, that those who have these phreno-organs decidedly predominant have, habitually. more pale faces than others — all else equal. Among the social organs, there is, also, to be found the same distinction. Most of the Socials belong to the expansive order, but Submissiveness, evidently, must be reckoned with Cautiousness and Secretiveness, as a contractive impulse, which tends to restrain enterprise, and submit to the powers that be. There is a natural tendency in Submissiveness and Cautiousness to act together; they are both large organs, and both have a restraining influence upon the voluntary and involuntary functions. The two organs will also generally be found, large or small, together in the same head. Cautiousness is the great restraining Impulsive of the ipseal class, and Submissiveness, of the social class. The moral and physical stimulus that excites one, excites the other, also; and so near alike are their manifestations, that it will be found, in practice, very difficult to distinguish between the external effects of reverence and those of fear. One faculty gives a sincere respect for power, as manifested by superiors, and the other a dread of its injurious operations upon ourselves.

The phenomena of mesmerism and spiritualism are sometimes the extreme effects of both of these organs combined, acting upon a weak, nervous organism.

SECTION X.

SOMNIFEROUS SYSTEM OF NERVES.

ECONOMICAL NATURE OF SLEEP.

PHYSIOLOGISTS have, hitherto, given no rational explanation of the causes and uses of sleep. The prevalent notion is, that it is a suspension of the animal powers, in consequence of their exhaustion; and that, during sleep, there is an accumulation of power, which may be expended during the waking hours that immediately follow. *Young* speaks of

> "Tired nature's sweet restorer, balmy sleep,"

as if something is lost by the active exertions of the day, which is regained by the process of sleeping. *Liebig*, the justly celebrated chemical physiologist, lays down the rule, that a man gains, during seven hours' sleep, the force which he expends during seventeen working hours; and, if I understand him correctly, he even expresses a doubt, whether man grows at all except when asleep.

I must oppose this doctrine; for all facts tend to show, that the principal advantage of sleep consists in the mere economizing of nutriment, since, by a temporary suspension of the voluntary powers, there is a clear saving of just as much nutriment as it would require to sustain the functions so long in a state of wakeful activity. The digestive and assimilating organs are also saved the labor of preparing the nutriment.

In 1844, in a volume entitled Etherology, I published an article on a new philosophy of sleep, in which I attempted to show that economy is its main purpose. At that time, I had not discovered the great organic law of economization, which is announced in this work, as applicable to all living beings, and all functions; but I had observed its operation in this instance.

Let us carefully distinguish sleep from other conditions that resemble it. Vegetables are sometimes said to sleep, because they droop, and suspend, or modify, their functions, in the absence of the stimulus of light or warmth; but this is not analogous to human sleep, but, rather, to the rest of a man who is quiet because he has no motive sufficient to prompt him to exertion. Vegetables are capable of becoming frozen, and remaining in a state of torpidity during winter—dead, but not disorganized, and capable of resuming the functions that constitute life. But neither can this torpid state be called sleep. The animals that approach nearest to vegetables in organization have the same capability as plants, of remaining in a frozen state during an indefinite period, and, upon the application of the requisite amount of caloric, resume, again, the functions of life. All the classes of invertebrates belong in this category; none of them can, properly, be said to sleep. In the absence of stimulus, they rest; but this is not sleep: under the influence of cold, they suffer a temporary death; but neither is this sleep. The two lowest classes of vertebrates—namely, fishes and reptiles—resemble the invertebrates and plants, in possessing the capability of becoming torpid under the influence of cold; but there is no evidence that they are capable of the same kind of sleep as that which human beings enjoy. I have the testimony of many persons who have kept fishes in glass vessels, and in other places where they could easily be observed, and they all agree, that they are never seen to sleep. The Baron von Paymer, who resides in Lancaster, N. Y., informed me, that when he suddenly changed the water in which he kept his fishes, from warm to very cold, they sank to the bottom, turned upon their sides, and appeared to be dead; but, when he added warm water, they immediately resumed their activity. The reason why these low animals become torpid under the influence of cold, is, that their digestive and respiratory powers are not sufficiently developed to enable them to engender the amount of heat which is necessary to maintain life.

When we come to the class of animals immediately above reptiles—namely, the birds—we find them incapable of torpidity; and they are the lowest animals that may, properly, be said to enjoy sleep. In fact, it is only birds and mammals—the two highest classes of animals—that manifest, unequivocally, the ability to enjoy real sleep, in contradistinction to torpidity.

True sleep consists in suspending the animal and mental functions, while the vegetative are continued. Freezing suspends both. Immediately above the birds, are the hybernating mammals; such as the marmot, or woodchuck, the tenrec, and the bat. The state in which they remain, during winter, is like the torpidity of reptiles, only, in being produced by cold, and in continuing until spring; but it is like true sleep in this, that it is only a suspension of the animal powers, while the vegetative continue to engender heat enough to keep them from freezing. Hybernation is produced by suspending volition, and checking respiration, thus preventing the consumption of nutriment, except for warmth. The sleep of the highest classes of animals, differs from the torpidity of the lower in being produced independently of the cold, and even when surrounded by stimuli and motives, which prompt to exertion. It does not depend upon external exciting causes, nor can it be entirely prevented by them; but it is an internal law or habit of the constitution. It also tends to return at stated daily periods, though these periods are capable of being greatly varied by the relative amounts of labor which are imposed upon the brain, and the nutritive system; thus, if the brain is much excited, sleep may be postponed; or if the stomach and liver are much excited, the sleep is encouraged. The stomach and brain must, therefore, be considered as antagonistic; one tending to produce sleep, and the other to decrease it. The brain being considered as a collection of potentive ganglia, and classed with those, on the nerves of special sensation, they must be regarded as antagonistic to the somniferous ganglia, on the same nerves.

This view enables us to embrace the physiology of nearly the whole nervous organism in a few words: thus, the nerves of sensation and their potentive ganglia, including the brain, tend to keep the mind occupied with the impressions which they transmit, the largest ganglia controlling the mind. Associated with each potentive ganglion is a somniferous centre, which receives impressions from the stomach, and transmits its peculiar motor influences to contract the minute arteries that nourish the nerves of sensation, the sensory nerves being thus deprived of nourishment, suspend their functions, and sleep until the arteries are again expanded by influences from the potentive ganglia and brain. From this, it appears that waking depends upon the predominance of the potentive ganglia and brain, and sleeping, upon that of the somniferous ganglia and stomach ; the two systems acting thus in direct antagonism to each other.

Infants sleep most of their time, if they are in health, and only wake to demand nourishment, and a comfortable situation. Most children are in continual motion during the day, because their locomotive organs are growing, and require exercise, but if they violate the law of economization, by playing or studying too much, or otherwise overtasking the nutritive powers, nature is certain to inflict a just and summary punishment by shortening their lives long before their precocious powers arrive at maturity. I am inclined to think, that it is the disproportionate activity of the respiratory powers, that ruins precocious children. The activity of the mind, which is observed in such cases, is probably a mere symptom of combustion. The activity of the brain, and limbs, and lungs, burns up the food and the flesh, and produces consumptions. In these cases, there may be no disease of the lungs, yet there is a disease which may be called arterial consumption, the remedy for which is quiet and sleep.

The animals that store their food have small lungs, that they may consume but little nutriment; those that hybernate nearly suspend their respirations, and thus avoid starvation. In pulmonary consumption, the patient dies for want of air, the food being incapable of nourishing, unless when combined with oxygen, which the lungs can not furnish while in their diseased state. But, in the case of precocious children, the reverse is the case: the head, being large, is continually provoking the mind and the voluntary muscles to activity, and the lungs being fully developed, also, the nutriment furnished by the digestive system is nearly all used up in sustaining the motions, and in producing warmth, so that the growing process is suspended.

The active exercise of all the animal functions and most of the mental Impulsives requires the coöperation of the respiratory powers; and it is certain, that respiration can only be effected by consuming food or flesh. If respiration consumes more nutritive material than the stomach furnishes, leanness and debility follow, and growth is stinted. Sleep, in such cases, is the auxiliary of the stomach, and enables the body to regain the flesh which it lost the previous day, and, also, to add to its bulk by growth.

In this sense, it may be said, that the body regains its losses during sleep; but if the powers are temperately exerted during the waking hours of an adult of full growth, his digestion, when awake, is fully equal to his consumption by respiration during the same time; and, of course, sleep is not necessary to enable his digestive organs to supply his animal powers, though it is useful as an economizer of food.

A person who is kept for a long time without sleep becomes insane, and dies, not from want of nourishment, but in consequence of the irritation of the brain, produced by suddenly breaking up an hereditary constitutional habit, which is so fixed as to be a vital law of our nature.

My attention was first particularly drawn to the subject of sleep, by noticing a boy who was remarkable for his intellectual precocity, who slept but little, and talked in his sleep. He was continually active. From early dawn until late in the evening, his body and his mind were in unceasing motion, though his health was delicate. His head was large, (the upper part especially so,) but it was narrow at the base. His body and limbs were very slender, and his lungs were proportionately larger than his pelvis. This is the very combination for intellectual, moral, and locomotive, activity. I instantly called to mind a large number of children of similar organization, who had the same habits; and I could, also, recollect others, whose heads were small in the higher regions, though they had large bodies, and their habits of body and mind were equally in contrast with those of the precocious children. They were slow in motion, speech, memory, and understanding; but they continually improved. At the age of puberty, the whole character advanced to a higher state of development, and now, at the age of manhood, they are men indeed—not men of genius, it is true, but they are possessed of strong practical sense, good constitutions, and good health; they generally devote about ten hours a day to business, six to recreation and improvement, and eight to rest and sleep. The precocious geniuses generally become cyphers in society, for want of nutritive and respiratory energy, or they die before maturity; but the moderate child, that promises to be no credit to the family, outlives all the others, and transmits his name and his moderation to posterity. It is worth some consideration, whether it is not best to check the playful activity of body and mind, manifested by those children whose heads are large, while their bodies are slender, instead of exercising them in the open air.

Sleep is a condition in which the nutritive organs have an opportunity to grow, and, also, accumulate extra energy to expend in play or labor; though this is not, as is generally supposed, the sole purpose for which sleep was instituted. The only use of play is, to exercise the powers—to improve them. More play than this robs the growing organs of the nutritive materials which they need for their own sustenance and expansion. Grown persons only digest food for two purposes—namely, for the reparation of wasted organs, and for motion; but children require nutriment for three purposes—reparation, motion, and growth. If the body is small in the region of the digestive organs, while the head is large, they will easily be excited to action, and manifest a great variety of abilities, but they will not grow, unless the greatest care is taken to prevent them from either playing or studying too much. They should be kept in healthful quiet, encouraged to sleep and rest as much as practicable, and protected from habits of long-continued labor, play, study, anxiety, or excitement.

RELATION OF THE SENSES TO THE STOMACH.

It is universally assumed, that sleep is most especially manifested by the senses. They are commonly said to be "locked in sleep," "steeped in forgetfulness." *Shakspeare* calls sleep "the warder of the brain," as if its office is to keep impressions out and impulses in. It is also assumed, by all authors, that sleep is, in some way, related to the nutritive powers. Here, then, we have two sets of organs—the senses and the stomach—distant and different from each other, but both admitted to be related to sleep. A little observation and comparison of the facts will bring us to the conclusion, that the relation consists in the senses being overpowered by the nutritive organs, to produce sleep; for we find, that whenever, in a state of health, the nutritive system is temporarily overtasked, sleep ensues: for instance, when one is in danger of freezing to death, the nutritive organs endeavor to monopolize all the blood, by inducing the senses and voluntary powers to sleep. And here, again, we are reminded of the hybernating animals, that sleep during cold weather. So, also, when we respire atmospheric air which has been rendered impure by carbonic acid, we become drowsy; as if the vital powers reserve the pure blood for their own use, and cause the senses, brain, and limbs to pause first, and thus prevent immediate death.

From what I have said, it is plain that there is an antagonism between the nutritive powers, on the one hand, and the senses, brain, and voluntary powers, on the other, and, accordingly, we shall find, in practice, that in those constitutions in which the body is large and inclined to corpulency, the tendency is to sleep; while, in persons who have large heads, the tendency is to be wakeful.

RELATIONS OF THE SOMNIFEROUS GANGLIA TO THE STOMACH.

It will be obvious to any one who will reflect upon the facts which I am presenting, that there must be some anatomical connection between the organs of nutrition and those of sensation, by means of which the nutritive organs influence the senses to produce sleep; and, if we actually find the two classes of organs connected by a special set of nerves, we shall certainly be justified in concluding, that sleep is the object of the connection. Let us enumerate some of the anatomical facts:

1. Each nerve that communicates sensation to the mind, has a ganglion upon its root, the uses of which have hitherto been unknown, but which I denominate the somniferous, or sleep-producing, ganglion.

2. Each of these ganglia is connected with the nutritive organs by means of nerve fibres, which, according to the authority of *Kolliker* and others, can, by the aid of

the microscope, be distinctly traced from them to the sympathetic intercord. The intercord is principally composed of fibres which connect the brain and nerves of sensation with the nutritive organs.

FIGURE 59.

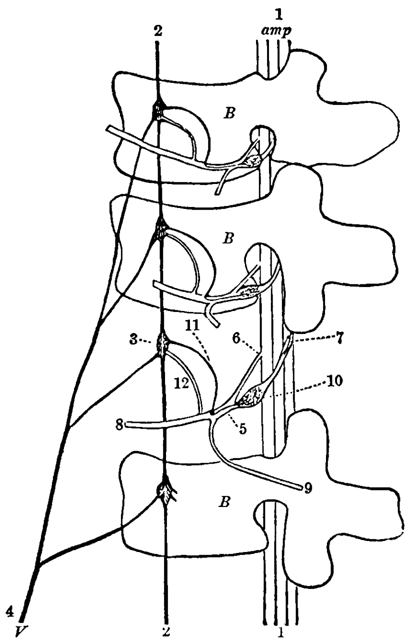


FIGURE 59. Diagram to show the connections of the spinal cord and its nerves with the pro-vital, or sympathetic, intercord, and its branches. *B B B*. Three of the vertebral bones. One of the bones is left out, to show the connections of the nerves. 1, Spinal cord, extending through the vertebral canal. *a m p*, Anterior, middle, and posterior, columns of the spinal cord. 2 2, Intercord. 3, One of the moderating ganglia on the intercord. 4 *V*, Splanchnic nerves,

proceeding to and from the brain, and from the series of moderating ganglia to the vital centre and the viscera. 5, Short trunk of the spinal nerve. 6, Anterior, or motor, root of spinal nerve. 7, Posterior, or sensory, root of spinal nerve. 8, Anterior branch of spinal nerve. 9, Posterior branch, going to be distributed to the back, without forming any connection with the intercord. 10, Somniferous ganglion on the posterior root of spinal nerve. 11, Short cord that communicates somniferous influence from the vital centre to, 10, the somniferous ganglion. 12, Short cord that communicates mental influence from the impulsive phreno-organs, through the spinal cord, spinal nerves, and moderating ganglia, to the vital viscera and large arteries, to cause them to act in such a manner as to harmonize with the state of the mind.

According to this statement, the dark cord, 11, belongs to the somniferous system, and the white cord, 12, to the mental impulsive system; 11 is related to ganglion, 10, and 12 is related to ganglion, 3; 11 sends influence, through 3, *to* 10, and 12 sends influence, *through* 3, to 4. 12 constitutes but a part of the mental impulsive fibres from the brain; the other portion passes through 8.

3. The motor nerves have no ganglia upon them, and, if these views are correct, there is no need of any, for a suspension of sensation produces a suspension of motion.

4. In the lowest class of fishes, there are no ganglia upon the spinal nerves, though they are very large upon some of the cranial nerves; accordingly, it is doubtful, whether they ever sleep as man does.

The ganglia upon the cranial nerves are potentive, that is, they sustain and continue the power of sensation, and thus act in opposition to sleep. This is consistent with the fact, that the fishes — the animals which have the optic potentive ganglia largest — have no somniferous ganglia.

When, in higher animals, somniferous centres were added to the nerves of sensation, they were placed in the potentive ganglia to antagonize their influence, whenever the nutritive organs required them to do so.

5. In the highest classes of fishes, and in reptiles, the ganglia on the spinal nerves exist, but they are very small; in birds they are larger, in mammals larger yet; and in man they are much more developed than in any other animal. In accordance with the anatomical facts, we find that man sleeps longer, sounder, and more regularly than any other animal.

6. Invertebrates have no ganglia on their spinal nerves, and they are like the lowest fishes and reptiles, in the fact that they suspend the operations of both nutritive and voluntary powers, and remain torpid an indefinite time, without losing their vital capabilities. This torpidity cannot be compared to the sleep of man and other mammals, in which the nutritive organs are continued in operation, while only the senses, brain, and voluntary organs suspend their functions.

7. Another reason why insects and other invertebrates have no need of proper sleep is, that they have no proper brains for their nutritive organs to antagonize, and we find that the ganglia on the spinal nerves are, in all vertebrates, developed in rigid proportion to the perfection of their brains. This fact, alone, would be almost enough to indicate, that their ganglia are somniferous in their character; no other reason can be conceived why insects, which have such perfect nerves, in other respects, should be entirely without these ganglia. Some anatomists are disposed to confound the somniferous ganglia with the moderating, and speak of them altogether as "sympathetic;" but we have the very important fact, that some of the moderating ganglia are well developed upon insects, but no somniferous ganglia are found upon the spinal nerves of any invertebrate, nor of the lowest vertebrates. This is sufficient, of itself, to indicate, that the two classes of ganglia are different in function.

FIGURE 60.

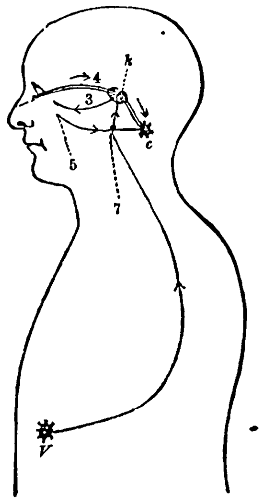


FIGURE 60. This diagram is made to illustrate the relation of the vital centre of nutrition to the optic and trigeminal nerves by which sleep is mostly produced.

4, Optic nerve. *k*, Optic somniferous and potentive ganglion. *c*, Conscious centre in which the optic nerve terminates. 3, A portion of the third motor nerve, that proceeds from the optic somniferous ganglion to the eye, to roll it up in sleep, and in those convulsions which are but an exaggeration of sleep, or, rather, an insanity of the somniferous apparatus. 5, The trigeminus with its somniferous ganglion.

When the nutritive system requires that sleep shall commence, an influence is sent to all the nerves of sensation by means of a special set of fibres, which the microscope has revealed. *V* Is the vital centre, from which a line of influence extends to 7 and to *k*, to suspend the nutrition of the nerves of sensation, and thus suspend their function, and produce sleep. This diagram enables us to understand why an irritation of the stomach, intestines, or the nerves of the spinal cord produces blindness, insensibility, convulsions, and morbid sleep; for the nutritive organs communicate, through the solar plexus, with all the nerves of sensation.

8. The special sense of sight is the highest and most important of all the senses. It has more influence than any other upon the movements of the body, and upon the operations of the mind. It has the largest potentive ganglia in animals that do not sleep, and the most complicated somniferous apparatus in those that do. The rolling upward and inward of the eye, in sleep, and the contraction of the iris, to exclude light, are movements produced by the agency of a set of nerve fibres, of the third pair, which have their centres in the optic ganglia. In this instance, at least, we have a positive demonstration, that the ganglia on the nerves of sensation are instrumental in producing sleep.

When we consider, that the eyes have three nerves, exclusively devoted to their motions, and the ophthalmic, or lenticular ganglion, with its numerous fibres, and a share of the fibres of the trigeminus besides—that, at least, six nerves are devoted to each eye—one would suppose, that a special centre on the optic nerve itself might be dispensed with, were it not for the necessity of adjusting the eyes in sleep, so as to exclude light, and suspend the optic function.

There are a great many facts which show the functional connection of the eyes with the stomach, and its subordinate parts.

1. Irritation of the stomach, producing convulsions, is first manifested by a squinting and rolling up of the eyes, in the same manner as in sleep, but in an exaggerated degree.

2. *Brown Sequard* states that an injury of the spinal

cord, between the ninth and twelfth costal vertebræ, produced a disease of the cornua of the eye.

FIGURE 61.

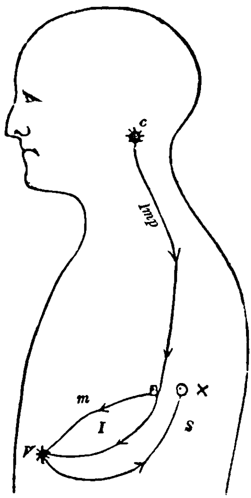


FIGURE 61. Ideal diagram to illustrate the physiological relations of the conscious centre, *c*; vital centre, *V*; and the three series of spinal, somniferous, and moderating ganglia: the three last are represented by a cross, a circle, and a square, or parallelogram. The line, *Imp*, with arrows, from *c* to *v*, indicates the course of the impulsive mental influence to the vital centre. The line, *m*, with one arrow pointing from the square to *v*, represents the moderating influence, which modifies the mental influence. The line *s*, with one arrow pointing from the vital centre, *v*, to the small circle, represents the somniferous influence proceeding from the vital centre of the nutritive system to the spinal nerve of sensation and its somniferous ganglion. The cross represents the spinal-aconscious centre, which is in the same plane, or section, with the other two centres. This diagram conveys a good and clear idea of the theoretical explanation which I have advanced of the impulsive, moderating, and somniferous systems.

3. I have just seen a patient who is troubled with convulsions, and, in describing the case, the mother stated, that "they always come on by an uneasiness in the stomach, and with blindness."

4. Nausea, which is produced by a disturbance of the stomach, always affects the eyes slightly; and the movements are of the same kind as in sleepiness — that is, they roll inward and upward.

5. Since sleep is, obviously, instituted to suspend the functions of the senses for the benefit of the stomach, it is reasonable to suppose, *a priori*, that precisely such an apparatus as the somniferous ganglia and their nerve fibres would be provided, to connect the two classes of organs, and enable the stomach to exercise its authority over the nerves of sensation.

The dull and stupid feelings produced by a deranged stomach, by impure air, or by an excess of carbon in the blood, may be more easily explained in this way than in any other that I know of. Thus, when the vital powers are depressed, and have quite enough to do to maintain themselves at home, they begin to check the senses, and endeavor to encourage sleep, to get rid of the labor of sustaining the vital, mental, and muscular powers, at the same time. Every one knows, by his own experience, if not by study, that the condition of the stomach and of the senses are mutually related. The usual explanation of the phenomena of temporary stupidity is, that the brain is oppressed with impure blood. It should, however, be considered, that every ultra-vital part of the constitution suffers from the same cause, at the same time, but no other organs manifest the suffering as soon, or as efficiently as the external senses do.

INFLUENCE OF THE STOMACH UPON THE BRAIN.

There are good reasons for believing, that the brain itself is influenced by somniferous ganglia, just as the sensory nerves are; otherwise, sleep would be no more than reverie, and would be accompanied by constant dreams.

If it is admitted that all the ganglia of the face are divided between sensation and motion, to moderate and check them, and bring them into harmony with the condition of the viscera, scarcely a doubt can remain, that some of the small ganglia in the brain are also devoted to the same purposes. We know very well, that, sometimes, the external senses and voluntary powers are entirely asleep, while nearly all the central powers of the mind are evidently awake and in a high degree of activity, weaving a thousand webs of thought, most of which are incoherent, but sometimes they are even more logical than the usual waking thoughts. Again, instances are not uncommon of persons who will answer questions when they seem to be quite asleep. This proves, that the sense of hearing and the vocal organs may be awake, and some portions of the brain, also, while the other senses and central organs are asleep. These facts prove, that sleep is produced by a general and central cause, which operates on all the powers; but that individual organs, and separate distinct nervous apparatuses, may be in such an abnormal condition, as to resist the general somniferous influence.

Let me here mention an important fact that I observed years ago, but could not then understand — which is, that those who in childhood had suffered much from convulsions produced by irritations of the nutritive organs, were frequently defective in development at the base of the anterior lobe of the cerebrum. The organs of Color, Order, Weight, and Language, or Words, were particularly small — sometimes they were very narrow between the eyes, and, at the same time, there was a tendency to squint. In some of these cases, I have found a general arrest or deficiency of the higher organs of the brain, accompanied with an absolute inability to learn or to improve by study. I have now no doubt, that these defects were caused by the disturbance of nutrition in the external senses and brain, by the derangement of the stomach and those nerves, which, in their healthy state, merely suspend nutrition, to produce ordinary sleep. This deficiency of the perceptive organs is so peculiar and so strongly marked in some cases, that I have ventured to express the opinion, that the child has been troubled with convulsions, though I had no other ground for the supposition than that afforded by the form of the head.

I would call the special attention of medical philosophers to the close analogy of the first symptoms of sleep, with those of fainting and convulsions. There is no question in my mind, that the same apparatus which nature employs to produce healthful sleep, also produces, when diseased, many of the frightful phenomena of convulsions, with the mental weakness that follows it. Admit, for a moment, that the stomach and vital centre send fibres to the senses and brain, to produce sleep, by suspending the nutrition of the cerebral fibres. Then consider whether a diseased action of the same apparatus would not be likely to permanently derange and weaken the nutritive operations of the optic nerves, and the anterior lobe of the cerebrum. If the stomach, through the somniferous nerves, can healthfully suspend the nutrition of the nerves of external sensation, and particularly of the eyes and that part of the anterior lobe which relates to the eyes, it must be plain, that the diseased action of the stomach and its subordinate parts may arrest the nutrition of the nerves and brain, in precisely the way in which we know that they often are arrested in children, producing a weakness of intellect and memory, which, in many cases, amounts to idiotcy.

I would, also, call the attention of that class of philanthropists who have charge of the insane, to the close analogy between the various phenomena of insanity and the normal functions which I have ascribed to the mental impulsive organs. The office of the moderating ganglia is, to restrain excessive activity, and, in health, they generally succeed in doing so; but diseased excitement of the cerebral organs often overcomes the moderating influences. When insanity proceeds, as it often does, from diseases of the bodily organs, a glance at Fig. 12 will show, that the bodily and mental functions are so related, that the diseases of one department will be likely to be reflected to those of the other, and thus, mental symptoms may be excellent indications of the location and nature of bodily diseases; and, on the other hand, the bodily symptoms will shed light upon the nature, causes, and locality of the cerebral disease.

I am satisfied, from observations which I have made upon mesmeric spiritual mediums, that the moderating ganglia of certain local departments are sometimes debilitated, and unable to resist ordinary mental influences; and the consequence is, that a slight mental excitement affects the health, favorably, or unfavorably, according to circumstances. Many of those symptoms of persons who are said to have weak nerves, or to be *nervous*, are, probably, caused by a weakness of the moderating ganglia; and what are commonly called strong nerves, are strong moderating ganglia.

FIGURE 62.

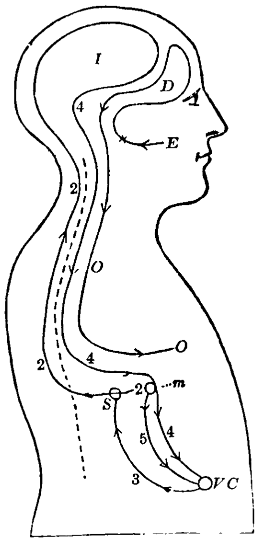


FIGURE 62. This ideal figure is made to illustrate, in a very general manner, all the important principles of nervous physiology inculcated in this treatise, and the relations of the principal parts of the nervous organism to each other. *Anatomical* accuracy and detail are sacrificed in this, as they must be in all mere diagrams, to convey the *physiological* idea of the author in a clear and simple manner. *D*, Directive region of the brain. *I*, Impulsive region of the brain. *E*, A line with an arrow, representing the external senses in the aggregate, sending impressions through the oblongata in the neck, to the directive organs in the forehead, from whence the same line is represented as being, physiologically, continued from the Directives, down through the anterior column of the spinal cord, to *O*, constituting the voluntary motor nerves. From this, it will be seen, that the external senses and the voluntary nerves are represented as parts of one circle, or nervous apparatus, which is distinct from the impulsive system behind it. The line of *dashes* represents the series

of aconscious centres in the spinal cord. *S*, represents a somniferous ganglion on a sensory root of a spinal nerve. 2, represents the course, or line, of a sensory nerve, passing through the ganglion, *S*, in the direction indicated by the arrows, up to the impulsive region of the brain, from whence the line is, physiologically, continued to 4 4, and there constitutes, or represents, the impulsive supply motor nerves, which act upon *V C*, the vital nutritive centre, to bring the nutrition of the body into harmony with the state of the brain. At *m*, the impulsive motor nerve encounters a moderating ganglion, which sends a line of influence, 5, to the vital centre, *V C*, to moderate the impulsive influence which 4 sends from the brain. The line, 3, represents the influence which is sent from the vital centre, *V C*, in the direction of the arrows, to *S*, the somniferous ganglion, to control the nutrition of 2 2, the nerve of sensation, when sleep is required by the vital centre and the organs of nutrition. The cross, on the line *E*, represents a somniferous ganglion, upon which the nerve from the vital centre operates to produce sleep. To avoid confusion and complication in the figure, I have left out the lines which should connect the cross with *V C*. For similar reasons, I have represented the lines in the neck as far separated from each other, and as being perfectly continuous and distinct; whereas, the truth is, that, anatomically, the nerves of sensation from the face penetrate to the very centre of the oblongata, and there their anatomical connections are lost; and it is only by a process of physiological and phrenological reasoning upon facts, that we can trace the connections, or show the relations of the nerves, spinal cord, or oblongata, to each other, or to the brain.

Dr. Rush remarked, that a great number of maniacs had a depression of the parietal skull bone. *Spurzheim* discovered, that persons with much hope, and a flow of animal spirits, had the skull full at the same place. Now, I have an additional observation to make, which is, that all persons who have a slight depression of the skull at the organ of Hope — and they are very numerous — are continually liable to debility of the digestive functions, and, generally, have an hereditary predisposition to dyspepsia, in some of its forms; while those who have Hope large, have a predisposition to inflammatory diseases of the pulmonary and arterial organs. These last have more of a predisposition to delirious, or active, insanity, and the former to melancholy insanity.

Reasoning by analogy, there must be moderating ganglia in the brain, as well as in the body; and I have no doubt that there are. If so, their debility would account for some of the cases of a rush of blood to the head.

APPLICATION TO TRANCE.

There is nothing which so perfectly illustrates this subject as the phenomena of mesmeric spiritualism. I have explained, in another place, the distinction between the contractive and the expansive organs of the brain, and the different effects which they produce upon the body. I also stated that the contractive organs are Secretiveness, and Cautiousness, of the Ipseals; and Submissiveness, of the Socials; and further, that they generally act together. I will now state, that the physiological or mental phenomena exhibited by spiritual mediums and by mesmerized subjects are essentially identical, and that they are both produced by so managing as to keep all the expansive faculties passive, and exciting the contractive powers of the mind. This is done by impressing the mind of the subject with ideas, expressed in words and gestures, and in no other manner.

Those whom we call susceptible, or persons who are constitutionally predisposed to become mediums, are so organized, or so weakened, as to be capable, when voluntarily passive, of having their contractive organs, or what are commonly called depressing emotions, so excited, as to render themselves perfectly subordinate to the person to whom they have submitted. I wish it distinctly understood, however, that I consider it an abnormal, and, in some degree, a debilitated, condition of the constitution, which induces mesmeric or spiritual susceptibility.

The condition of a person who is in what is called a trance, is, physiologically, the same as that of a hybernating animal, excepting that his cerebrum may be in a state of independent activity. The animal functions are all suspended, as in hybernation, except those of the cerebrum. He is not merely asleep—he is more than asleep in body, but more than awake in mind. Let me explain: he is more than asleep in body, for, in healthful sleep, the skin, though cooler than when awake, is not deathly cold and pale, nor the pulse so low as to simulate death, nor is there a clammy perspiration upon the face; but this is frequently the case in mesmeric trance. The bodily condition produced by a large dose of opium is precisely like that often produced by the trance. The hybernating animal is in the same condition; the effect of chloroform is the same, though temporary; again, the effect of fear, and, also, of nauseating sickness is of the same character; so is the effect produced by freezing cold. I consider the effects produced by the influence of the contractive, or depressing powers of the mind, not only as analogous, but as identically the same as all these. It is a remarkable exhibition of the power which the brain has over the nutritive functions, through the impulsive supply nerves, which I have been describing, and I consider it to be the office of the moderating ganglia to prevent these excesses of the impulsive cerebral organs. What we call mesmeric susceptibility is, doubtless, a debility of the moderating ganglia, which prevents them from successfully resisting the controlling influences of the brain and mind, upon the nutritive functions of the body.

The analogies to which I have referred show, that any cause whatever, which is capable, during health, of contracting the powers of life to the lowest degree consistent with its continuation, is practicably equivalent to mesmerism or spiritualism, so far as the physiological effects are concerned.

But the entranced or mesmerized person is more than awake in mind, even though his nutritive powers are depressed, and his arteries contracted more than in healthful sleep. What is necessary to produce the mesmeric condition of a suceptible person, is a certain state of mind, and it is immaterial what causes that state. When a susceptible person submits to be passive, the stimulating language and manners of the operator produce the necessary state of mind; but, if the medium can by any process of superstition or of will, work his mind into the right condition, he can become entranced, upon the same principle that enabled *Garrick* or *Siddons* to become pale or flushed at pleasure, by giving the appropriate mental powers the reins over the nerves of the body. When the cerebrum, therefore, has placed the animal powers of the body upon the smallest possible rations of nutriment, it still can itself indulge in the most delicious dreams and spiritual reveries, unencumbered by bodily sensations. The proto-conscious and submental organs are passive, as the body is, but the cerebrum is the mind's superior chamber, where it revels in a paradise of its own creations.

It is no wonder, that the productions of a mind thus conditioned, are sometimes superior to those of the same mind, in the ordinary state of the body; but it would be strange if they could acquire new and scientific facts in this condition; their ideas are only "such stuff as dreams are made of," and their vague romances are "rounded with a sleep," of the mesmeric character.

I have described extreme cases of trance, but about one person in ten can, if he will submit to be passive, and allow a friend to influence him by an assumption of superiority, become entranced so far as to fall into a wake-dreaming state of somnambulism. I have spoken principally of the physical causes and effects of mesmeric and spiritual trance, but there are mental processes to be considered.

To understand this matter clearly, we must conceive the mind to be occupying the centre to which the phreno-organs all converge. We must next understand, that all states of mind are caused by impressions made upon the centre through the organs that converge to it: thus, an idea, a feeling, or a sensation, is each a state of mind, produced by an impression made upon the centre by one of the organs of the phreno system. A train of thought is caused by a succession of impressions. The influence which any one organ exerts in the centre, depends upon its relative size, and the degree to which it is stimulated. If an organ is very small, it may, notwithstanding, control the mental centre, if it is sufficiently stimulated, while large organs are not. But, when all the organs are equally stimulated, the influence of each is in proportion to its size and nutrition.

The ordinary character of any individual depends upon the character of his largest organs, because they rule the centre and produce habit. A temporary excitement may cause the character to be different, while the excitment lasts; but there is a continual tendency to return to the original character. When the developments of the different cerebral organs are nearly equal, the character depends upon circumstances, habits, and education.

When a person is perfectly asleep, his external senses convey no stimulus to the brain; but the brain may, in imperfect sleep, be stimulated by spontaneous and diseased irritation through the internal senses and body, or by imperfect external impressions; and trains of thought may pass through the mind, which seem as real as those which occupy the awakened train. The absurdity of ordinary dreams depends upon their inconsistency with external perceptions; but as the external organs are asleep, they do not contradict the internal organs. Ordinary dreams consist of reproduced impressions and ideas. Ideas and impressions are registered, no one knows how, in the fibres of the brain; and when, during sleep, the brain is stimulated by internal causes, the registered impressions are reproduced in a thousand fantastic combinations, which constitute our dreams. When any one organ has sufficient influence in the brain to prevent it, no other organs are allowed to contradict its impressions. And this is another reason why dreams seldom or never appear absurd, while they occupy the mind. Impressions from the external world being shut out, there is nothing to prevent the most dominant organ of the brain from giving its own character to the dreaming trains of thought. When we are awake, the character of thoughts depends upon external impressions, and the internal organs roused by them. External impressions are of two kinds:

1. Ipseal, or experimental, are those which constitute the individual's own experience and knowledge of external things, independent of all teaching or reading.

2. Social, or those which constitute the teachings of others, concerning their experience and knowledge. All human knowledge, and all stimulus of the brain are therefore derived from two sources—namely, experience and testimony. When testimony is consistent with expe-

rience, the mind readily receives it as truth, but when otherwise, the mind is beset with conflicting ideas, and it becomes a question, which shall prevail, the ideas derived from experience, or those derived from testimony. If experience habitually prevails, the character of the mind is said to be sceptical. If testimony prevails, it is credulous. To avoid extremes, to acquire the proper kind of experience, and to give proper credence to testimony, requires a well-balanced and healthy organization, and a proper education. If the constitution is not properly balanced, there will be a tendency to allow the stimulus of either experience or of testimony to have too much influence, and to exclude the other. In this conflict, the Impulsives that are most gratified by any particular kind of experience, will oppose the influence of adverse testimony in the mind, and the contrary.

In those heads in which the conforming Socials, and especially Credenciveness, is large, and the Perceptives small, testimony will be likely to prevail; while, in the heads in which the conforming Socials are small, and the Perceptives and Ipseals large, experience will prevail. Those who have been in the habit of personal subordination to other persons, physical, moral, or intellectual, will be influenced by testimony; while those who have been in habits of authority, and independence of thought, will naturally be disposed to subordinate testimony to their own experience. Persons of indolent or scrofulous temperament are more liable, while passive, to be affected, abnormally, by testimony, from general inability to resist impressions of any kind; and, finally, in some individuals, there is a peculiarly diseased, or abnormal, condition of the nervous organism and brain, in which the body participates, that seems to give a tendency to the brain to yield easily to impressions, and especially to those of the testimony of superiors. In some of these persons, the trains of thought which spring from testimony and assertion can not be antagonized by the experience of their senses, nor by memory; they allow their minds to become passive, and then they listen to the voice of another, and allow their Credenciveness to overrule their senses and all other powers of mind. Thus, they are able to see tables move, though they do not move, and to hear raps or voices, or see forms, which do not exist.

SECTION XI.

PROGRESSIVE SYSTEM OF PHRENOLOGY.

PHRENOLOGY is the science of mind, founded upon the anatomy and physiology of the brain and nerves. *Dr. Gall* discovered twenty-seven phreno-organs, but did not attempt to divide them into classes. *Spurzheim* added several organs, which he believed that he had discovered. He, also, changed the names of many of the organs, and bestowed upon them most of the names by which they are now generally known. He divided them into two orders—namely, intellectual organs, situated in the forehead, and the organs of the affective faculties, or feelings, which occupy the rest of the skull. The feelings he subdivided into propensities, which occupy the lower portions of the skull, and sentiments, which are located in the higher regions. He applied the name, *propensities*, to indicate internal impulses, "which invite only to certain actions; and *sentiments* designate other feelings, not limited to inclination alone, but which have an emotion of a peculiar kind superadded." The intellectual faculties he divided into perceptives, which are situated at the base of the forehead, and the reflectives, which consist of two organs only, in the upper part of the forehead. This division of *Spurzheim* was generally adopted by phrenological writers, until the author of these pages published, in 1838, his new system of Phrenology, in which he proposed a new classification of the organs, which is illustrated in this volume, with some important additions.

According to the system of phreno-nervous physiology developed in this work, all the nervous apparatuses belong, either as principals or subordinates, to two grand divisions—namely, Directives and Impulsives—as follows:

1. *Directive Division.*

a, The cerebral phreno-organs of the anterior lobe.

b, The striatum.

c, The upper and anterior parts of the oblongata.

d, The external senses, and the potentive and somniferous ganglia on their nerves.

e, The voluntary motor nerves.

f, The proper aconscious reflex, or spinal nerves, which produce many of the same effects upon the muscles as the voluntary nerves do, and may be considered as auxiliary and subordinate to them.

2. *Impulsive Division.*

a, The cerebral phreno-organs of all the brain, except the anterior lobe.

b, The claustrum, thalamus, and cerebellum.

c, The internal senses, and the potentive and somniferous ganglia on their nerves.

d, The impulsive supply (sympathetic) motor nerves, and the moderating ganglia on the course of their fibres in the face and neck, and the cavities of the body.

EXTERNAL SENSES, OR PROTO-CONSCIOUS PHRENO-ORGANS, THAT COMMUNICATE IMPRESSIONS FROM THE EXTERNAL WORLD.

I have described the nerves and potentive ganglia of the senses, as but a lower order of phreno-organs, from which all the cerebral organs are developed, and upon which they depend. This being so, we must briefly review the senses, before considering the higher organs, to which they are thus related. The name of proto-conscious organs, which I have applied to the senses, implies that they are the lowest organs which communicate with the mind.

Consciousness. What the nature of the mind, or consciousness, is, unconnected with the nervous organism, science affords us no means of judging; but all the facts which I have been able to obtain, lead to the conclusion, that the special *seat* of the conscious mind is in the oblongata, at the terminus of the mouth and stomach nervès. Nerves from the body or face may impress the oblongata, and thus produce what are called sensations, in the mind. So, also, brain fibres, or phreno-organs, may impress the oblongata, and produce what are called thoughts, ideas, or feelings; but the mind itself must be deemed as distinct from the nerves or the brain, though, in some unknown way, capable of being affected and put into various states by the impressions from the fibres: just as a mirror may be impressed by rays of light, and have the power of reflecting the rays again to other objects; yet the rays, the images on the mirror, and the mirror itself, are each distinct things—so, the mind is one thing, the ideas that temporarily occupy it, another, and the nerves, or brain fibres, that transmit impressions, yet another. The nerves of voluntary motion are complements or incidents of the nerves of the external senses, that is to say, an impression made upon the mind by a nerve of external sense, is reflected from it again— as light is from a mirror — to the muscles, through the voluntary motor nerves. This is reflex conscious motion; such motion, and probably such mentality, as the lowest —the protozoic — animals manifest; that is, sensation, consciousness, and motion, without brain. But, if this impression, made upon the mind through the nerve of external sense, be reflected from the mind to the anterior lobe, and from thence to the mind again, through several excited organs of memory, there will be, of course, several ideas impressed upon the mind, informing it of the size, form, color, or motions of the object.

It will be observed, that, in this train of mental operations, the mind itself is represented as merely passive and self-impotent. The popular old notion that the mind, during this mortal life, is capable of moving, acting, or manifesting attributes of any kind, independently of the muscles, nerves, or brain, is a mere assumption without a single fact to support it. It is upon this baseless fabric, however, that modern spiritualism is founded. The mind is represented by these theorists, as leaving the brain and going to distant spheres, in search of knowledge, carrying with it, from the body, the faculties of sensation, volition, thought, and feeling; while the organs of the faculties are left behind in the deserted body, there to wait, until the truant and capricious mind deem it expedient to return again and take upon itself the direction of the material organs. The spirit mediums, according to the spiritual theory, are *bodies*, from which the rightful mind has been forcibly ousted, and another mind—a bodiless vagrant—has taken temporary possession, and, like a lost bird in a wrong nest, sits, hatching a brood of foreign thoughts, and startling all around with its strange notes.

It is hardly necessary to say, that this is all mere fancy. One mind only can occupy one body; and when a mind communicates with another, there is no evidence whatever, to show that it does so, otherwise than by the transmission of impressions from one brain to another.

Sensation and perception depend upon the nerves and oblongata; memory upon the brain; volition upon the nerves, muscles, and oblongata; and if the mind should be separated from these organs, we can not conceive how it could exercise the faculties which depend upon them. In making these remarks, I do not wish to be understood as calling in question the doctrine of the future existence of the mind after death, as it is believed by all professors of the christian religion. I only mean to deny the separate existence and independent action of the mind and the body, during life, as taught by the spiritualists. Nor do I question the power of the Almighty to interpose, in any special case, and cause such an apparent miracle to take place; but I do deny, most emphatically, that any thing of the kind has taken place in our times.

The Senses of Touch and Taste.

These senses are regarded as the lowest and most common; but it has been in my mind a doubtful question, whether taste or touch is first manifested by animals. On the whole, I suspect, that taste is the lower in the scale. It requires, that the object perceived should be in some degree decomposed, so that its internal qualities and fitness for assimilation may be perceived. The sense of touch merely requires contact to produce perception.

Smell.

This is one of the most wonderful of the faculties. The achievements of some animals, especially hounds, perceiving, as they do, by the scent, whether a fox or a man has crossed their path, in ever so rapid flight, within several hours, are well calculated to excite our astonishment, and prepare us to believe in the possibility of clairvoyance being manifested by persons whose nervous functions are greatly exalted and rendered susceptible by disease.

Hearing.

The senses of taste and of touch require the actual contact of the substances perceived, with our external organs. The sense of smell, requires not the same kind of contact of the object itself bodily, but of invisible emanations of some of its constituent particles, which proceed from it to the impressorium of the olfactory nerve, and thus inform the mind of its qualities.

Hearing does not require that the object or thing which makes the sound shall, itself, or any of its constituent particles, come into contact with the organs; but that the object shall move suddenly, and thus produce a peculiar vibration of the surrounding air that is in contact with the ear, and produce an impression which we call sound. We can form some idea of the direction of sound, and can generally determine instantly, whether they are behind, before, above or below; but we are easily and often deceived in this respect, especially when any body besides air intervenes, to change the direction, or modify the character of the vibrations. An echo is produced, when a vibration is impeded by some solid body like a wall, and reflected, or made to rebound, in another direction, before it strikes the ear. In this case, the ear is entirely incompetent to perceive the origin of the sound, and naturally attributes it to the solid objects from whence the vibration last proceeds.

The diffusion of a vibration through a sonorous body, like a table or door, is also deceptive, as can easily be shown by an experiment with a large table standing on one central leg: let a company sit around it and place their hands upon it as the spiritualists do; if a rap is made on the leg near the floor, it seems, to uninformed persons, to be on the table itself; and to one person it seems to proceed from one part of the table, and to another from a different part: the ear is thus deceived, and the roguish medium imposes upon the credulous and ignorant with impunity; especially if, by artful conversation, the listeners are led to expect the sound to proceed from the table itself.

The faculty of the memory of words, is a specialization of this nerve.

Sight.

The air is the finest substance which we can perceive with our senses, and, by means of its vibrations communicated to the ear, we learn the existence and some of the qualities of things. But there is, undoubtedly, another substance filling all space, which has the same power of vibrating and of reflecting as the air has, but which is as much finer than air, as air is finer than water. Let us call this substance *etherium.* It occupies the space between the sun, the planets, and the earth, and constitutes a universal ocean, in which all the planets are floating, and by means of which they communicate with, and influence each other. As *Sir Isaac Newton* has suggested, perhaps the force of gravity may be transmitted through this medium; but there is no longer any doubt, that light is merely a vibratory motion or undulation of this invisible etherium, adapted to affect our eyes and optic nerves, and thus to make known to us the existence, the forms, colors, distances, directions, numbers, motions and arrangements of all the substances from which the vibrations of the etherium are reflected to our eyes. The most rapid vibrations, or undulations, of etherium produce red colors, and the slowest violet colors; just as rapid vibrations of the air produce sounds of a high pitch, and slow vibrations, those of a low pitch; and, just as an echo deceives the ear in regard to the true place of a sounding body, so does a mirror deceive the eye in regard to the true place of a visible body — that is, it seems to be in the place from whence the vibration leaves the last mirror, to proceed to the eye; in other words it seems to be where the mirror is. Objects seen in mirrors may, therefore, be called echoes of light; and, just as one sound may be many times multiplied by echoes, so one image may be multiplied by a proper arrangement of mirrors. In fact, every thing which we know of light proves, that, though it is not itself a substance, it is an effect produced by the movements of a material substance, and obeys the same laws of motion as air, or any other substance does.

There is good reason for believing that electricity, instead of being a distinct fluid, is a manifestation of the identical etherium, the vibratory movement of which produces light; and the same may be said of magnetism, heat, and even the supposed mesmeric fluid which has been assumed and used, to account for the phenomena of clairvoyance.

THE DEVELOPMENT, ARRANGEMENT, AND CLASSIFICATION OF THE PHRENO-ORGANS.

I protest against the continuance of the practice which has hitherto obtained among phrenologists, of examining heads, and endeavoring to explain the effects of individual organs upon the character, without the examiners making themselves acquainted with their mutual influences upon each other, and upon the body. I protest against the separation of phrenology from physiology, comparative and human, and insist, once more, that neither can be comprehended without the other. To understand phrenology, even practically, we must consider the form of the skull as adapted to the surface of the brain, and that surface as one terminus of a vast number of fibres, that all functionally converge to the striatum, claustrum, and thalamus, and from thence to the oblongata, where they impress the mind, and where they receive and communicate impressions, by means of which the body and mind influence each other.

The function of any one phreno-organ is easily stated and understood, when it is once ascertained by observation. But the relations of that organ to other organs; its relations to the inferior parts of the brain — the submenta and oblongata; its relations to the nerves of sensation, and its dependence upon them; its relations to the nerves of voluntary motion and impulsive vi-motion; its relations to special parts of the body — to the heart, lungs, arteries, stomach, liver, skin, etc.;— all these relations, connections, and dependencies must be taken into consideration, and to some degree understood. This is not easy, nor, until now, has it been even possible.

We have abundance of able works on comparative physiology, in which a sad want of knowledge of the well established truths of phrenology is betrayed; and we have, also, works on phrenology, in which the most inexcusable ignorance of physiology is manifested. I do not know of a single author whose writings indicate that he has made himself acquainted with both phrenology and comparative physiology.

Before I proceed to state the functions of the phreno-organs in detail, I will introduce several additional illustrations, in order to thoroughly impress upon the mind of the reader, the manner and order in which the different parts are successively created, and added to each other.

FIGURE 63.

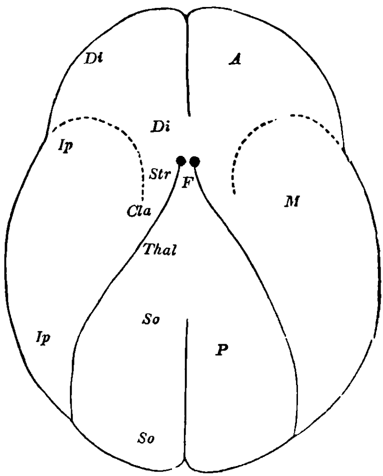


FIGURE 63. This is a diagram of the base of the cerebrum, to show that the phreno-organs which constitute the three classes, all spring from the submental parts in the middle of the brain.

The striatum, *Str*, is immediately beneath where the letters are placed in the figure. The phreno-organs of the lowest Directives are very near here, and all the other Directives radiate from hence, and bend upward, and backward, to constitute the phreno-organs of the brow and forehead.

The claustrum, *Cla*, is immediately beneath where the letters are placed in the figure. The organs of Alimentiveness, Pneumativeness, and Sanativeness, are situated near *Cla*, the claustrum, and, like all the other Ipseals, are developed from it, as from a common root.

The thalamus *Thal*, is situated immediately beneath where the letters are placed in the figure, and the parental phreno-organ has its fibrous roots in it, and thus lays the foundation of the social class of organs, which are superadded to the thalamus and posterior lobes.

A, Anterior lobe. *M*, Middle lobe. *P*, Posterior lobe. *F*, These two round bodies are, from their form, called mammillary bodies; *Di Di*, Directive organs, developed from *Str*, striatum. *Ip Ip*, Ipseal organs, developed from *Cla*, the claustrum. *So So*, Socials, developed from *Thal*, the thalamus. It will be noticed, that the relative positions of the three lobes is the same as that of the *Str*, *Cla*, and *Thal*.

FIGURE 64.

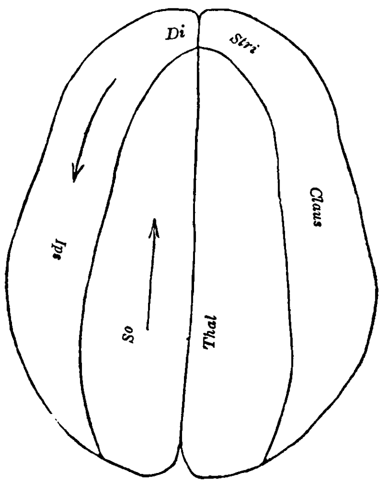


FIGURE 64. View of the top of the cerebrum, to show, that the three classes which commence in the striatum, claustrum, and thalamus,

are continued upward, to constitute the higher parts of the brain; and that, while the Directives and Ipseals are developed from before, backward, in the direction indicated by the arrow, the Socials are developed from behind, forward.

FIGURE 65.

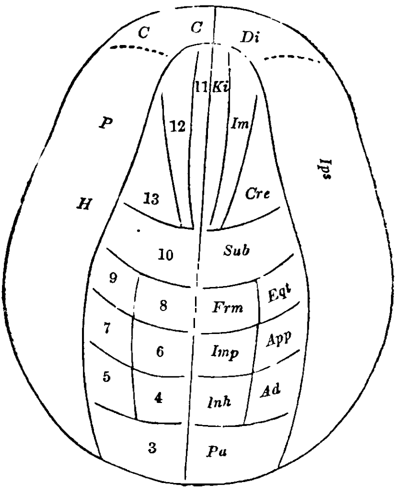
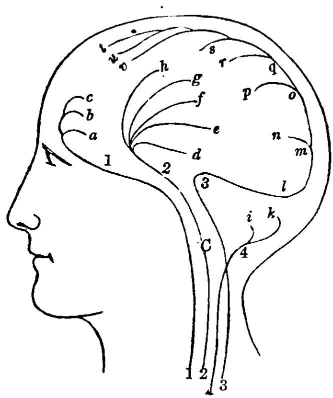


FIGURE 65. This figure is the same as Fig. 64, but has the organs of the social class marked upon it, arranged as phrenological practice has established them. They rise in character in the order of the numbers, which proceed from the lowest to the highest, in the same direction as the arrows in Fig. 64. It will be perceived, that 12 and 13, the highest Socials, *P H*, the highest Ipseals, and *C C*, the highest Directives, all arrive at one region of the head, which is above and before the temples. *Di*, Directives. *Ips*, Ipseals. Compare the numbers with the same on Fig. 67.

FIGURE 66. This figure gives a side view of the development of the organs of the whole brain, showing their origin in the spinal cord and oblongata, and the direction of their development in four series, to constitute the phreno-organs.

FIGURE 66.



1, In the oblongata, proceeds to 1 in the brain, to form the striatum, and then to *a b c* in the forehead, to constitute the directive class of phreno-organs.

2, In the oblongata, proceeds to 2 in the brain, to form the claustrum, and then to *d e f g h*, the five ranges, or strata, of ipseal organs. 3 in the oblongata, proceeds to 3, the thalamus, and then to *l m n o p q r s t u v*, the social phreno-organs of the cerebrum.

4, In the oblongata, proceeds to 4 in the cerebellum, to form the rhomboideum, and then to *i* and *k*, the lowest social organs. *C*, Conscious centre, or place where the sensory nerves and the mental organs all converge, to communicate with the mind.

This figure illustrates the idea, that the phreno-organs of the cerebrum are developed in three classes, and that each class is progressive, rising and branching like a tree, each higher branch being of a more general character, and adapting its possessor to a more extensive and complicated state of society. The figure is also a perfect illustration of the idea, that the direction of the development of the Directives and Ipseals, is first forward, then upward, and then backward; but the Socials develop, first forward, then backward, then upward, and forward again, following the same course as the cerebral band, or fornix and ourlet, and that the whole head is thus made of a convenient form.

FIGURE 67.

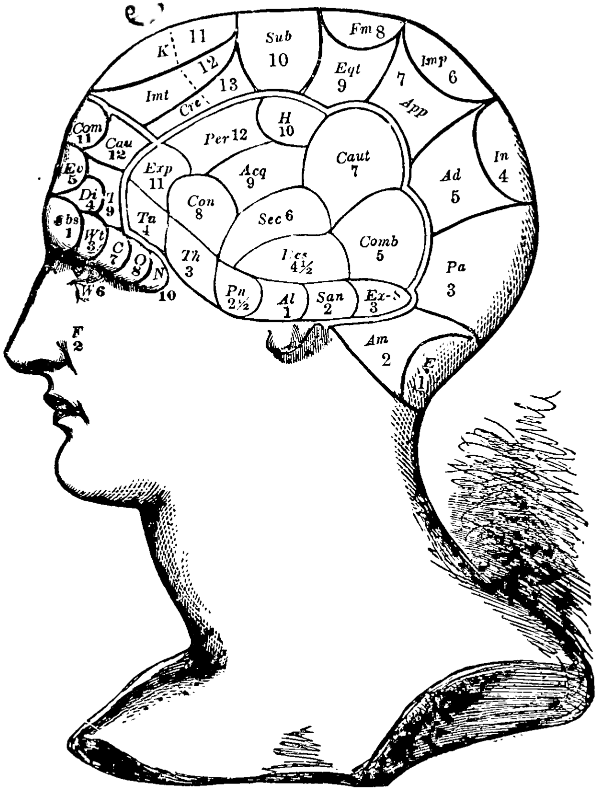


FIGURE 67. Bust, with numbers to show the successive order of the phreno-organs — the Directives in the forehead, the ipseal Impulsives on the side, and the social Impulsives extending from the back of the neck over the head.

The organs are located with very great labor and care, and after many years of observation, so as to be in accordance with nature. Each organ has the initial of its name in it, to distinguish it, and each has, also, a number which indicates its place in the successive order of creation. It will be perceived, that, as there are three classes, there are three series of numbers — one series for each class, the lowest number in each class being placed upon the first created organ, and the highest number upon the highest and last created organ.

Observation and Flavor were the first created Directives, from which other organs seem to be radiated; so, Alimentiveness and Pneumativeness are the first created Ipseals, from which the whole ipseal class is developed; and so, also, are Equi-motiveness and Amativeness the first created Socials, to which the others are superadded.

I have illustrated, in the section upon phreno-physiology, (see Fig. 11 and 12, p. 71,) the arrangement of the organs at the base of the brain, from before backward, in a manner corresponding with the arrangement of the bodily organs, to which they specially relate. And from this, it appears, that the stomach is the common point of departure, from which the bodily organs developed above and below. In the same way the organ of Alimentiveness, is a common point of departure, and the phreno-organs that specially relate to those of the body above the stomach are before Alimentiveness, while those that relate to parts below the stomach are behind Alimentive ness.*

* The brain of a fish is a continuation of the spinal cord, in the same plane; because this animal has no occasion to raise its head out of the water, but generally remains in a horizontal position. The human body, however, being carried in an erect position, the spinal cord of man is perpendicular; but his brain is bent forward, nearly at right angles with the cord, so as to be horizontal. The consequence of this is, that we use the term *anterior column* of the spinal cord, and then, when speaking of the same column continued up into the skull, we call it the *base of the brain*. What we call the anterior lobe of the brain (were it not for the bending forward) might properly be called the upper part of the brain, and would correspond with the face, (see

The organs above the base of the brain are special modifications of those at the base, and the functional relations of the superadded organs to those below them are striking and remarkable, as follows:

Immediately before Alimentiveness is Pneumativeness, the impulse to attend to respiration, which is the means of producing warmth; next to that is Thermativeness, the impulse to attend to warmth; above is Constructiveness, the impulse which is first manifested in providing shelter from cold; above and behind this organ, is Acquisitiveness, which impels to the acquisition and storing of provisions for winter; higher yet, and above all, is Hope, which, in its lowest mode of action, impels to change, and annual immigration to warmer climates. The student should trace these organs on the bust, as he reflects upon their functional relations.

Let us return to Alimentiveness again. Above, and a little behind it, is Destructiveness, which modifies its character, and gives a preference for meat over vegetables; above Destructiveness, is Secretiveness, which modifies its operations, and enables it to seize upon prey, by cunning, which otherwise would escape; above Secretiveness is Cautiousness, which is very analogous to it in character.

Returning again to the base of the brain: behind Alimentiveness is Sanativeness, the impulse to endeavor to avoid personal injury, and to continue life and health; above it, Combativeness, which tends in a different manner to the

Fig. 11. The middle lobe would correspond with the neck and middle parts of the body, and the posterior lobe would correspond with the lower parts of the body; in other words, they would then be upper, middle, and lower; and thus, the correspondence would be perfect. In this case, instead of saying, that the organs *behind* Alimentiveness correspond with those *below* the stomach, we should say, those *below* Alimentiveness correspond with those *below* the stomach.

same object; above this, Cautiousness is so very analogous to Sanativeness, that it is sometimes difficult to distinguish between them.

Commencing again at the base of the brain, Ex-Sanativeness, Amativeness, and Parentiveness, have this in common, that they operate to dispose of the surplus of nutriment; and the relative positions of the three in the body and brain are the same.

Tune, Experimentiveness, and Perfectiveness are the most anterior of the Ipseals. They constitute the improving or artistic range: they have one principle in common, which is, that they all imply surplus vigor and time, for operations which are not prompted by immediate bodily want, but are of the nature of amusements.

From this review, it appears that all the higher Ipseals are special modifications of those at the base, and, particularly, of Alimentiveness and Pneumativeness. It is interesting to observe, that Hope is the highest specialization of the pneumative impulse; and this, in connection with the fact, that a deficiency of Hope is found to indicate a tendency to defective respiration, is important, in a medical point of view. It is equally interesting to observe, that Cautiousness is the highest organ of those that are specializations of Alimentiveness, and that it is the natural antagonist of Hope, just as Alimentiveness and the stomach are of Pneumativeness and the lungs. The pneumative series prompts to active enterprise, and the alimentive series to moderation, after the immediate wants are satisfied.

The social organs above Parentiveness are so obviously related to each other, and to the progression of society, that no special review, to point out their relations, is necessary. Figures 66 and 67 should be studied in connection with the anatomical illustrations.

The directive organs are developed from the external senses, and located in corresponding relative positions, at the base of the anterior lobe. The organ of Flavor is superadded to the senses of taste and smell; Form, Size, Weight, Direction, and Motion, to the sense of tact, or touch; Color, Order, and Number, to the sense of sight. Time, or Succession, Comparison and Causality relate to the organs below them.

ANALYSIS AND DEFINITION OF THE PHRENO-ORGANS.

Observation, Individuality, Form, and Size.

Situated in the centre of the base of the forehead, so as, when large, to give it prominence just above the nose, is a portion of the human brain, which *Spurzheim* and others have denominated Individuality, and defined it the organ of the faculty which perceives the existence of things, without reference to their qualities. I do not believe that such a *faculty* exists, and, of course, there can not, then, be an organ of this character. We only know the existence of things by their qualities; and the lowest organs of this class must relate to those qualities which are perceived by the lowest animals. By this reasoning, I arrive at the conclusion, that taste, touch, and smell are the lowest perceptive faculties, and that the lowest, most central, and most posterior, organs of the anterior lobe are related to taste and touch. The portion of brain called Individuality is, doubtless, related to the sense of touch, and the perception of the outline, the extent, direction, and forms of bodies. Phrenologists have placed four organs here, within the space of a square inch—namely, Individuality, Form, Size, and Locality. In practice, I find it impossible to distinguish these as separate organs, and I, therefore, group them all together, under the name of Observation, or Form.

Phrenology is a practical science, and, however plausible may be the arguments which are brought forward in favor of any particular faculty or organ, if we can not demonstrate its existence and its attributes by external indications, confirmed by corresponding manifestations, we must abandon it. Now I wish to be distinctly understood as confessing, that, after more than twenty years of constant practice, I am obliged to treat Individuality, Form, Size, and Locality, as the general organ of Observation. I do not deny the separate existence of the mental faculties of Locality or Direction, and of Size or Extension; but I do doubt the existence of a distinct faculty of Individuality, as defined by *Spurzheim.* And as for Form, I consider it a compound faculty, made up of the perception of extensions and directions. If we know the extent of any object in various directions, we know its form.

The organs which relate to the qualities of things as individuals, are in the centre and base of the directive class. They are those which perceive flavor, form, size, weight, color, motion, and sound. The organs that relate to relative qualities are Order, Number, Comparison, and Causality. According to this analysis, Individuality is compounded of all the faculties that perceive the qualities of things, as individuals, and the organ of Observation is the centre of them: in this sense only is it the organ of Individuality.

In making practical examinations of crania, for the purpose of determining the essential traits of character, I find upon the forehead four points of cardinal importance; this phreno-organ of Form, or Observation, is the first of these; Comparison is the second Causality the third, and the outward extremity of the eyebrow, including Order and Number, the fourth: if to these we add the organ of Language or Words, which gives a fullness to the eye, we have all the phreno-organs of the intellect, which can always be relied upon in practice.

The six organs which I have enumerated as always reliable in practice, are generally the only ones which we need to understand, in those cases where we have no opportunity to learn a person's special talents by experience and acquaintance. The region of Form, or Observation, is important, from the fact, that its deficiency gives an inclination to a defective mode of reasoning, by neglecting or assuming the premises and facts, instead of endeavoring to investigate, demonstrate, and remember them.

Inventive mechanics, philanthropists, and metaphysical theologians who are small in this region, seldom or never succeed in putting their views into practice: they fail in distinguishing and describing the main features of the things which they observe, and dwell too much upon collateral and remote circumstances and qualities; they seldom make their speeches or writings popular or practical though they may be logical, profound, and methodical.

The excessive development of this region, while the other three important parts of the forehead are very defective, leads to mere superficial and disconnected views; to a good memory of isolated facts, and a deficiency of the power of generalization. They perceive many little facts, but they cannot conceive or imagine the laws which connect them together into one great fact.

Imagination.

Persons with this part of the head large, use many nouns. Substantives or nouns are the names of things, of all kinds, real or imaginary.

Real things are those that actually exist in the external world beyond our nervous organs, but capable of so impressing them, as to inform the mind of their existence and qualities. Imaginary, or ideal, things are such as are formed only in the mind by the operations of the brain, and under circumstances when the real things can not impress the mind, as in dreaming, and in remembering past impressions. Ideal things all originate in external impressions, as much as real things do. A dream is but a species of memory, in which former real impressions are repeated in new combinations, and in a new order.

What we commonly call recollection, or remembering, is an operation in the brain and among its fibres, in which past impressions and ideas are repeated and renewed in the mind, in nearly the same order as that in which we originally received them. Imagination is also produced by a similar process of repetition of past impressions; but instead of allowing them to take place in the order in which we first received them, we allow them to succeed each other in a new order, and to combine, in a way to gratify some predominant impulsive faculty. This is the key to reveries, dreams, and romances.

Large and Small Perceptives.

When the whole head is large, compared with the body, the effect is, to enable the brain to act more independently of immediate bodily sensations, than when it is small; immediate sensations are rendered subordinate to cerebral preliminations; memory is called into requisition; habits of mind, instead of habits of body, are indulged in; the past and future, the distant and absent, are made the subjects of contemplation, instead of the present. This will be the tendency, even when what are called the organs of the perceptive faculties are very large, provided the body, and especially the chest, is small.

If the perceptive organs are small, and the head, otherwise, very large, compared with the body, there will be an exaggeration of the disposition, above described, to indulge in contemplation, with this important difference, that the *memory* of past perceptions will be obscure, or defective; and, therefore, the conclusions concerning future results will be erroneous; though the reasoning may be logical, and the language in which the ideas are written may be surpassingly beautiful.

I have often been puzzled to account for the existence of large heads with small Perceptives — rickety-shaped heads upon persons who have never had the rickets, and whose general constitutions are vigorous; but, upon a thorough investigation of such cases, I find, that the defect of the anterior cerebral lobe can be traced to convulsions, produced by irritations of the alimentary canal, acting, in my opinion, on the somniferous system of nerves, and arresting the nutrition of the perceptive organs, and thus preventing their growth. I have noticed, also, that persons with defective vision, and near-sightedness, generally have a defect of the central Perceptives, as if a common cause of debility had blighted both, and left the other parts of the brain and body comparatively uninjured. It has also been a serious question in my mind, whether the injurious effects of paregoric, and other forms of opium, upon the brains of children, are not produced on the same principle, that is, by inducing an artificial, or spasmodic state of sleep, which operates especially through the somniferous nerves, to check the nutrition and growth of the cerebral perceptive organs

It is a common remark among nurses, "that to allow a child to sleep too long will make it foolish." Very likely, when a child is inclined to sleep too long, there is something wrong in the state of its alimentary canal, which is producing the long, abnormal sleep, by operating through the somniferous ganglia upon the Perceptives in the anterior lobe.

Since I have entertained these views of the relations of sleep to the senses and anterior lobes, I have made many examinations with reference to this subject; and have about arrived at the conclusion, that most of our metaphysical and unpractical dreamers are suffering under the effects of a chronic debility of the Perceptives, produced in childhood by disorders of the stomach, accompanied with abnormal sleep, and generally with convulsions.

Another notorious fact which has not been explained, is, that children whose digestive systems are weak, generally have very large heads, with small perceptive organs; but children whose bodies are large and healthy, have smaller heads, with large Perceptives and wide faces. There are two causes of this — one is, that when the higher organs are large, they act in place of the lower, and render a large development of the Perceptives less necessary; another is, that the weaker the nutritive organs are, the more they restrain the senses and Perceptives, and probably they succeed in moderating their activity, by checking their nutrition, even when they are unable to produce sleep.

2. *Flavor and Tact.*

The first created perceptive faculty, we have already seen, was associated with the glosso-pharyngeal nerve. This nerve is, evidently, compound in its constitution and its function, combining the power of transmitting to the mind sensations relating of both Flavor and outline, or touch.

FIGURE 68.

FIGURE 68. This figure gives an excellent idea of the relation of the external senses and impressoria to the nerves and brain. The two faces, *A* and *B*, are greatly in contrast, in regard to the development of the lips and nose, the external organs of the senses, which relate to tact and smell. The most refined races and families of men have the external organs and face-bones small, as in *A* ; and the most rural and uncultivated are like *B*; but it is common to see two faces, nearly like *A*, differing decidedly in the prominence of the organ of Flavor, and equally differing in gustatory discrimination.

In 1838, I called attention to the fact, that persons whose faces were prominent immediately under the eyes, excelled in the power of distinguishing the qualities of food and drink; and I made a distinction between the perceptive faculty which relates to food, and the impulse to eat and drink, to satisfy the cravings of appetite. I am aware of the anatomical objections to this location of a cerebral organ; but, after having made all reasonable allowances for the difficulty of distinguishing between the effects of osseous and of cerebral developments, I must still insist upon the probability, that, in persons of delicate and refined organization, the prominence of this part of the face is principally owing to an uncommon development of the brain. It is an instructive fact, that the phreno-organ of Language, or the memory of words, which was the first that was discovered by *Dr. Gall*, is liable to the same objections; the organ being situated above and behind the eyeball, so as, when large, to crowd it downward, and outward, and cause the eye to assume a more prominent position, than when the phreno-organ of Words is small. Notwithstanding all the apparent difficulties in this case, theoretical and anatomical, the organ has not only been verified by all practical phrenologists, but it led to the discovery of all the other known phreno-organs. I would, therefore, recommend to those phrenologists who object to the organ of Flavor, on such grounds, to consider the history of the organ of Language, or Words, which is situated contiguously to it. It must, however, be admitted, that the theoretical difficulty is much greater, in regard to the organ of Flavor, than to any other organ at the base of the brain, from the circumstance, that the olfactory nerve has its impressorium spread out upon the schneiderian membrane, and, of course, a large development of this part may correctly indicate the superiority of the perceptive faculty of Flavor, while the cerebral part in question is small. I am far from being disposed to undervalue this objection, or any other; on the contrary, I would call attention to it, that practical observers may finally arrive at the truth; but, on the other hand, I would not have the student overlook the important fact, that the whole train of anatomical and physiological reasoning, exhibited in this work, tends to show analogically, that there must be such a perceptive faculty, and that its organ must be near the centre of the posterior part of the base of the anterior lobe.

3. *Weight, or Resistance.*

Every one will admit, that there is a distinct faculty for perceiving force, or muscular resistance. Next to the perception of food and of surrounding forms, there is no faculty which animals require more frequently, since almost every motion which they make requires to be guided by a perception of the resistance which the action must overcome. A deep, overhanging brow is the sign of this faculty. I am satisfied, that this organ is established; but it must not be confounded with the impulsive faculty of Equi-motiveness.

4. *Direction, or Locality.*

Among the first discoveries of *Dr. Gall*, was the fact, that a prominence of the skull at this part, which is between the middle of the brow and the centre of the forehead, indicates an uncommon memory of places. The observation was, unquestionably, correct; but it by no means follows, that the name or the definition of the organ observed is philosophical. If the idea of locality is compounded of the two ideas of distance and direction, as I think it is, and if there is a distinct faculty of perceiving distance or size, then there must, of course, be another for perceiving direction.

The frontal sinus, or hollow of the skull, renders the examination of the organs along the brow sometimes difficult; but I have frequently had occasion to notice, that the character actually agrees with the developments of the bone itself, even when it is evident that the development of the brain is not directly indicated by the bony prominence. I can only account for the fact, by supposing, that, in the ancestral ages, the bone assumed its form in correspondence with the original form of the brain; and that the bone, therefore, indicates the *form* and relative proportions of the different parts of the brain, though their size is uncertain.

5. *Eventuality.*

This is said to be the faculty which notices and remembers the events of history, biography, and nature. If we would reduce it to its simplest expression, perhaps it may be called the perception and memory of motions or changes, for these constitute the history of any thing. It is related to verbs, as Form is to nouns.

6. *Words, or Language.*

This organ was called, by *Dr. Gall*, the Memory of Words, and this, I think, is its best definition. If we understand clearly that words are but sounds, and that sounds are related to the ear, and auditory nerve, then we shall perceive, that this organ is a mere specialization of the auditory nerve, to produce a memory of words, or sounds, and give the ability to reproduce them, when necessary, for the uses of language. What is understood in schools, as a good memory, is more dependent upon this organ than any other in the brain, for the plain reason, that almost all human experience is recorded in words.

A person may have correct ideas upon any subject, without a good memory of words; but he can not be a man of much learning, nor can he express himself readily nor happily.

The perception and memory of words enjoy one great advantage over all other perceptive faculties, and that is, that the most important and numerous class of sounds which we hear — namely, words and tunes — can be reproduced from our own vocal organs, and thus be strongly and repeatedly impressed upon our own memories.

We acquire our ideas of form, figure, or outline, in some degree, from touch, but mostly from sight. We can learn more, concerning the qualities of things around us, in a minute, by sight, than we can by all our other senses in a week; and we probably acquire and fix upon our memories ninety-nine-hundredths of our ideas, by this sense. This being so, of course, memory and imagination must both be mostly supplied from this source also. When we endeavor to exercise our minds upon any subject, we naturally bring it before our "mind's eye," as a *form*, or body, and the subordinate things which associate with it, also assume, in our minds, the aspect of inferior forms. Each of these forms seems to be entitled to a name, and to possess certain qualities, which distinguish it from other forms.

We are prone to bestow upon the principal subject of our thoughts a substantive *name*, and a form of some kind, before we proceed to think upon it, or imagine it doing anything. The organ of the brain that performs this office of perceiving forms, must, of course, be the leading fundamental organ of the intellect, upon which all rational processes depend; and its predominence or deficiency must be of the greatest consequence in its effects, in giving character to our intellectual operations.

Written and printed language involves an intricate combination of *forms* and *words*, suggestive of ideas which are adapted to stimulate every organ of the brain, and thus add a hundredfold to the capabilities of memory.

This organ being large, it by no means follows, that it bestows uncommon fluency of speech, nor love of talking, nor the power of combining words in literary composition: it merely bestows the power of committing and recollecting words readily. To compose readily, a full development of Comparison, Causality, and the memory of words is requisite. To speak with facility, requires, in addition, certain social organs to be large, especially the conforming Socials, the highest of which — namely, Credenciveness — I conceive to be the special organ, that not only inclines us to listen to others, and believe what they say, but to talk ourselves, and give expression to our own credencive ideas: the governing socials assist in giving a desire to make assertions.

7. *Color.*

I have found so many painters with this part of the brow large, that I am forced to admit, that the faculty is correctly located; but, in ordinary cases, it is useless to attempt to give any opinion concerning its manifestations; for there are very few who are conscious of any deficiency in the perception of colors, and there are, certainly, but few instances in which this faculty exercises any decided influence upon the character. I have, however, lately observed, that persons in whom it is large, think more continuously and patiently of colors, and seem to take pleasure in contemplating them. I was induced to notice this manifestation, in consequence of having otherwise arrived at the conclusion, that the true function of the potentive ganglia and phreno-organs is to produce attention, memory, habit, and continuity of thought, with reference to its own peculiar department

Perhaps it would be more correct to say, that the nerves of sensation, in conjunction with the mind, are alone truly *perceptive* of external objects, and that cerebral organs produce memory and judgment.

8. *Order and Position.*

This is an organ which must not only be admitted, but the degree in which it is manifested can be judged with great accuracy. It seems to give the ability to notice and remember the *relative positions* of things, and to arrange physical objects in their proper places, habitually, without specially resolving to do so. This constitutes the principal element of neatness, and is particularly important in proceedings of a mechanical character, such as book-keeping, housekeeping, store-keeping, farming, or managing a complicated establishment where any kind of labor or manufacturing is performed. This must not be confounded with systematic proceeding, with planning, or a perception of results in complicated matters which require sagacity or logical ability; though, doubtless, it is a subordinate and useful element in such matters. There are many people with this organ large, who are neat and orderly to a fault, but have neither the judgment nor disposition to lay plans or direct the complicated proceedings of business; and I see people, every day, with the *ability* to be orderly, but who lack the industry, prudence, and carefulness to *use* their talent. Cautiousness and Acquisitiveness dispose to the use of Order, for the sake of economy.

9. *Time, or Succession.*

Spurzheim proposed this organ, which is situated between Tune and Eventuality; but, with the most persevering observations, I have been unable fully to satisfy myself, that there is such a faculty and organ. What is called the perception of time, would seem to be merely a perception of succession, regularity, or periodicity. I have noticed, that persons with this region full are inclined, when relating events, to state them in chronological order; whereas, others whom I have seen, with this part sunken, and Causality large, state facts according to the order of their logical or rhetorical importance, without any reference to the order of time in which they happened.

10. *Number.*

This is another undoubted faculty and organ of the intellect; it relates to plurality, and to numerical calculations; it is the perception of repetitions; it is an element in all mathematical operations; but this faculty alone, however large, does not bestow the logical talent required to solve difficult problems of any kind. The Reflectives are necessary for this purpose.

11. *Comparison.*

I consider this the organ of classification, and of discrimination. It perceives distinctions, resemblances, differences, analogies, and contrasts. It suggests illustrations by anecdotes, fables, allegories, parables, examples, and by rhetorical and poetical figures of speech. In scientific investigations, the Perceptives collect materials and facts; but this faculty arranges them in classes, orders, genera, and species. It is active in practical characters, who decide promptly in new matters, by comparing them with past experience, instead of referring to original principles.

12. *Causality.*

This faculty perceives the connection of one thing with another, as its cause or effect, its necessary predecessor or follower. It perceives the natural connections of a long series of links in a chain, or succession, of facts to each other, and thus perceives the unity, remote origins, and remote consequences, of things and events, and bestows the most important element of philosophical originality upon its possessor.

INTERNAL SENSES, OR BODILY IMPULSIVES.

Just as the external senses are but a lower species of intellectual or directive organs, so the internal senses are but a lower species of impulsive organs, or propensities. This is evident enough, when we observe the nervous organisms of the insects, that are so finely developed, while they are entirely destitute of brain. In them, of course, the external senses are their only directive organs; and their internal senses and the bodily organs from which they proceed, are their only Impulsives. From these internal impulsive senses, the cerebral Impulsives are in higher animals developed or differentiated above the oblongata. I regard the oblongata as an intermediate organ, with the external and internal senses terminating in it, to communicate with consciousness, and, through consciousness, with each other and the voluntary motor nerves. I regard the spinal cord and body, below the oblongata, capable of acting independently of the mind; and the cerebrum above, as equally capable of acting independently of the body. When the body is large and vigorous, and the brain small, the functions and present conditions of the body occupy the first place in the attention of the mind.

When the body is small and weak, and the brain large, the contemplations of the mind are comparatively independent of the bodily functions.

It must be evident, that the nerves of internal sensation, including the bodily organs from which they proceed, are perfectly analogous to the impulsive organs of the brain, in their operations. When the stomach requires food, it sends an impulsive impression through the vagus to the oblongata, and there produces in the mind the feeling of hunger; from the oblongata, the impulse is propagated through the motor nerves to the jaws, head, eyes, and feet, impelling them to supply the stomach; this is Alimentiveness; and all this is done without the brain, in animals which, like insects, have none; and it may sometimes be done without the brain, in animals that do have one. When the organ of Alimentiveness is added, what more does it accomplish? It keeps the attention of the mind upon the subject, after the hunger has passed away; produces a memory of the past sensations, and a contemplation of similar indulgences in future. This statement makes it clear that the nerves of internal sensation are of the nature of Impulsives, and, indeed, they are the most powerful of them. Their influences upon the mind must be more powerful, when fully roused, than those of any of the cerebral organs are; not only so, the phreno-organs, being developed from them, and capable of being excited by them, are often rendered subservient.

Here is a powerful and essential element in phrenology, which, like the planet Neptune in the solar system, has never been before taken into account, and its disturbing influences have hitherto been unknown. It has been assumed, that the phreno-organs in the brain are the sole representatives, in the mind, of the appetites and wants of the body; that they may be roused through the nerves, and that they will then only act with an energy proportionate to their size. But comparative physiology demonstrates, that this is not the true state of the case. The nerves of sensation are not, in any degree, dependent upon the brain for their influence in the mind; on the contrary, it is the brain that is dependent upon them for stimulating sensations, which are transmitted to the brain through the mind.

This new view of phrenology, or rather this physiological addition to it, instead of overturning the system, as some may apprehend, will, on the contrary, lend it new claims to confidence, by showing, that one of the sources of error is, at length, discovered and understood, and may, therefore, be in some degree obviated, by the examiner making himself acquainted with the conditions and habits of the body.

We can now understand clearly, why it is that slight diseases of the body sometimes produce insanity, and at other times, the most severe diseases do not essentially derange the mental functions; for, if the bodily organ is diseased in such a way as to produce peculiar irritations of the impressoria of the impulsive nerves, insanity will result—otherwise, not. We know very well, that some peculiar diseases of the stomach produce melancholy insanity; so, also, the habitual use of ardent spirits produces the uncontrollable desire for it, which makes the inebriate. In many of these cases, there is no doubt that the disease is in the body, though its principal manifestation is in the moral character; for, if each bodily function has a nerve which represents it in the councils of the mind, then it has also a moral influence in that mind, which may act for or against Firmness, or Kindness, or Equity, just as Acquisitiveness or Destructiveness may do so.

The only mode we have of judging of the energy with which the bodily Impulsives act, in any given case, is by the proportionate developments of different parts of the body, and their apparent conditions and diseases.

It must be obvious, that a practical examiner should be a good physiologist, and be also well acquainted with the general principles of pathology, in order to be able to give judicious advice in connection with phrenological examinations.

Medical men are familiar with a variety of diseases of the body, which always produce a sympathetic condition of mind, and we have here a perfect clue to some of these sympathies. We can understand why it is that so many of the symptoms of disease are mental and moral, and also, why they are so frequently manifested by the peculiar expressions of the countenance; for if the disease can cause impressions to proceed immediately and directly to the mind, without involving the brain above, of course, it can influence the impulsive supply nerves and the voluntary nerves, and produce its characteristic effects upon the expressions.

By regarding the whole conscious nervous organism as being divided into two systems, or nervous apparatuses, one of which is the directive and the other the impulsive, and the oblongata being the common centre of both systems, we simplify the whole matter exceedingly. We simplify it still more by viewing the external senses as the afferent part of the directive system, and the voluntary motor nerves as the efferent part of it; and then, speaking also of the internal senses, as the afferent part of the impulsive system, and the impulsive supply (sympathetic) nerves, as the efferent part of it. If to these we add, that the directive phreno-organs are auxiliaries superadded to the external senses, and the impulsive phreno-organs are superadded as auxiliaries to the internal senses, we shall have a clear and concise synopsis of the whole conscious nervous organism.

We can, also, now understand why the cerebrum can oftentimes maintain its functions, and allow the mind to exhibit the most perfect clearness, while the body is wasting with disease ; for, if the disease is not of an irritating nature, such as to rouse and occupy the attention of the mind unpleasantly, the cerebrum, the great super-mental organ, can operate independently and correctly, and can oftentimes entirely control the bodily sensations and impulses.

IPSEAL IMPULSIVES.

CORPOREAL RANGE.

3½. *Thermativeness.**

The impulse to obtain warmth is a distinct power of the mind — quite as much so as that to obtain food — and is as universally manifested. All animals obey the laws of climate, and adapt their habits to the seasons. Some become torpid, as cold approaches, and remain, during the whole winter, in a profound lethargy, in which all their

* The numbers on the bust indicate the order in which it is believed that the organs were created, and not the order in which we treat of them. This may seem to indicate a want of system in treating the subject; but the explanation is, that, in the ipseal class, the organ of Alimentiveness was created first, and the organs before it and behind it were developed from it, simultaneously, in two directions, so that Sanativeness and Pneumativeness are entitled to nearly the same rank; I have, therefore, numbered Alimentiveness 1, Sanativeness 2, and Pneumativeness 2½, to indicate that they are nearly equal in grade. Similar remarks may be made concerning the lower Directives. The lower Socials are developed but one at a time, and succeed each other in single file, as the numbers indicate.

organic powers participate; others flee to a warmer climate; another class make dens, or holes, in which to hide themselves and their accumulated supplies of food; and many animals are endowed with a new development of fur, as winter approaches, and are made to shed it again in the spring. Man is, by nature, the most unprotected of all larger animals, and in no respect is his great superiority exhibited, more than in his ability to acquire and regulate the means of clothing, and shelter from the constant changes of temperature.

My attention was first called to this subject, by noticing a friend, who had a singular habit of changing his clothes several times a day, and rising frequently at night to regulate the temperature of his room, and the quantity of his bed coverings. His head had a remarkable fullness between the ear and the temple, just below Constructiveness. I afterward noticed manifestations of the same nature, in other persons of a similar development. At first, I was inclined to attribute what I had observed to a lower development of Constructiveness; but further investigation has satisfied me, that Thermativeness, or the impulse to regulate warmth, is a distinct faculty and organ, and, that Constructiveness is a superaddition to it, and a modification of it. There is a remarkable contrast between the heads of negroes and those of the Esquimaux, in the region of Thermativeness, which is very instructive, in confirmation of my views.

2½. *Pneumativeness.*

Most of our breathing, especially during sleep, is involuntary; but when the circumstances are such that a

* Why are oxygen and food necessary to life? Life is motion modified by organization. Every substance contains, among its constituents, a certain quantity of motion. When any substance parts

voluntary effort is necessary to obtain the ordinary supply of air, a distinct power of the mind is roused, which has an organ in the brain, impelling all the faculties of the body and mind, to unite their energies, to obtain "the breath of life." There is no state of mind more agonizing than a sense of suffocation, and this fact alone is sufficient to prove, that there is a distinct impulsive faculty, which produces this state of consciousness. There is, however, no word in our language to express the feeling of desire for air, as hunger does for food. I propose the word *pneumor*; so that we can say, that we have an organ of Pneumativeness, or we may say, that we have a feeling of pneumor, when we are disagreeably con-

with a portion of its motion, it concentrates its particles into a more limited space: so, also, any substance which is compressed, or chemically united with another, so as to occupy less space, always gives out heat, or molecular motion.

Oxygen is a gasseous substance; food is solid or liquid. The solids enter the stomach, and are formed into a liquid, which enters the lungs, where the oxygen is combined with it, in a manner which is not understood. My own opinion is, that the union of oxygen with the blood in the lungs is, essentially, mechanical rather than chemical, and that it produces no effect there in generating heat. The oxygen is conveyed with the blood to the capillaries of the distant organs, and there it produces motion, or rather communicates motion and heat to the organs, by chemically uniting with the solids, and becoming concentrated into a more limited space. So it is in what is called combustion; the solid fuel unites chemically with the gasseous oxygen, and causes it to occupy less space, and, therefore, to give forth heat. Consistent with this theory, is the fact, that the motions and the warmth of all animals are in rigid proportion to the quantity of oxygen which becomes concentrated, by combining with other substances within their bodies.

I thus answer the question at the head of this note, by saying, that solid food is taken for oxygen to unite with, and oxygen is taken to concentrate, that it may thereby yield its motion, or heat.

scious of the necessity of the ventilation of our apartments. I believe, that this organ is situated at the base of the anterior part of the middle lobe of the brain, contiguous to Alimentiveness; but, though observation led me to first notice this organ nearly twenty years ago, and further observation has confirmed it, I must confess, that the variable development of the bones of the face, and probably also the fact that but a small part of the organ is near the surface, render it impossible, in many cases, to estimate the relative size of this part of the brain, in a satisfactory manner.

I have noticed, that persons who are wide in this region of the head, are more disposed to cough, and manifest much sensibility, when the lungs are but slightly irritated.

1. *Alimentiveness.*

The impulse to obtain food. Although I have no doubt that the organ of this impulse is located in the anterior part of the middle lobe of the brain, I find it difficult to determine its relative size with as much accuracy as can be done with most of the other Ipseals; in this respect it is, like Pneumativeness, probably, in part, concealed at the base, and in the fissure of Sylvius, where it can not affect the external form of the head or face, except by producing a general width of the face and head at this part. According to the principles of phreno-physiology inculcated in this work, the impulsive organs that directly relate to the bodily functions, exert a direct and powerful influence upon these functions, whenever the attention of the mind is called to them in a proper manner. When we contemplate food, Alimentiveness causes the saliva to flow into the mouth; the gastric juice to flow into the stomach, and the bile to flow into the duodenum, or second stomach. A very important lesson may be learned here, concerning the importance of persons of weak digestive powers allowing their minds to contemplate their food with as much satisfaction as possible, before eating it, instead of eating while their minds are fixed upon these subjects. I would say, with all reverence, that the practice of mentally asking for a blessing upon our food must, according to these principles, actually conduce to the very blessing which we solicit. The same principle equally applies to all bodily functions that require mental coöperation.

2. *Sanativeness.*

This organ is so situated, at the base of the middle lobe, as, when large, to crowd the eye outward, and to give width to the head immediately above the orifice of the ear. I consider it as a well established organ and faculty; practically, it is easily determined and perfectly reliable. It bestows the dispositon to shrink from immediate personal injury, and to avoid the causes of pain and disease. When small, the consequence is a reckless indifference to personal danger and disease; when very large, there is a manifest dread of wounds and sickness; a slight wound produces great uneasiness; a slight sickness is exaggerated to something dangerous and important. With small Hope and large Cautiousness, it tends to hypochondria. Many of the traits which have been ascribed to Cautiousness, belong to Sanativeness; but the difference is, that Cautiousness relates to danger in general, and of a doubtful, distant, and contingent character; whereas, Sanativeness relates to personal injuries and disease only. I have known several men who had large Destructiveness and Combativeness, who were quarrelsome and ambitious of the reputation of being courageous, but who shrunk ingloriously from all contests when there was a probability of their being personally injured, and thus acquired the name of cowards. Of course, a large development of Cautiousness with Sanativeness adds greatly to the energy of the manifestation.

When any part of the body is weakened or injured, it needs strengthening and repairing immediately; this can only be done by the blood which is conveyed to it by the arteries; accordingly, the blood is actually sent to the parts of the body to which the attention of the mind is directed. For this reason, it is exceedingly important, that the mind of a wounded or diseased person should be in a state favorable to the cure of the disease, since it will thereby facilitate and hasten the cure. This is what my friend, *Prof. T. Childs*, denominates a "moral tonic," which sometimes saves a patient whose case would otherwise terminate fatally.

Medical works abound with illustrations of the influence of the mind upon the body; the peculiarity of this treatise is, that it explains these phenomena, in a simple and rational manner. The distinction between the expansive and the contractive phreno-organs, becomes of great importance in these cases; for if the patient is in a critical condition, a mental impression which contracts the arteries, as Cautiousness does, may prove fatal; while one that expands them, as Hope does, may give a favorable turn to the scale, at a moment when it is poised doubtfully on the vital centre.

Every one has experienced a painful sensation in the region of the heart, when his mind has suddenly received a moral shock occasioned by the loss of a dear friend, or by seeing a child in the act of falling from a precipice. This dreadful feeling is probably caused by the brain suddenly impelling the heart to change its mode of action, to adapt itself to the exertion required by the emergency.

In some of these cases, if there is no occasion for action or speech, to give vent to the mental emotions, the brain is relieved by tears—a wonderful and beautiful contrivance to prevent cerebral congestion, which has never been explained nor even fully appreciated.

3. *Ex-sanativeness.*

I have, for several years, been convinced, by observation as well as reasoning, that the portion of brain immediately behind Sanativeness, relates to the healthy discharge of the excretory functions. Every one must have observed, that animals differ greatly in regard to cleanliness; and I have frequently found the location of the organ confirmed, by the unclean language and conduct of persons whose education and position were calculated to develop the highest degree of refinement. On the other hand, I have seen numerous instances of persons who manifested a shrinking delicacy, fastidiousness, and morbid modesty, in regard to excrementary subjects, which was almost ridiculous, and could scarcely be accounted for by their associations or their education.

I first announced the observation of this organ in my work on Etherology, in 1844. It is important to mention this now, because the singular confirmation which it has just received, by phreno-physiology, (see Fig. 12,) might, otherwise, lead to the suspicion, that the location of the organ was suggested by the necessity of filling up an otherwise vacant space; but the truth is, that more than twelve years intervened between the publication of the probable location of this organ, and of the discovery of the remarkable harmony of the brain with the body, as illustrated by the figure.

BELLIGERENT RANGE.

$4\frac{1}{2}$ *Destructiveness.*

The organ of Destructiveness is, in all the lower animals, a modification of Alimentiveness, and this alone is enough to prove the existence of Alimentiveness, and to render its location highly probable, independent of the united testimony of all practical phrenologists. As for the proof of the existence and proper location of Destructiveness, I will merely remark, that whatever may be said by opponents and cavilers, no practical phrenologist will express the slightest doubt or hesitation concerning this organ, or any other of this class, above the corporeal range. Its primary function is, to tear flesh, and prefer it to vegetable food.

5. *Combativeness.*

This differs from Destructiveness, in being exhibited by animals that do not feed upon flesh. It aims at victory only, and not revenge nor destruction. It bestows a love of contradiction, and its manifestations are greatly increased by a deficiency of Secretiveness and Cautiousness.

7. *Cautiousness.*

The tendency to avoid danger, and to restrain the impulses in consideration of the consequences. Dr. Gall, with some reason, called it the organ of forethought. He noticed, that, when large, it produces hesitation and indecision. It is generally small on those who are continually suffering from misfortune, caused by their own imprudence. Such persons are commonly described as impulsive.

A full explanation of the functional relations of Cautiousness involves nearly the whole of physiology. The organs of the body which manufacture blood, are liable at any time to have their energies increased and expanded to a great extent, to serve the purposes of these cerebral organs which prompt to positive and vigorous actions. To restrain this increased activity of the arterial functions, are two very different sets of organs: one of which I have denominated moderating ganglia, and explained their functions in another place; they conserve and protect the vital functions. The other set is constituted of phreno-organs, the chief of which is this great organ of Cautiousness. Secretiveness and Submissiveness belong in the same category; nearly the same circumstances that excite one of these faculties, generally calls the other into some degree of activity. It is important to remark, that, in certain inflammatory diseases of the lungs, such as pulmonary consumption, Hope is excited; while diseases of the stomach, liver, or spleen — known under the name of Dyspepsia, or Indigestion — are accompanied with an excitement of Cautiousness and a corresponding depression of Hope.

Is it because the impressions sent to the brain from the diseased lungs are of the same character as when the lungs are in a high state of functional activity? The lungs, being the sources from whence the whole constitution derives vigor to sustain hopeful enterprizes, the irritation of the lungs by disease probably simulate or counterfeit the irritation produced by healthful respiration, and thus, as it were, cheat the mind, by counterfeit impressions, into a state of false hope. On the other hand, irritation of the stomach may simulate the condition of starvation, and thus send to the brain impressions of a desponding character, such as are calculated to excite Cautiousness and other restraining faculties, and produce a depression of spirits, which is equally a false representation of the condition of the body.

It is instructive to contrast the opposite effects of Destructiveness, Combativeness, and Hope, in expanding the heart and arteries, and that of Cautiousness, Secretiveness, and Submissiveness, in contracting them. The ancient idea, that the passions and affections are related to the heart, is, after all, founded in truth, and is consistent with physiology. Our rhetoricians may now use the terms: "a stout heart," a "brave heart," a "faint heart," a "kind heart," without being rebuked by the phrenological professors; for, really, it is doubtful whether the affections would manifest themselves with sufficient energy to make their existence known, were it not for the coöperation of the heart. Courage makes the heart beat full and strong, expands the lungs with air, and the arteries with oxygen, and prepares every faculty for action.

> "When the blast of war blows in our ears,
> Then imitate the action of the tiger;
> Stiffen the sinews, summon up the blood —
> Disguise fair nature with hard-favored rage.
>
> * * * * * * *
>
> Now set the teeth, and stretch the nostrils wide —
> Hold hard the breath, and bend up every spirit
> To his full height!"
>
> *Shakspeare*, (*Henry V.*)

When Cautiousness is greatly excited in a weak constitution, every function is suppressed, or contracted, to its smallest compass. The voice is reduced to a low whisper, or the vocal organs are so contracted as to produce a shriek of fear; the breath is held, or is hurried and imperfect, and the heart beats faintly; the circulation in the small arteries is almost suspended; in some of the capillaries it ceases altogether, so that the generation of heat is each moment less, and the extremities become deathly cold; the insensible perspiration is checked, and gathers in clammy drops upon the pale and shriveled skin.

Some persons are so constitutionally weak, and deficient in respiratory energy, that they have a chronic timidity, which can not be fully accounted for by the form of the head alone, without taking into account these physiological conditions. On the other hand, there are some who are not combative, even in an ordinary degree, but they have such vigor of the heart and arteries, that they are strangers to groundless fears, or nervous timidity.

PRUDENTIAL RANGE.

6. *Secretiveness.*

The impulse to act indirectly, and to restrain direct manifestations of the feelings or the intentions. It is large in nocturnal animals. The skull of the owl is remarkable for having its largest diameter through the region of Secretiveness. Originally, it seems to have been created as an auxiliary to Destructiveness, to restrain it; for, although it may manifest itself in any combination, it is, among animals, most frequently combined in action with the carnivorous propensity. Social persons who are deficient in this important impulse, are continually laying themselves open to the injurious operations of the selfish or unjust people by whom they are surrounded.

Under exciting circumstances, they can not help speaking and acting in such a way as to betray their real sentiments. It is a common mistake, to suppose, that this faculty alone will induce its possessor to keep, faithfully, the secrets of others; it is purely selfish, and rather prompts to the treacherous betrayal of the secrets of others, than to silence concerning them. Firmness and Equity produce faithfulness in the keeping of promises.

INDUSTRIAL RANGE.

8. *Constructiveness.*

The impulse to perform mechanical labor—to work up the raw materials which nature furnishes, into articles of greater utility. This organ, however large, does not bestow mechanical skill or dexterity, independent of the directive organs, but it gives the disposition to attend to mechanical subjects.

9. *Acquisitiveness.*

The impulse to acquire and store up property for future use. The rodents, particularly the beavers and squirrels, are good illustrations of this propensity in its simplest manifestations. It relates to winter, and is only exhibited in cold climates; of course, it did not exist in any animals, before the tertiary period, when winter commenced its reign. It is small in the race that belong in tropical climates—in Negroes, Hottentots, and Malays. No man can be successful in the regular mercantile profession, in whom this organ is small: for it, alone, gives the disposition to *attend* to business, as a habit.

10 *Hope.*

The primitive and original impulse, in its lowest manifestations, is, probably, the disposition to immigrate to "a better country." All the attributes of Hope are consistent with this idea: the indifference to present possessions; the confident expectation of greater enjoyments in some future time or some distant place; the readiness to embark in uncertain enterprises, and to act upon the assumption, that they will be successful; the fact, that large Hope is generally associated with active respiratory and arterial functions, such as vigorous movements require; and, finally, the fact, that we always find it tending to give activity to all the energies of body and mind, under discouraging circumstances; — all conspire to confirm the explanation which leads us to regard this organ as but a modification of what was primitively an impulse to indulge in migratory habits. When Hope is small, there is a tendency to a depression of the respiratory and arterial powers, and, with it, a depression of what are called animal spirits, and, also, of the spirit of spontaneous enterprise. Such persons, if in good health, will sometimes act with great determination, when circumstances require it, but they never do so with much confidence in their ultimate success. That the idea is correct, which associates activity of Hope with the vigorous condition of the respiratory powers, is further proved by the fact, that indigestion, by preventing the lungs from receiving their appropriate pabulum, or material for oxygen to consume, is accompanied with low spirits, even when Hope is well developed. Furthermore, alcoholic drinks produce temporary cheerfulness, by supplying the lungs with respiratory pabulum immediately, without the labor of digestion. This temporary stimulus must be continually and regularly renewed to keep up "the spirits," and soon the quantity must be increased, and, finally, a species of alcoholic monomania is the result, which is unhappily too familiar to need description. The best substitutes for alcohol, in these cases, would be such articles of nourishment as supply the requisite fuel for the lungs to consume with the least amount of labor to the stomach and liver such as sugar, and some kinds of oil or fat.

IMPROVING, OR ARTISTIC, RANGE.

4. *Tune.*

No organ has caused practical phrenologists as much embarrassment as this, but I have, at length, discovered the source of the difficulty. It consists in not perceiving that Tune is not an intellectual, or directive, faculty, but a mere blind impulsive faculty which is analogous to Constructiveness, or Cautiousness, in being destitute of all the qualities that constitute the power of perception. It gives the disposition to exercise the vocal powers in music, and to attend to musical subjects with patience. Birds are impelled, by an internal propensity, to sing tunes which have no essential variation, and indicate no more discrimination, or perception of the qualities of music, than animals possess that do not sing. The only animals that sing are those that have an excess of respiratory energy; and, even in them, it seems to serve no useful purpose, except to exercise the vocal and respiratory powers during leisure, and thus keep them in good condition. In this particular it is perfectly analogous to the other three organs of this range—namely, Experimentiveness, Perfectiveness, and Hope. The accuracy of musical performances depends upon the ear, the auditory nerve, and the organ of Words, or memory of vocal sounds.

A good development of the organ of Weight is necessary to make a good performer on a musical instrument. The organ of Succession, or Time, probably gives the power to observe succession and time in music.

Much of the pleasure derived from musical sounds, depends upon their association with our most powerful impulses and emotions, without much reference to the mathematical accuracy of the performance.

Tune seems to be an impulse to exercise the vocal organs, by making a variety of agreeable sounds. Of course, it is related to the respiratory organs; and my own opinion is, that its use is to keep them in a healthful condition. The love of elocution is, physiologically, a lower degree of the musical impulse, and is equally conducive to health.

11. *Experimentiveness— Wit — Mirthfulness.*

Dr. Gall discovered that persons large at this point are witty, and he named it, accordingly, the organ of Wit. *Dr. Spurzheim,* finding the organ large in many persons who were mirthful without being witty, changed the name to *Mirthfulness.* When I commenced the study of phrenology, I found scarcely two authors agreeing concerning the function of this organ, while all agreed that it is, in some way, related to both wit and mirth. In 1838, I named it the organ of Playfulness. During the last eighteen years, I have been constantly making observations, with a view to settle disputed points in regard to the functions of cerebral organs. In my Phreno-Geology, published in 1850, I adopted, for this part, the name of Experimentiveness, and this I still think the most appropriate, and expressive of its actual function. It gives the disposition to think, and act, and speak, in a novel and experimentive manner, instead of following in the beaten track which Imitativeness points out. We must not confound this with the affectation of originality, which springs from an ambitious desire of distinction, or of independence; for, when this organ is large, it endows its possessor with a disposition to vary his performances, to adapt them to circumstances, without reference to the views of others, and without necessarily being conscious that there is any merit in doing so. I find the organ large in all inventors, and in all published portraits of authors who have been remarkable for their originality, wit, or ingenuity.

I consider the sports of animals and children as a kind of experimental exercise of their organs, during youth and leisure, which is calculated to educate and improve their expanding powers. Wit is experimental expression; it is the inventive talent applied to literature. A pun, for instance, is a word experimentally applied to a new use. Mirthfulness depends upon an excessive development of the organ of Hope, combined with a sanguine temperament and vigorous health; it has no relation to the organ under consideration, that I can discover; and it was a serious mistake in *Spurzheim*, to confound mirthfulness with wit.

12. *Perfectiveness—Ideality.*

The impulse to improve, to perfect, to adorn, to rise above mere utility, and to cultivate the polite and ornamental arts, which flourish only in the most refined communities. When first discovered by Dr. Gall, it was called the organ of Poetry. The name was by *Spurzheim* changed to Ideality, because it is believed, that the ideal of beauty is superior to the real productions of nature. Admitting it to be so, there is no more reason for callingthis Ideality, than for calling any other organ by that name; for we can have an ideal of construction or destruction, of kindness or justice, far superior to what we can find actually existing. The fact is, the earlier phrenologists had not very clear notions of the functions of these organs, and they, consequently, did not give them appropriate names. I consider the impulse to improve, or perfect, as analogous to the impulse to govern, or to construct; its exalted and elegant character should not blind us to its utilitarian and practical nature, when developed in an average degree. I have noticed, that, when it is small, there is a disposition to neglect self-improvement, and to consider a limited education, such as practical business requires, as quite sufficient; but it is large in those who spontaneously acquire a superior education, under discouraging circumstances. The poetic genius is no more dependent upon this organ than it is upon several others. So far as poetry requires a love of the beautiful, it does depend upon Perfectiveness; but

"The eye, in a fine frenzy rolling,"

and the exquisite delicacy of feeling and perception, which are equally necessary, depend upon the temperament; the necessary command of figurative language, upon Comparison and the organ of Words. This organ is large in all persons, of all professions, who excel in the ornamental part of their practice, or who sacrifice time, and neglect mere business, for the pleasure of improving their performances.

I have always reckoned Hope in this range, until now: I propose to associate it with Acquisitiveness, Constructiveness, and Thermativeness, because it has relations to climate, as they also have.

A careful analysis of the whole ipseal class will show, that Perfectiveness is the highest of them all in its character, and ranks, in that respect, with Credenciveness, of the Socials, and Causality, of the Directives.

SOCIAL IMPULSIVES.

DOMESTIC, OR ESTABLISHING, GROUP.

1. *Equi-motiveness.*

This is the impulse to maintain the equilibrium of the body, and adjust it with reference to the laws of gravitation. The central portion of the cerebellum is called the verm, or vermiform process, and is believed, especially by the opponents of phrenology, to be related to the combined movements of the muscles which are necessary to locomotion. The fact, that many insects combine a greater number of muscles than man possesses, for locomotion and other purposes, and perform all the functions which are ascribed to the cerebellum by physiologists and phrenologists, and yet are entirely destitute of both cerebrum and cerebellum, ought to teach us, at last, to take a rational view of the functions of the brain, and one which is consistent with all the facts. I do not consider any portion of the brain necessary to enable any part of the body to perform its function. That the brain may influence the body, and interfere with its functions, in order to accomplish its own object, is much more in accordance with our present knowledge of the facts; but all comparative physiology is against the idea, that the body is, otherwise, *dependent* upon the brain above the oblongata.

The precise function of this organ, as I understand it, is, to keep the attention of the intellect directed to the equilibrium of the body, sufficiently to prevent the loss of balance by neglect, stupidity, or sleep. The *voluntary* motions necessary for this purpose proceed from the Directives; the cerebellum influences the Directives, and (through the impulsive supply nerves) it also influences the arteries. All the experiments, and all the known facts, point to this conclusion. The destruction of the cerebellum does not destroy the voluntary power over the locomotive muscles, but it weakens and disturbs it, by interfering with the functions of the arteries which nourish them. To understand the function of this, or any other impulsive organ of the brain, we must bear in mind, that it operates, at the same time, upon the *attention* of the mind, and the *nourishment* of the bodily organs which it requires to act. I can not subscribe to the doctrine, that this or any other organ of the brain is specially devoted to locomotion, *per se*. Any and every Impulsive may require locomotion, to reach the objects which it desires, and will, in such a case, excite the locomotive organs, just as it may the vocal organs, the hands, or the mouth. Locomotion is more especially related to the social organs than to the Ipseals, because they call it into requisition oftener; and, as the impulse of equilibrium is necessary to locomotion, its organ is superadded to the spinal cord, and made the foundation of the social class.

2. *Amativeness.*

The doctrine, that the organs of the brain are necessary to enable the body to perform its functions, has produced much confusion in the minds of phrenologists, in regard to the nature of the amatory impulse. We have abundant anatomical evidence, that the cerebellum, the lateral part of which we consider the organ of Amativeness, receives impressions from its appropriate organs in the body, and, when thus excited, it forces the attention of the mind to the subject, and, at the same time, sends through the supply-nerves an influence to the arteries and respiratory powers, to cause them to act in unison with the mind. At the age of puberty, the body undergoes the changes which cause it to excite the brain, and command the attention; the lungs and arteries expand at the same time, so that, when the impulse is excited, the respiration and circulation is capable of responding, by supplying, on the instant, the requisite amount of good arterial blood,

"And then the lover, sighing like furnace,"

affords a good illustration of these views. The doctrine, that the heart is the seat of the affections, is so far true, that, when one of the organs of the impulses is excited, especially one as powerful as that of love, the supply nerves transmit, from the brain to the heart, impressions which impel the blood through every artery, and cause the lungs to sigh, to obtain more air.

Amativeness is a mental organ which may be acted upon by the body, and react in turn; but it may also be controlled by the other mental organs with which it is connected; and it is for this reason that it is associated with them, and placed under their guidance. A whole flood of important suggestions come crowding upon us concerning the importance to the health of the body, of keeping the minds of young and growing persons, in a proper moral condition, with reference to Amativeness, since, according to this physiology, the health and purity of the body are at the mercy of the moral affections, of which Amativeness is one. From this point of view, the nature of the effects of immoral love-fictions may be conceived. This is one of the largest organs of the brain, and has a powerful influence upon the heart, lungs, and the whole arterial system. The wisdom of the Creator has ordained, that this mental impulse shall not come into action until after the body is nearly developed; but exciting amatory words, plays, or vicious associates tend to excite it early in life, or when the body is weak and consumptive, and requires the arterial blood to sustain the growing organisms. Parents and teachers should understand the order in which the different faculties of body and mind are ordained, by the Creator, to come into action; and they should understand, that, if the higher faculties of the body, or of the mind, are allowed to precede the lower, the health of the lower suffers in consequence. This is the reason why precocity is an alarming symptom; it is an indication, that the higher faculties are usurping the place of the lower, and preying upon the vitals. The young patient should be made to associate with others of the same, or of inferior, age, and whose manners and language are simple and childlike.

Parentiveness — Philoprogenitiveness.

This is the special impulse to attend to the wants of offspring. In combination with other faculties, it manifests itself in various ways — giving to some a gentle, tender, and paternal manner, when dealing with the young and helpless or the sick; to others, a love of pets and favorites among animals. To understand the physiological relations of this organ, we must consider it as perfectly analogous to Amativeness. It receives impressions from its appropriate bodily organs, and, in return, forces the mind to attend to its favorites, and, through the arteries, it modifies the supply of milk which the parent furnishes to its young.

4. *Inhabitiveness—Concentrativeness.*

Is the impulse to concentrate our property and friends in a particular local habitation, and thus constitute a permanent home. Persons large at this part, are, certainly, less inclined than others to wander unnecessarily. Some phrenologists are disposed to consider this the organ of Concentrativeness, and deny that it relates to habitation exclusively; but, if we distinguish carefully between the primitive and original function of an organ and its incidental effects in peculiar combinations, I think that all will admit this to be just what its name implies, the impulse to become attached to a particular home. At the same time, it is a fact, that a remarkable deficiency in this part of the head is accompanied with a disposition to wander from one topic to another, in a way which is very unsatisfactory to those who have this part of the head large.

5. *Adhesiveness.*

I conceive this to be the converse of Parentiveness; for its primitive function is, to impel offspring to attach themselves to their parents and friends. I infer this from the fact, that it is larger in children than in adults, in females than in males; and because this seems to be the most reasonable account of it.

After the age of puberty, it combines with Amativeness, and produces conjugal affection; so also, in other combinations, it produces platonic, sentimental, religious, or intellectual friendship.

GOVERNING GROUP.

6. *Imperativeness, or Self-esteem.*

The impulse to command, to lead, to control, to influence others, accompanied with a consciousness of fitness to do so. This is a social impulse, because its sphere of action is society, and because, without it, there could be no government nor order—in short, regularly organized society could not exist. Wherever we find animals or men living together, there we find this impulse manifested. It is large in the heads of all those who have been the leaders in extensive associations of men—in the army, the church, the cabinet, or the academy.

7. *Approbativeness.*

This impulse is, primitively, an auxiliary of Imperativeness; and its object is, to make government acceptable and popular, by conciliating rivals and opponents, and gaining the good will of a large number. It modifies the harshness and rudeness of Imperativeness, and thus induces others to tolerate it. When Imperativeness is small, and Approbativeness large, then, indeed, we have extreme manifestations of vanity, ostentation, the love of display, compliments, applause, notoriety, reputation, or fame. On the other hand, when Imperativeness is large, and Approbativeness very small, there is an indifference to the opinion of others, and a shameless recklessness in regard to reputation, which is often mistaken for actual dishonesty and viciousness, and which, indeed, is generally not far removed from it; for it seldom happens, that Approbativeness is very small, without the organ of Equity being also deficient.

8. *Firmness.*

The impulse to resist the social influences which tend to change the opinions, habits, or moral positions which have been acquired or adopted. This impulse is often confounded with that of Combativeness, but differs from it in being defensive and quiet. Combativeness expands the arteries and increases the respiration; but it is questionable, whether Firmness does not tend to keep the pulse and the expression of the face unchanged.

9. *Equity — Conscientiousness.*

This is the social impulse to act impartially in dealing with our fellow beings; to render unto all men that which is their due, even if it is ever so much our interest or inclination to act partially. Such is the *tendency* of this impulse; of course, it is, like all other impulses, liable, even when large, to be overrun temporarily, by any highly excited impulse, in times of temptation. The common idea, that remorse of conscience depends upon this organ, is erroneous. It depends upon a combination of this organ with Cautiousness and Submissiveness and a depression of Hope. The effect of this impulse upon the circulation is to render it equable, and keep it undisturbed; and, in this respect, it is auxiliary to Firmness, as its lateral position indicates.

CONFORMING GROUP.

10. *Submissiveness, or Veneration.*

The impulse to recognize authority, and obey "the powers that be;" to submit to superiors, and treat them with respect; to obey the established law, and aid in its execution, without considering its justice or its severity; to suppress all expressions or manifestations which may be displeasing to the higher powers; and yield opinions, principles, and rights—personal and political—into the hands of masters: such are the tendencies of this impulse, when unchecked by other powers. In a well balanced and instructed mind, the submissive principle will be modified by self-respect, justice, kindness, prudence, and courage; and then it will manifest itself in prompt obedience to just and lawful authorities; in respectful manners and language, combined with dignity; in religious observances which are not repugnant to reason nor morality; and in a readiness to yield to others in matters of no importance, when social harmony would otherwise be disturbed.

Kindness—Benevolence.

The impulse to be kind, obliging, and courteous to strangers and persons who belong to different and opposing sects, parties, or races. To understand the nature of this impulse, we must consider the progressive nature of the social organs, and of society itself. The voluntary association of conscious beings that have wants, interests, or feelings, in common, may be called *society*. The first requisite to the formation of society is the ability consciously to manifest equilibrium and locomotion; and for this, the lowest organ of the social class is necessary. In the earlier stages of animal creation, the only purpose for which one animal approached another, was to eat it, or to unite with it in multiplying the species. Accordingly, in the programme of social organs, as arranged in the brain, (see bust,) the first relates to locomotion, and the second to reproduction. The next step in the progress of society was the creation of the parental impulse, which necessarily produced the family relations. In this stage of society, the number of individuals who were brought into social communication was limited to the two parents and their mutual offspring. The disposition to court the good will of acquaintances beyond the immediate sphere of the family, was probably produced by Approbativeness, which is situated immediately above Adhesiveness, and is a kind of modification of it, but differs from it in operating in a more extended sphere than mere domestic life. The organ of kindness is of such a nature as to produce a disposition to enlarge the circle of acquaintances to a degree proportionate to its development; and it will be found, that it is largest on those who are most remarkable for general philanthropy, and for the disposition to treat strangers with the same affability, upon a brief acquaintance, as if they were members of the family. The natural tendency of this organ is, to concentrate the whole human race into one community, by conquering their prejudices, and expanding their charities towards each other.

12. *Imitativeness.*

The impulse to adopt the habits, manners, language, and fashions, of associates, and especially of those who are admitted to be superior. It is, evidently, a most important agent in extending the sphere of society, and preventing it from being confined to a limited clan. Mechanical imitation is so dependent upon accurate observation, that we never find any one who excels in that way, who has not the central perceptives largely developed; but social imitation being less dependent upon minute observations, and more upon words, we often find the organ of Words, or Language, rather large, and the central organs of Observation small, when the forehead is narrow, high, and prominent. Persons with such an organization excel only in general and metaphysical literature, and in the social arts which are dependent upon language. This organ and its function must not be confounded with the mechanical impulse of Constructiveness; it is a social faculty, merely, though it, doubtless, may combine with Constructiveness, to give excellence in the fine arts.

13. *Credenciveness—Marvelousness.*

I consider this the highest and last created development in the brain. It is the impulse to believe in the testimony of others, to imagine and assume that it is true, and to act accordingly. It gives the desire to hear and to read the statements and assertions of others concerning matters which are beyond the sphere of observation and experience: it thus relates to that which is distant in time or place, and greatly enlarges the sphere of thought and action. By means of this credencive faculty, one man can make all other men, with whom he can communicate, his agents for acquiring information. The men who lived thousands of years ago, built monuments, and wrote parchments, to communicate their ideas to us; and we, through credencive faith, receive the full benefit of their accumulated labors and experience, merely for the trouble of reading their history. In an economical point of view, no other organ can compare with this, since, by its means, the many errors and useless labors of the countless dead may be avoided by the living; and the important results of all their observations and thoughts are given, gratuitously, to us, as a capital to begin life with. What wonderful stores of intellectual wealth has this faculty enabled man to accumulate! How almost infinitely has it raised him above all other animals! Even the lowest savages have a power, that no lower animal has, of transmitting knowledge and experience through language, by tradition, to posterity. Written language is wonderful, in its power to elevate those who can read. Printing diffuses the power to all the human race; and, while being thus diffused, it multiplies a thousand fold during each generation. This organ is found large upon those who are habitually talkative, and are especially fond of repeating what they hear or read. It is, therefore, an important element in the character of a poet, romancer, or rhetorician.

REMARKS UPON THE SOCIAL ORGANS.

In practice, it will be found, that when the establishing Socials are large, and the governing, and conforming, small, the character is disposed to be domestic, clannish, and sectarian. When the governing group is large, and the conforming, small, the character is inclined to be uncommunicative, stubborn, uncharitable in speech, unchanging in habits, and unconformable in manners. When the governing group is small, and the conforming large, the character is amiable, obliging, and affectionate, but undignified, changeful, and easily influenced by the persuasions, assertions, or examples of others. When the establishing are small, and the governing and conforming both large, the character is ambitious of public employment, and disposed to avoid the cares, and evade the duties of domestic life.

It is common to see heads in which the three highest Socials are small and low at the front part, where they join the forehead, but large at their posterior part, where they join Submissiveness. This is often seen in the heads of the lower classes, and indicates, that the higher social organs have not arrived at their full development. It must be remembered, that the Socials develop from behind, forward; and, in these cases, the highest social organs are defective in their highest parts. Such persons are unskillful in general society, they are deficient in conversational tact, and the use of complimentary language; they are not good physiognomists, nor are they successful writers upon human nature. Some phrenologists, having observed this deficiency, have divided these conforming Socials—making the front part of Kindness an organ of Suavity; and of Imitativeness, an organ of Human Nature. In practice they are not far wrong; but it may be doubted, whether it is proper to divide the organ in this manner.

The bust, p. 278, has a line of dots passing transversely across the three most anterior conforming Socials, to indicate that they may be thus subdivided; and it will be found, in practice, that those persons who have the posterior part much developed, while the anterior is deficient, manifest them more impulsively, and less in combination with the intellect. Those who have the anterior part large, have a disposition to extend their spheres of action to more general society, more general knowledge of human nature, and more extensive, liberal, and philanthropic views of religion, government, and social intercourse. Shakspeare, Walter Scott, Garrison, Oberlin, Fremont, and Buchanan, are all instances of this development and illustrations of its truth.

RELATIONS OF ORGANS OF ONE CLASS, TO THOSE OF THE SAME GRADE IN OTHER CLASSES.

Phreno-organs of the same rank, though in different classes, are peculiarly related to each other. The highest Directives, Ipseals, and Socials act together, and mutually stimulate each other; and so, also, do the lower.

It is a curious fact, that the Ipseals were created before the Socials were, and took possession of the nerves and muscles of the face; so that, when the Socials were afterwards introduced, they were forced to borrow the ipseal instruments, with which to manifest and express themselves. Thus, the lower Socials express themselves by means of the lips, which are instruments primitively created for eating; the governing Socials express themselves by belligerent signs; for instance, Imperativeness expresses itself by signs borrowed from Destructiveness; Firmness borrows the expression of face and manner which primitively belongs to Combativeness. So of the conforming Socials, also; they borrow the expression of the higher Ipseals: thus, Submissiveness borrows the expression of Secretiveness and Cautiousness; Kindness borrows the cheerful expressions of Hope; Imitativeness the expression of Constructiveness; and Credenciveness that of Perfectiveness. This is a curious and interesting subject, which I intend to treat more extensively in a future treatise on physiognomy and expression.

SECTION XII.

THE TEMPERAMENTS.

THE predominance of one important part of the body, or of one class of organs, over the others, so as to constitute an appreciable degree of disproportion, is properly called a temperament. Any peculiar climate, disease, or occupation, which essentially modifies the form or complexion, the vigor or the health, produces, in a few generations, a permanent constitutional habit, which becomes hereditary: and this is the origin of the various temperaments.

1. *The phreno-nervous temperament* is indicated by a large head, small trunk, and slender, lean muscles; it produces activity of mind and body, without corresponding energy. It adapts its possessor to light, sedentary employments, and was probably caused by such employments being followed by their ancestors; or by the effects of diseases, which debilitate the body, and add to the cares and labors of the mind. It is possessed only by man.

2. *The muscular temperament* is indicated by large, solid, muscular limbs and face, without more than a medium amount of fat; the brain not more than middling size, and the lungs a very little less. It produces a capability of manifesting uncommon strength of body, without corresponding activity. It is possessed by the

ox, the elephant, and the dray horse, and adapts its possessor to slow, heavy labor.

3. *The thoracic temperament* is indicated by a disproportionate development of the lungs, when compared with the cranium and pelvis. It produces impulsiveness, without corresponding prudence or sagacity. It does this by furnishing the Impulsives with the oxygen which they require for prompt and powerful action, and gives a disposition to discharge the surplus oxygen from the blood by muscular exertion. It qualifies its possessor for athletic and energetic performances in the open air, and, probably, originated in such exercises.

4. *The florid temperament* is indicated by a florid face, blue eyes, chestnut hair, and animated expression of countenance. This complexion may be seen in persons of every size and form. It must be distinguished from the thoracic temperament, for it is common to see florid persons with small lungs. It is most frequently seen in mountainous and cold countries; and I suspect, that it originates in exposure of the skin to cold, clear air; for, under such circumstances, the blood always rushes to the surface, to generate heat, and repel the invading cold — the greatest enemy of life. Persons with this temperament, are very zealous and promising in their first endeavors and exertions, but they do not persevere, unless they have other elements of character to make them do so. If the lungs of a florid person are small, the employment should be in the open air, but not monotonous, nor such as to require great strength, nor endurance. They are fitted for light, active employments, which afford a great variety of exercise to body and mind.

5. *The venous, or bilious, temperament* is indicated, in the white races, by dark hair and eyes, sallow skin, and, generally, a sober expression of countenance. It is,

usually, accompanied by a remarkable tenacity and continuity of all the functions of body and mind. The cause, or physiology, of this has never been given. My own opinion is, that it is caused by the predominance of the liver and venous system of bloodvessels. It seems to partake of the reptilian character. It characterized the land animals that existed before the tertiary period. Reptiles are remarkable for the tenacity and continuity of their functions; they continue to live, when any other animals would die. This temperament, though enduring, is but moderately active, unless combined with the nervous.

6. *The pelvic temperament* is indicated by a broad pelvis and back, with lungs of not more than medium size. This is the temperament of women, and adapts its possessor to patient labor, which does not require sudden exertions of uncommon vigor.

7. *The lymphatic temperament* is indicated by light, fair skin, hair, and eyes, and soft, yielding flesh. It produces, mostly, negative qualities, and is, generally, accompanied with a greater or less degree of weakness of the respiratory powers, with indolence of the functions of body and mind, and the inability to continue long in any employment which requires uncommon energy. It does not, necessarily, produce fullness, or corpulence, though it generally does so; but it is sometimes seen in those who are lean and slender. It is, probably, caused by the lymphatic system of circulating vessels predominating over the venous and arterial systems. I regard the lymphatic system as belonging, peculiarly, to the stomach; in fact, it is a continuation of the stomach to all parts of the body; and, in the same way, the arteries are continuations of the lungs. The predominance of the one tends to excessive action, and of the other,

to extreme passiveness. The venous system is intermediate, and belongs, almost equally, to both systems, having no special functions of its own, except to supply the liver with the nutritive materials which no other organ can digest. In accordance with this physiology, we find, that persons of the lymphatic temperament are too slow; those with the florid, arterial, and nervous, are too fast; but the venous-bilious temperament is neither very slow nor fast.

8. *The adipose temperament* is indicated by a corpulent, full habit, with large, fat limbs. It is, probably, in many cases, the result of disease; but some families and tribes of men are, constitutionally, predisposed to this peculiarity, especially in cold climates, where the fat is useful as a source of heat, and a non-conducting protector from cold. It is doubtful, whether it has any other effect upon the functions than to moderate their activity. It is common to see fat men, with florid complexions, who are exceedingly vigorous, persevering, and efficient; the moderation produced by the corpulency being a fortunate balance to their excessive respiratory vigor.

There are, of course, many combinations of these temperaments, which it is unnecessary to describe particularly.

SECTION XIII.

APPLICATION OF THE PRINCIPLES OF NERVOUS PHYSIOLOGY TO MODERN SPIRITUALISM.

So much has been written concerning modern spiritualism, without any satisfactory explanations being given of the phenomena, that the public will naturally ask what reason they have, for supposing that the author of this work will be more successful than his predecessors. What do you know about it? What can you prove? What can you do, to satisfy us that your positions are correct? There are several classes of these inquirers.

First, the *religious believers*, are those who, under the name of spiritualism, have adopted certain religious notions, to which they are attached, not on account of any manifestations by which they have been proved, but because of their adaptation to the hopes which they entertain of future enjoyment in the society of departed friends. I know too well the power of such feelings, to expect to successfully oppose them by scientific demonstrations. We might as well expect, by argument, to induce an ardent lover to look with indifference upon the object of his affections. When the mind is under the supreme control of any impulsive faculty, the intellect is incapable of appreciating the arguments, or perceiving the force and value of the facts, that tend to oppose its gratification.

Second, the *marvel-lovers*, who are delighted with spiritualism, merely because it gratifies their romantic imaginations. Simple, unpoetic science has no charms for them; they prefer a new and wonderful lie, to an old and important truth. The author who strips falsehood of its disguise, and holds it up to the contempt of the world, is regarded, by them, as a mischief-maker; and, although his works, if studied, may yield them much instruction, they excite no sensations of pleasure.

Third, the *reluctant believers*. These constitute a very large and honest class, to whom, I hope and expect, that this work will be useful. They are hostile to the religious principles inculcated by the spiritualists, and have little sympathy with them in any way; but their minds have been overwhelmed by the flood of *testimony* in favor of its phenomena; and, besides, they have, themselves, witnessed some things which seem to confirm, by physical demonstration, the wonderful things which they have heard: in addition to this, they shrink, with aversion, from the skeptical condition of mind which would reject such an immense weight of human testimony, corroborated, as it seems to be, by the analogies of the sacred scriptures. To this class of inquirers, and all others, I answer, that I shall attempt to show, that they have been misled by their amiable confidence in the testimony of their fellow-men; and that no phenomena, nor manifestations, have been really exhibited, under the name of spiritualism, except such as depend upon an abnormal condition of the nervous organism, and which can be easily reproduced by scientific experiments; that neither rappings nor the moving of furniture are ever actually produced, except by jugglery; and that all the so called spiritual communications proceed from the brains of living impostors, or dreaming credo-maniacs. I fancy that I hear you exclaim, that this is taking a very bold stand, and assuming a great responsibility, especially when the number and character of the accused parties is considered. I answer, that I am perfectly aware of the responsibility, and am ready to meet it. I wish it to be understood, that I do distinctly charge all rapping mediums with being impostors; and all honest writing and speaking mediums, with being the subjects of a nervous disease, by which their unusual manifestations may be accounted for.

A fourth class of inquirers are they who believe, that a law of nature, hitherto unknown, has been discovered, by which strange physical and mental manifestations are produced; and, while they protest against admitting, that departed spirits have any agency in producing the effects, they insist, that a new and wonderful class of phenomena are actually exhibited by the mediums. To these, and to all, I make the same answer, that, after a thorough investigation, my conclusion is, that disordered nervous organisms are the only sources of the honest and actual manifestations; all else is imposition on one side, and credulity on the other. There is no new, or unknown, law of nature concerned in the matter; but, rather, an old law of diseased human nature, by which common sense is rendered subordinate to a miserable delusion.

The spiritualists generally accuse those who deny their pretensions, with ignorance, and with having neglected to investigate the subject. They exclaim, "Oh! if you had seen what we have seen, if you had examined and investigated as we have, you could not help admitting, that there is truth in spiritualism. You have no right to deny and to denounce what others believe, without investigation. It is not fair, it is not honest, it indicates a prejudiced mind, influenced by an unprogressive spirit, or a mind laboring under a lumbering load of antiquated notions!" Pause, pause a moment, my ardent friend, and let me inform you that I have investigated this subject, probably, a hundred times more than you have. Investigation is my business, my daily labor, and my recreation, and has been, ever since the day when this modern spiritualism reared its deformed head, and claimed a place among the powers of earth. I have never yet met one who has investigated spiritualism as much, or as long as I have; and so far from finding evidence of its truth, I find the most overwhelming and cumulative proofs of its falsity. I oppose it, therefore, not from the weakness of ignorance, but from the strength and fulness of knowledge and experience.

Some of my skeptical friends have censured me for directing so much attention to a subject which they regard with contempt; but my answer has been, that the subject is rescued from contempt, by the highly respectable character of a great number of its believers; and, though this affords no good reason for our credence, it does give it a claim to a candid and careful investigation. The apparent improbability or the absurdity of a pretended discovery, may be a good reason for denying and opposing it, and demanding the most rigid proofs, but not for refusing to examine the evidences which respectable persons offer to adduce in its favor. What appeared, beforehand, more improbable than the propositions which were demonstrated to be true by Columbus, and Franklin, and Fulton, and Morse?

PRACTICAL EXPERIENCES.

I propose to give some account of the circumstances which led me to direct so much time and attention to psychological matters. The public, and especially the honest spiritual believers, have a right to know what opportunities have been enjoyed by one who speaks thus positively on a controverted subject; and, perhaps, nothing which I can write will be more acceptable or instructive than a narrative of some of my experiences in connection with spiritualism.

Personal narratives always seem egotistical, especially when they require the frequent use of the pronoun, "I;" but the egotism will readily be forgiven by all sensible readers, if that style of speaking is best adapted to the nature of the subject. A witness should speak, directly and plainly, in the first person, without any affectation of timidity or morbid modesty.

In the year 1832, *Spurzheim* visited this country, and though he died at Boston in less than three months after he landed, his visit drew public attention to the science of phrenology, and caused several converts to engage in giving public lectures upon it, in various parts of the country. Among these I was one of the most enthusiastic. Several years before, when I was scarcely nineteen years old, I had taught a public school in Pennsylvania, and had been severely puzzled to account for the vast differences in the natural capacities of my pupils. It was in vain that I studied the works of Locke, Ried, Stewart, and Brown, and the other great masters of mental philosophy, to find a key to this mystery of human nature. My delight may, therefore, be imagined, when I found a new science that did much more than I then required; for it not only solved the problem of the great variety of talents and moral characters, but it seemed to me to open a vast field for new researches and discoveries.

Let me here confess, that I was for a while almost discouraged by the many errors which practical phrenologists made in examinations. Though I spared no time nor pains to learn the science and the art, as far as it was known, and though I could always discern some points of character with infallible certainty, in regard to other points, I found, that there were practical and theoretical difficulties, which could only be attributed to the imperfections of the science. While in this state of doubt, I was employed, temporarily, in giving a course of experimental lectures on chemistry, in the Troy Female Seminary, when, one day, a conversation which I had with the young ladies concerning the nature and power of alcohol, and its relation to the mind through the organ of Alimentiveness, induced me to make a series of observations which led to the discovery of the natural classification of the phrenological organs.

During the year 1838, I witnessed, in Buffalo, some experiments in mesmerism, which first satisfied me of its truth; but I sought in vain, among books and men, for any plausible explanation of the facts. I reasoned thus: If phrenology is the science of mind, as it appears to be, and mesmerism is but a series of phenomena of mind, surely the science of mind ought to afford an explanation of its phenomena; and some connection between phrenology and mesmerism must exist, though it has not yet been discovered. Phrenology shows, that each faculty of mind is associated with a definite portion of the brain; but it does not show the manner in which the different faculties assist, oppose, or modify each other in health, nor does it teach us how the manifestations of the organs are affected by disease. Finding that no explanations of mesmerism could be obtained, I postponed the matter, and waited for further developments. In the mean time, I devoted my energies almost exclusively to promulgating "the new system of phrenology" which I had advanced, encountering at every step the most determined opposition, not only from skeptics, but also from other phrenologists.

In 1841, the world was startled by an announcement, that the phrenological organs could be separately excited by merely touching the heads of certain impressible persons; that, in this way, not only could the truth of phrenology be demonstrated, but new discoveries in phrenology and physiology could easily be made. If the function of any part of the head or the body is in doubt, according to this new doctrine, we have only to find an impressible person, and touch the head or organ in question, and the function is instantly manifested in such a decided manner, as to dissipate every doubt, and settle the question forever. *Rev. Le Roy Sunderland* of New York, claimed the honor of this discovery. The claim was disputed by *Dr. J R. Buchanan* of Cincinnati. Converts were innumerable; almost every phrenologist of this country, excepting myself, ackowledged, that such a discovery had actually been made; and one went so far as to publish a new edition of his work on phrenology, and added a large number of new organs, which he declared had been discovered in this manner; and, besides this, he assured the public, that he had verified the experiments by examinations of crania.

The history of this phreno-mesmeric delusion has many instructive points of resemblance to that of the spiritual delusion. In both cases, the only honest reality was mesmeric disease, in a new guise. In both cases, hundreds of respectable, and some eminent, persons were misled and induced to lend their influence in favor of the error. In both cases, the operators and mediums were frequently deceived, themselves, and innocently became instrumental in deceiving others.

The truth is, that no phrenological organ can be excited by the phreno-mesmeric method ; and those distinguished gentlemen, *Dr. Elliotson*, of London, *Dr. Caldwell*, of Kentucky, and others, who made public declarations in its favor, were utterly mistaken, themselves, and were the means of misleading thousands of others.

The same sort of evidence and arguments were used to sustain the head-touching phreno-mesmerism then, as are resorted to now, to substantiate spiritualism. The head-touchers would say, as one did say in a letter to me: "Here is my daughter, a young, honest, and innocent girl, who is the subject — she was never known to tell a lie — I am myself the operator. I know nothing of phrenology, and am quite sure she does not; yet, if I touch her head ever so cautiously, the organ touched instantly responds, and the mind of the subject falls under its dominion. If it is Self-esteem that is excited, her imagination revels in ideas of authority and power. If it is Constructiveness, structures are contemplated, or airy castles built, which surpass all reality in their vastness and splendor. Let Tune receive the magic touch, and all the vocal powers of the subject are called into action — she will actually sing or play in a manner far superior to that which she exhibits in her ordinary state. Now, friend Grimes, it is impossible to explain this, without admitting that the phrenological organ exists immediately beneath, or near the spot touched, and that it is thus separately excited. If I knew the location of the organs, it might be supposed that my mind influenced hers, or if she knew, that would sufficiently account for the manifestations; but as both of us are entirely ignor ant of phrenology, no such explanation can be admitted, and the inevitable conclusion is, that phreno-magnetism is true. Of all men, you, friend Grimes, ought to be the last to oppose this new discovery, for, by its means, we are enabled to prove phrenology to a demonstration. We have convinced hundreds of skeptics in this way, that phrenology is true, who had previously rejected all the evidences derived from craniological examinations. I am sorry to be obliged to say to you, that you seem, in your opposition to this beautiful discovery, to be influenced by professional prejudice, which prevents you from doing justice to its claims upon your respect."

Dr. Caldwell, of Kentucky, the oldest of the American phrenologists, in answer to a letter, assured me, that he had convinced himself, by his own experiments, that the phrenological organs can be easily excited, separately, by mere touching. *Dr. Elliotson*, president of the London Phrenological Society, made a public speech, in which he expressed a similar conviction, as a result of his experiments. *Rev. Mr. J. Pierpont*, of Boston, an eloquent phrenological lecturer, made a public speech in that city, in which he spoke in the most glowing terms of the splendid discovery. A committee, among whom was *Wm. C. Bryant*, appointed by a large and respectable audience, in New York city, reported unanimously in favor of the experiments and conclusions of *Dr. Buchanan*.

Up to this time, I had steadily refused to say anything in public upon the subject of mesmerism, or to perform any mesmeric experiments, simply because I could not accompany the exhibitions with a satisfactory, nor even a plausible, explanation. But now, that it was erroneously supposed, that the phreno-organs could be excited by its means, I could no longer be a silent and passive spectator — engaged, as I was, continually, in giving lectures on phrenology and physiology, in various parts of the country. I, therefore, devoted all my spare time, for several months, to a careful investigation of the relations of mesmerism to the human brain. The result was, that I published a work, in 1844, entitled "Etherology: the Philosophy of Mesmerism and Phrenology;" in which, I believe, that I proved, to the satisfaction of all my unprejudiced readers, that phreno-mesmerism was a delusion, and that the organs could not be excited, as *Dr. Buchanan* and others had supposed that they could. I accounted for all the manifestations of phreno-mesmerism, without attributing them either to the will of the operator, or to the direct excitement of the organs of the head by touching, but merely by the effect of language and belief upon the imaginations of susceptible persons — just as I now account for the honest spiritual manifestations.

It is worthy of especial remark, that the advocates of the touching process denied that the new art was, in any way, related to mesmerism. *Dr. Buchanan* named it "neurology;" "*Mr. Sunderland*" called it phreno-magnetism; an English author, *Mr. Braid*, gave it the euphonious title of neuro-hypnotism — and all agreed in considering mesmerism as something of a different nature, and unworthy to be mentioned in connection with their favorite novelty. I demonstrated then, just as I do now in relation to spiritualism, that all the actual capital stock which the pretenders have had to trade with, was, and is, merely that same old mesmerism which they despised, and nothing else. Does it not seem almost in conceivable, that credulity could manufacture such an immense amount of delusion out of so small an amount of actuality?

Immediately after the publication of my expose of neurology, or phreno-magnetism, it was abandoned by most of its originators, and now none can be found so weak as to do it homage. But how Protean are the forms of error! In my Etherology, I gave a true *rationale* of the common mesmeric manifestations. I discovered, and published, for the first time, in that work, the philosophy of credencive induction, or credo-mania, demonstrating that the real power that produced the phenomena, was the power of speech, in the operator, affecting a diseased nervous organization. The publication of that work had the effect of putting a quietus upon the head-touching folly. But it created, in its place, a still more monstrous error, which has been known under the names of electro-biology, and psychology. Several lecturers perambulated the country, declaring that they were in possession of a great secret, which they called biology, and which they professed to impart for the sum of ten dollars, to each person initiated. I was in Boston when this biology was introduced there by a lecturer, who, it was reported, received six thousand dollars in one week for his great secret. He scoffed at the idea of its being a form of mesmerism, and declared, that it was something entirely new — a discovery of his own — by means of which, nearly all diseases could be cured, as if by magic. I went to one of his public exhibitions, and, behold! his biology consisted in merely performing the same experiments, and in precisely the same manner, as I had described and explained in my work on Etherology, under the name of credencive induction. In consequence of the failure of the publishers, Etherology had but a very limited circulation, and was entirely out of print. This circumstance emboldened the biologists to proclaim as a new discovery of their own, a process which was minutely described in that work, and its philosophy explained.

I immediately engaged the lecture room of the Tremont Temple, in Boston, and commenced a series of lectures, in which I thoroughly exposed the fraud, and convinced the people of my native city, that biology was identical with mesmerism, and that *language*, and not electricity, was the agent which produced the effects. The biologists did not honestly explain to their dupes how the results were performed, even after they had received the ten dollars which they demanded, but pretended, that a piece of copper coin was necessary, which had a piece of zinc in its centre. This coin was held in the hand and gazed at intently by the subject a few minutes, when, if he were susceptible, they pretended that the electricity would proceed from the coin into the hand, then through the ulnar nerve up to the head, and from the head to the whole body, and thus the subject would be perfectly under the control of the operator. The honest truth is, that neither the coin nor the ulnar nerve had any thing to do with the result. The language of the operator and the morbid nervous organism of the subject, were the only real agents employed.

Let a dozen persons place themselves in a passive situation for a few minutes, and allow any grave and sensible person, in whom they have confidence, to stand and talk to them in such a way as to influence them in a special manner; in most cases, one, at least, will be found in the dozen, who will be biologized, mesmerized, subjected, spiritualized, or mediumized.

Origin of Modern Spiritualism.

Modern spiritualism is not only a delusion, but a fraud. It originated in a selfish attempt to impose upon the public, in order to make money, by palming off the promptings of a few designing biologists, uttered through their own mesmerized subjects, under the pretence that they were the inspirations of disembodied spirits. It is important that this should be known to those who are honestly credulous concerning the spiritual origin of the new dispensation. If I show that the head of the animal is a serpent, I expect that my readers will infer, that those parts of the reptile which follow behind his head, partake of the same character.

Modern spiritualism originated at my lectures in Poughkeepsie, N. Y., in 1843, in the following manner:

I gave a course of lectures on phrenology and the physiology of the nervous organism, illustrating each lecture with experiments in mesmerism. I had just discovered the principle of credencive dreaming, and the wonderful power of language upon the nervous organism; and, here, for the first time, I attempted to reduce my new theory to practice, in public.

I found no one in Poughkeepsie who professed to believe in mesmerism, and, at first, my lectures were very poorly attended; but, after I had succeeded in operating upon a number of well known citizens, my lecture room was crowded by the best people of the place, and a high degree of interest manifested.

One evening I attempted to mesmerize a number who had never been tried before, by merely talking to them, without any exercise of the will, and without making the usual mesmeric "passes." Before this time, mesmeric experiments had only been performed according to the method taught by *De Leuze*, in his work on mesmerism, which may be briefly described as follows: the subject and operator sat directly face to face, and stared in each other's eyes, the operator holding the subject by the thumbs. As soon as the subject became a little exhausted, he closed his eyes, and then the operator drew the ends of his fingers over them several times, and made a succession of passes, by moving his hand from the centre of the subjects forehead, to his extremities. After wearying himself by these passes, the operator resumed his former position, by taking, again, hold of the thumbs; during all this time, the operator kept his mind intently engaged upon his subject, and exercised his determined "*will*," that the subject should go to sleep. If the subject began to nod, or in any other way show signs of somnolence, the operator asked, "Are you asleep?" and, if the reply was "Yes," then he was supposed to be in the mesmeric sleep. This process of mesmerizing generally consumed, at least one hour at each sitting; and sometimes not less than thirty sittings were found necessary before the operator triumphed, and the subject was thrown into the mesmeric state.

The theory of this operation was, that a fluid—a species of animal magnetism—proceeded from the operator, which could be directed, by his will and his hands, to the mind and body of the subject. When I first essayed my own skill in the mesmeric art, I humbly imitated my predecessors, and contented myself with learning what they professed to know of the philosophy of the matter, which I ultimately found to be just enough to show that they were in almost total darkness.

It was not until the mesmerizers professed to excite the phreno-organs, that I considered myself as competent as any one to form an independent opinion. When they pretended to discover and excite social organs in the very centre of the ipseal class, and ipseal organs in the midst of the social class, I felt confident that they were mistaken; though, of course, I could not, at first, point out the manner in which they committed their errors. In order to do this, it was necessary to discover what was not then known to any one — namely, the real nature of the agent by which the manifestations were produced, and, also, the nature of the susceptibility which made some persons such remarkable subjects, while so many others were proof against all the attempts made to mesmerize them. I did, at length, succeed in discovering, first, that the principal, if not the only, active agent, in almost all cases, is the language of the operator; second, that the susceptibility of the subject is of such a nature that it may properly be classed among diseases; third, that the principal effect is upon the conforming social organs, Submissiveness, Kindness, Imitativeness, and Credenciveness, upon the upper part of the head, (see Fig. 67.) I was busily engaged in preparing a work on the subject, which I afterwards published, when I gave the course of lectures and experiments in Poughkeepsie.

After having tried various experiments with electricity and magnetism, I found that they had no perceptible effect; and, having noticed that the caprice and imagination of the subject evidently was the source of *some* of the strange phenomena, I resolved to try what effect could be produced by operating, by words only, upon the minds of susceptible persons, and soon came to the conclusion, that nearly all the phenomena are produced in this way.

In Poughkeepsie, I first tested the principle publicly, by calling for volunteers from the audience to come forward, and allow me to ascertain, by an experiment, whether any of them were susceptible or not. Nearly twenty came forward, and seated themselves upon a designated bench, when I requested them to take hold of a cord which I gave them, and to close their eyes. The cord, though originally prepared for electric experiments, was now unprepared, so that it produced no effect whatever, except upon the imagination of the subjects. As for myself, I did nothing but talk to the audience, to keep them from laughing, or otherwise interrupting the experiment. In less than five minutes, several of the persons who had hold of the cord, seemed to be deeply affected, though in different ways. One shook as if under the influence of an ague; another broke out into a profuse perspiration, grew deathly pale, and seemed nearly ready to faint away; a third sat rigid and stiff, as if frozen, while his eyes rolled up, and his breathing was loud and stertorous, as though suffering with apoplexy; several others were affected, but no two alike. I called several of them before the audience, and controlled their minds, and through their minds controlled their bodies, merely by making various assertions. It made no difference how absurd the assertions were, the subjects instantly assumed them to be true, and proceeded to act consistently with them. I found that my silent will was powerless against my language. It was evident that the conforming faculties of the subjects were in a state of excitement, and that, if the subjects learned my wishes, by any means, they were ready to act conformably to them.

It appeared to me that this was the commencement of a new era in the history of mesmerism. Hereafter, in order to understand the philosophy of mesmerism, phrenology must be studied, that the relation of the conforming social powers, to the other powers of the mind and to the body, may be understood.

Among the persons who were operated upon, I noticed two who manifested slight symptoms of clairvoyance, by shrinking from the approach of my hand, when it was obvious that they could not see it. This is a rare phenomenon—so rare that I blame no one for doubting it or disbelieving it altogether. But I am bound in candor to say, that there is some truth in clairvoyance; though it is much less practicable and less provable, than it is commonly supposed to be by its believers. I mentioned to the audience the fact which I observed, but told them, that I did not propose to exhibit clairvoyance, and advised them to try experiments for themselves, as they could do so quite as well as I could, if they would proceed in the proper manner. I then described to them the usual method of proceeding, to ascertain whether any one is clairvoyant or not. The next day a large number tried the experiment, and several reported that they had succeeded.

Andrew Jackson Davis, one of the persons affected on this occasion, was an apprentice boy. He had never previously made his appearance in public, and, although I noticed that he manifested some slight indications of clairvoyance, he was not otherwise as good a subject for experiments, as several others whom I selected for that purpose.

Another individual who attended the lectures, and became interested in the subject, was *Mr. Wm. Levingston*, a merchant tailor. One day, during the time that the course of lectures were proceeding, *Davis* went into *Levingston's* shop, and proposed to try the experiment which I had described. *Levingston* consented, and proceeded to the trial. In a few minutes, *Davis* declared, that he could see through the back of his head, and *Mr. Levingston* has assured me, that *Davis* actually read a newspaper which was held up behind him, while his eyes were closed, as readily as if he had been looking at it with his eyes. The rumor, that young *Davis* was an extraordinary clairvoyant, soon spread through the town, and naturally created a great sensation. Hundreds flocked to *Levingston's* store, to test the wonderful powers of the clairvoyant, and *Levingston* soon learned to make medical prescriptions, and to charge a fee for each.

At the conclusion of one of my lectures, a gentleman (I believe that he was a physician,) arose in the lecture room, and asked, if I sanctioned the clairvoyant practice of medicine, and whether it is a fact that clairvoyant subjects can perceive the internal organs, and describe their healthful or diseased condition; and, also, whether they can, in the mesmeric state, prescribe for diseases, as they pretend, with more accuracy than a regular scientific physician can. In reply, I took occasion to speak, in strong terms of condemnation, of the clairvoyant practice. I stated then, what I still teach, that clairvoyance is a fact; that it is occasionally exhibited as a phenomenon of disease, but that it is not, at present, of any practical value; for though, sometimes, we may be surprised by the accuracy of the perceptions of clairvoyants, we are much oftener disappointed, and, on the whole, no reliance can be placed upon them. I consider clairvoyant medical practice as a miserable species of quackery. If it apparently produces cures, it does so through the influence of the credencive principle of the mind operating upon the body, as all other quackery does.

Of course, there could be no sympathy between the clairvoyant practitioners and myself, after a public declaration of such sentiments; and, though my lectures in Poughkeepsie gave birth to modern spiritualism, and first caused *A. J. Davis* to come into notice, I distinctly protested at the time, and always since, against the principles and the practices which grew thus illegitimately out of my labors, and finally resulted in producing a motley brood of pretended spirit mediums.

When the clairvoyant business grew dull in Poughkeepsie, *Levingston* took *Davis* with him on a tour through Connecticut, curing diseases wherever he went. At length, they arrived in the city of Bridgeport, where they made the acquaintance of a universalist clergyman, the *Rev. S. B. Brittain,* who has, from that time to the present, been the principal manager of the spirit-medium business, and is now one of the editors of the "Spiritual Telegraph." *Davis* and *Levingston* were both universalists; the *Rev. Mr. Smith,* of Poughkeepsie was their pastor, and visited Bridgeport with them. It was therefore natural that they should make the acquaintance of the universalist clergyman of Bridgeport, and that he should become interested in their proceedings. Living in the same house with *Mr. Brittain,* was his brother-in-law, *Dr. Lyon,* a botanic physician, who took a still deeper interest in the clairvoyant; for when *Levingston* and *Davis* prescribed medicines, *Dr. Lyon* was employed to put up the prescriptions, for which he, of course, received a small share of the sum paid by the patient. *Levingston* was the magnetizer, *Davis* was the clairvoyant, or instrument of perception, and *Lyon* enacted the subordinate part of apothecary, and received the smallest share of the profits. Why could not *Dr. Lyon* unite the functions of magnetizer and apothecary, and thus dispense with the services of *Mr. Levingston,* and send him home to attend to his other avocations? Could not the business be better managed, in more skillful hands? These were the suggestions which were frequently made to *Davis,* by his Bridgeport friend. To these delicate hints, were added promises of large profits — of going to New

York, opening an office, and doing the clairvoyant business on a large scale; of getting out a wonderful book, becoming famous, and making a fortune for the whole clique.

Dr. Lyons solicited and obtained permission, occasionally, to mesmerize *Davis*, and used him as a kind of pathescope, by means of which to ascertain the condition of his patients, and the best remedies with which to cure them; and thus, he soon succeeded in obtaining a decided ascendency over his mind.

Poor *Levingston* began to perceive, that his magnetic sceptre was passing from his feeble hands into the more powerful grasp of *Lyon, Brittain & Co.* At length, *Levingston* found himself under the necessity of making a formal abdication, and *A. J. Davis* passed under the dominion, and became the special subject, of *Dr. Lyon.* I happened to be on board of the steamboat, with *Levingston*, when he was on his way home, and received from him a particular account of his misfortune, accompanied with bitter complaints against the conduct of *Messrs. Lyon* and *Brittain.*

When *Davis* became the subject of *Dr. Lyon*, he, for the first time, learned, that he was specially inspired by spiritual beings for a great work; that he was a prophet and a seer; that his soul could leave his body, and go into the spirit world, and get information of any description which he desired, and return again to earth, enter his body, and make use of his corporeal organs of speech, to impart the knowledge, thus obtained, to his fellow mortals. *Davis* did not, himself, make the discovery of his own spiritual powers; nor did *Levingston* discover, that *Davis* was more than an ordinary medical clairvoyant. I freely confess, that I had no idea that he was remarkable for any but negative qualities. Not so with *Dr. Lyon;* as soon as he had fairly obtained possession of *Davis*, his eyes were suddenly opened, to perceive the miraculous powers of the young man. It was announced, that he was "going to have a revelation;" and that he was preparing to issue a book that would throw the Bible and all other books into the shade. It was calculated, and boasted, that not less than fifty thousand dollars would be realized out of its sale.

But *Davis* was notoriously ignorant and illiterate; he could not pronounce his words as correctly as ordinary young men of his age; nor could he converse, without grossly violating the rules of grammar. How, then, was he to write a superior book? Would the spirits, who were to utter, through him, such wonderful ideas, assist him also to clothe those ideas in good language? It was, certainly, natural to expect that they would do this; nor can any reason be perceived, why they might not inspire his mind with good notions of grammar, as easily as of philosophy, chemistry, or astromony. But, alas! the spirits proved capricious, and uttered their great thoughts, through *Davis*, in mean language and bad grammar; mispronounced most of the technical terms and unusual words, and manifested the utmost contempt for the rules of English composition. Those who heard *Davis* utter his "*divine revelations*," all agreed, that the language and pronunciation were his own, but the ideas evidently proceeded from some higher intellectual fountain. To publish the precise words of *Davis*, was out of the question; and, in this dilemma, the spirits—so it is pretended—were applied to for advice, when they, very graciously, relieved the book-makers from the difficulty which the spirits themselves had created, by appointing a scribe for *Davis*, whose duty it should be to take the ideas which he should utter when in the spiritual state.

and modify the languagé, so as to adapt it to the public taste. The *Rev. Wm. Fishbough*, a universalist clergyman, was the person whom the spirits designated to fill the important office; and he certainly proved himself fully competent to perform the task which the spirits assigned him.

Before proceeding to the formal commencement of the "Divine Revelations," several preliminaries were arranged which deserve the especial notice of the public. If spiritualism originated in a deliberate design to impose upon the public, by passing off crude theories of religion and philosophy, under the false pretence that they were Divine revelations, and at the same time to make money by the fraud, it is not to be supposed, that the conspirators would publicly avow their designs, or expose their private movements to public scrutiny. In such cases, as in all criminal trials, circumstantial evidence affords the only means by which to prove the guilt of the accused; but this is oftentimes of such a nature as to be perfectly overwhelming. There are two views taken of this matter, which are hostile, and utterly irreconcilable with each other: one is, that *A. J. Davis* was assisted by unearthly spirits to compose the book entitled "Divine Revelations," that the spirits furnished the ideas, and *Davis* and *Fishbough* the language, while *Lyon* sustained *Davis* by his magnetic influence, and *Brittain* aided and assisted in the work, witnessed its growth, attested its genuineness, and advocated its doctrines. The other theory is, that *Davis* was a mere dupe, and mesmeric mouthpiece of *Lyon*, & Co.; that *Lyon* privately mesmerized *Davis*, and while in the mesmeric condition, *Davis* was taught certain *lessons*, which, when afterwards publicly mesmerized, he could repeat, to the astonishment of the uninformed witnesses, though, in his ordinary state, he, possibly, knew nothing upon the subject; that *Davis* was inspired by those who employed him, mesmerized him, and paid his expenses, and by no one else; that the pretence, that he was assisted by disembodied spirits, was merely designed to excite an interest in the minds of the weak and credulous, and create a sale for the forthcoming book.

Before proceeding with the publication of the revelations, *Davis* was induced "*voluntarily*," (so says his scribe,) to assign all his rights to the pecuniary profits, to be derived from the sale of the revelations, to *Lyon* and *Fishbough*.

To appreciate the nature and full beauty of this transaction, it should be known and considered, that *Davis* was mesmerized several times a day by *Lyon*, in which mesmerized condition, he could be readily made, "*voluntarily*," to sign any document whatever. This fact should be considered, in connection with the one previously mentioned, that *Davis* was induced, "*voluntarily*," to leave *Levingston*, and choose *Dr. Lyon* for his magnetizer, and *Fishbough* for his scribe.

The copyright of the book was secured to *Lyon* and *Fishbough* before it was written, and arrangements made to extend its publication into foreign countries.

It was seen by the sagacious spirits, that some wicked persons in this world might attribute the work entirely to mortal minds, and deny the agency of spirits altogether. To prevent this, to satisfy the public mind and make assurance doubly sure, it was arranged, that the revelations should take place in the presence of witnesses, whose veracity could not be questioned; and these witnesses were nominated by the spirits themselves, by the mouth of *Davis*.

After the suggestion which I have just made, that *Dr. Lyon* could privately mesmerize and teach *Davis* his lesson, it will be obvious to the reader, that the witnesses could only testify to the fact, that the lessons were regularly and duly recited in their presence, but they could not know whether *Davis* had been privately trained and instructed or not.

The question will now occur, why did not some of the witnesses or spectators suggest the objection which I have made, that *Davis* might be privately taught the recitations, which he publicly made? In reply, I would state, that it was then known to but few persons, and to none that I know of, in New York city, that such a mesmeric feat could be performed; and, if asked, how it happened that the *Davis* and *Lyon* clique were acquainted with this method of managing a mesmerized person, while their associates and witnesses were ignorant, I will explain, by stating, that I had performed this very experiment, and explained the process publicly, both in Poughkeepsie and in Bridgeport, where these originators of spiritualism resided. I did this before they became acquainted with each other.

During the course of lectures which I gave in Poughkeepsie, at the time that *Davis* was first mesmerized, I operated upon a young gentleman, named *Potter*, and made of him what would, now, be called, by the spiritualists, a speaking medium. As far as I know, he was the very first speaking medium that was ever thus publicly made. If I told him that he was Henry Clay, or Macbeth, or Patrick Henry, he instantly assumed the character, and acted accordingly, in the most admirable and appropriate manner. One day, I met him in the street, and it suddenly occurred to me, that I would try a novel experiment, which would be at once a source of amusement and instruction to my audience. I requested *Potter* to call at my room at Rutger's Hotel. When he called, I mesmerized him, and made him believe that he was at home, in his own room, and that I was the spirit of Spurzheim, and had appeared to him, to instruct him in the anatomy of the brain. Taking up a series of drawings of the brain, I gave him a lesson, and made him repeat it several times, and then promise that he would deliver a lecture upon the subject, to the audience, that evening. Accordingly, in the evening, when I was performing mesmeric experiments with him, in the presence of the audience, upon a hint from me, he proceeded to lecture upon the anatomy of the brain, to the surprise of his intimate friends, and very much to the amusement of the audience. When he concluded, one of his acquaintances arose, and inquired whether, by the exercise of my own imagination, I had inspired *Mr. Potter* with my own ideas, and thus had enabled him to give the explanation to which they had just listened with so much interest, concerning the anatomy of the brain? "I know *Mr. Potter* very well," said he; "and I know that he is totally unacquainted with the subject, and does not even believe in phrenology; and yet he has been talking, fluently and learnedly, in favor of the phrenological method of dividing the brain; using technical terms readily, with which I know that he is unacquainted. Will you please to explain this?" In reply, I referred him to *Mr. Potter* himself, for an explanation. *Potter*, very honestly and seriously, assured the gentleman and the audience, that, during the day, being in his own room, at home, the spirit of Spurzheim appeared to him, and taught him the lesson which he had just repeated. At my last lecture, I explained the mystery to the audience, and taught them to operate in the same way.

I performed some experiments, also, in Bridgeport, of a similar character, when a young man, named *Gordon*, who has since become a noted medium, made his first public appearance.

The reader will now perceive, that, however much *Dr. Bush* may have been puzzled, when *Davis*, from Poughkeepsie, with the aid of *Lyon*, from Bridgeport, performed, in New York, the exploit of giving a pretended spiritual lecture while in the mesmeric state, the solution of the mystery is very simple. I had, certainly, some reason for believing, that they had learned the art from me, and had availed themselves of my instructions, to accomplish their selfish purposes. Whether they learned in this way or not, is immaterial; it is sufficient, that I have shown, that there was an opportunity for them to learn to deceive in this manner: for, when a wonderful occurrence is to be explained, it is foolish to look for supernatural causes, when well known agents, simple and natural, are fully competent to produce all the effects. It would be much more pleasant to account for *Davis'* performances, consistently with the honesty of the parties concerned, if it could be done; but this seems to be impossible; and, when we find, that those who had the knowledge and the opportunity which enabled them to deceive, had, also, a strong pecuniary interest in doing so, we shall show a pitiful ignorance of human nature, as well as of philosophy in general, if we do not conclude, that it is much more likely that deception was practiced, than that the spirits of the departed dead came upon earth and made use of an unlettered ignoramus, as a medium through whom to utter important communications, touching the future destiny of the human soul.

When all the arrangements were completed, *Davis*, in the presence of the chosen witnesses, on stated occasions, went through various contortions, became pale and cold, and then uttered a few words slowly, "*which Dr. Lyon repeated, to make sure that they were correct.*" *Fishbough* wrote them down, and afterwards made such trifling alterations as, in his judgment, were required, before giving them finally to the press! *Dr. Lyon* magnetized him twice a day, for three months, before the revelations began, and thus *prepared* him for his task, and was his constant companion during the delivery of the revelations. Now, when it is known, that any educated person, who is susceptible to the mesmeric influence, can easily be made to commit lessons in private, which that person will afterwards honestly and innocently repeat before witnesses, and sincerely and truly declare, that he received them from some spiritual source unknown to himself; when it is known, that, on an average, at least one educated person in fifty can be made such a medium as *Davis*, but far superior to him; when it is known, that I actually made such mediums in Poughkeepsie, before *Davis* became a medium, and hundreds in other places since, and stand ready now to manufacture and supply any number of such, "at short notice, and on reasonable terms;" when it is known, that this book contains a full explanation of the *modus operandi*, and *rationale* of the process, so that any one who reads may practice the same thing;— when all this is known, those who still continue to believe that *Davis's* pretended divine revelations are honest productions, must be deemed, like all other fanatics, invulnerable to the influence of reason and common sense. It may not be polite to call them insane, but it is, certainly, a serious question, whether they stand in greater need of charity or of medicine.

The performances of *Davis* and *Lyon* were well calculated to attract public attention. It was the first instance, in which one, pretending to be an inspired prophet, had publicly advertised his revelations previous to their being uttered or printed. There was something so business-like and apparently fair in the proceeding, as, in some degree, to disarm suspicion. Among the many hearers who took a deep interest in these singular proceedings, was the *Rev. Geo. Bush*, a learned and pious Swedenborgian. He was naturally struck by the resemblance of *Davis's* manifestations to those of the great *Swedenborg*, and, being himself of an exceedingly honest, disinterested, and unsuspecting disposition, he was so far imposed upon as to be induced publicly to advocate the genuineness of the revelations, and at the same time to suggest (by way of apology for the errors which mingled with the truths revealed,) that false spirits sometimes impertinently interfered and inspired the seer with their unhallowed thoughts.

Prof. Bush published a small book, which preceded and heralded the revelations, in which he undertook to prove, that mesmerism harmonizes with and corroborates Swedenborgianism; and that *Davis's* case was a unique and extraordinary one, perfectly reliable and truthful, so far as human agency was concerned; and that, whether true or false, the revelations were actually prompted by the spirits of the dead. It is not strange that thousands of common minds fell into a snare, which entangled the feet of so distinguished a divine. *Davis's* revelations, on their publication, did not produce the excitement, nor the profit which was expected by their authors; and the newly fledged spiritualism was fast sinking from public notice, when a new wonder came to the rescue, and lent it additional claims to attention. I refer to the so-called "Rochester knockings."

Davis was the first of the series of modern mediums. At the time of his advent, there were no speaking, rapping, tipping, nor writing mediums. He stood alone, between heaven and earth, the single connecting link of mortal humanity with the world of spirits. He occupied a high position, to which he had been raised from obscurity, not by his talents nor his virtues, but by spiritual election! He had neither wit, nor words, nor worth, natural nor acquired preëminence, nor did he need such helps; greatness had been "thrust upon him," without his choice, and without the necessity of any achievement, on his part, except a masterly passiveness of mind, which enabled the spirits to nestle in his brain, and hatch a brood of wonders. Hitherto, great men had been obliged to travel a long and rugged road, to reach their goal; but *Davis* moved in a new sphere of intellectual excellence, through which he could float, during the periods of his mesmeric sleep, to the delectable regions of an Utopian immortality. But he was not permitted, for a long period, to pursue this path alone.

The Fox Girls.

In the very small village of Hydesville, in Wayne county, N. Y., about five miles from Palmyra, lived an unpretending family, the principal of which was *Mrs. Fox*, the mother of three daughters, the eldest of which, *Mrs. Fish*, was a young widow, and resided in Rochester, while the two younger daughters resided with their mother.

One evening, as the story goes, the attention of the old lady was attracted to an unusual knocking, near the feet of one of the girls, and, supposing, of course, that the girl herself made the raps, requested her to stop them; but the girl assured her mother most solemnly, that she did not make the noises, and was utterly ignorant of the cause of them. It was next observed, that the raps seemed to reply to the language of the old lady. Questions were then asked, and a certain specified number of raps requested in reply. Immediately, the number of raps mentioned were given, just as if some intelligent person was rapping. The whole village was soon in commotion, and two parties were formed, one of which, judging by the past, contended, that the whole thing was a trick of the girls, to gain notoriety; while the other party inclined to the opinion, that the noises were made by supernatural beings, who had just discovered this method of communicating with mortals. One of the girls soon after made a visit to her sister in Rochester, and the knockings not only followed her, but soon after manifested themselves near or through the sister, *Mrs. Fish.* Accounts of these wonderful communications found their way into the public prints, and were discussed all over the country, under the name of the "Rochester rappings:" thus the fame of the *Fox Girls* soon began to rival that of the Poughkeepsie seer.

The *Foxes,* evidently, it would appear, did not set out with any settled plan of operations. They had no theological system to build up, nor any philosophical theories to maintain or promulgate. They were simple country girls, who woke up suddenly one morning, and found themselves famous. They began, in girlish sport, to make raps upon the floor and the furniture of their rural home, at the same time that they roguishly denied all knowledge of the causes of the raps which they made. None were more astonished than they, at the result; though the cause of their astonishment was very different from that of their dupes. They must have been perfectly amazed at the avidity with which their rude marvels were swallowed, and the hungry eagerness with which more were demanded.

When, however, they found that they were attracting public attention, and were regarded as spiritual mediums, they were not ignorant of the best mode of proceeding to make the most of their pretended gifts.

The following is *Mrs. Fox's* account, as published by *Mr. Ch. W. Elliott:*

"'Twas in December of the year 1847, that she moved from Rochester into this hired house. Very soon, they were disturbed, after going to bed, by various noises, which, however, did not attract much attention, as they supposed them to be made by the rats, which do sometimes, of themselves, have strange doings. It is a pity, that the age and condition of the house are not stated in either account. They were, however, disturbed, and, indeed, kept awake some, until they began to suspect, that mischievous persons might be playing tricks. Examination, however, did not show any such explanation, and they were obliged to content themselves with the rats, until, after a space of nearly four months, when, on the last day of March, year 1848, they determined to go to bed early, so as to get a good night's rest, in spite of all noise; but this was not permitted. The thought *then* struck *Mrs. Fox*, whose bed was in the same room with that of her two daughters, *Margaretta*, aged fifteen, and *Katy*, aged twelve, that she would question the noise.

"'Who makes the noise?'

"'Is it made by any person living?'

"'Is it made by any one dead?' Rap.

"'If by an injured spirit?' Rap.

"'If injured by her or her family?'

"'If by various other names?'

"Getting no further reply, she arose, somewhat excited, and called her husband, and some of the neighbors, who were yet up.

"The two girls, so *Mrs. Fox* states, were not apparently as much excited as she was, but entered, with some spirit, into the doings of the other spirit, one of them snapping her fingers, and asking the spirit to do as they did, which it did do.

"One of the neighbors followed up the injured spirit, asking, when the injury was done? Five raps, indicating, as they supposed, five years.

"'What name did the injury?' Rap, at the name mentioned of a man who lived there some five years before.

"'Is the body here, then, in the cellar?' A rap was heard, and they determined to dig, but somehow learned that they must delay it some four months, and, of course, did so.

"*Mrs. F.* stated, that, upon digging at the time mentioned, her son, and two others, found some pieces of bone, but whether or not those of a man, does not seem to have been ascertained. The person accused by the spirit, she said, was much outraged, but took no very efficient steps to remove so questionable an accusation. *Mrs. Fox* stated, that she left the house, and lived with some friends, as the excitement for, or against them, was so considerable; but, strange to say, the sounds followed her two girls, and, in the course of the summer, the alphabet was revealed to the son, when alone, in the wonderful house.

"The son's wife, also, for a time, she stated, was a 'medium,' for such is the title now used, but has, somehow, lost the gift."

I was informed, in Palmyra, that very few, if any, in that vicinity, believed in the pretensions of either *Joe Smith* or the *Fox* girls; even the relatives of the *Foxes* there, who knew them the most intimately, were the most ready to testify against them, as will appear from the following affidavit of *Mrs. Culver*. When *Dr. Boynton* gave a lecture against spiritualism in Palmyra, *Mrs. Culver* exposed, publicly, the manner of producing the raps, and performed, in the presence of the audience, precisely as the *Fox* girls did.

Deposition of Mrs. Norman Culver.

"I am, by marriage, a connection of the *Fox* girls; their brother married my husband's sister. The girls have been a great deal at my house, and, for about two years, I was a very sincere believer in the rappings; but some things which I saw, when I was visiting the girls at Rochester, made me suspect that they were deceiving. I resolved to satisfy myself, in some way; and, some time afterwards, I made a proposition to *Catharine* to assist her in producing the manifestations.

I had a cousin visiting me from Michigan, who was going to consult the spirits, and I told *Catharine*, that, if they intended to go to Detroit, it would be a great thing for them to convince him; I also told her, that, if I could do any thing to help her, I would do it cheerfully — that I would probably be able to answer all the questions he would ask, and I would do it, if she would show me how to make the raps. She said, that, as *Margaretta* was absent, she wanted somebody to help her, and that, if I would become a medium, she would explain it all to me. She said, that, when my cousin consulted the spirits, I must sit next to her, and touch her arm when the right letter was called. I did so, and was able to answer nearly all the questions correctly. After I had helped her in this way, a few times, she revealed to me the secret. The raps are produced with the toes. All the toes are used. After nearly a week's practice, with *Catharine* showing me how, I could produce them perfectly, myself. At first, it was very hard work to do it. *Catharine* told me to warm my feet, or put them in warm water, and it would then be easier work to rap; she said, that she sometimes had to warm her feet three or four times in the course of an evening. I found, that heating my feet did enable me to rap a great deal easier. I have sometimes produced a hundred and fifty raps in succession. I can rap with all the toes on both feet — it is most difficult to rap with the great toe.

"*Catharine* told me how to manage to answer the questions. She said it was generally easy enough to answer right, if the one who asked the questions called the alphabet. She said, the reason why they asked people to write down several names on paper, and then point to them, till the spirit rapped at the right one, was to give them a chance to watch the countenance and motions of the person; and that, in that way, they could nearly always guess right. She also explained how they held down and moved tables. (*Mrs. Culver* gave us some illustrations of the tricks.) She told me, that all I should have to do to make the raps heard on the table, would be, to put my foot on the bottom of the table when I rapped, and then, when I wished to make the raps sound distinct on the wall, I must make them louder, and direct my own eyes earnestly to the spot where I wished them to be heard. She said, if I could put my foot against the bottom of the door, the raps would be heard on the top of the door. *Catharine* told me, that, when the committee held their ankles, in Rochester, the Dutch servant-girl rapped with her knuckles, under the floor, from the cellar. The girl was instructed to rap whenever she heard their voices calling the spirits. *Catharine* also showed me how they made the sounds of sawing and planing boards. (The whole trick was explained to us.) When I was at Rochester, last January, *Margaretta* told me, that, when people insisted on seeing her feet and toes, she could produce a few raps with her knee and ankle.

"*Elizabeth Fish*, (*Mrs. Fish's* daughter,) who now lives with her father, was the first one who produced these raps. She accidentally discovered the way to make them, by playing with her toes against the foot-board, while in bed. *Catharine* told me, that the reason why *Elizabeth* went away west to live with her father, was, because she was too conscientious to become a medium. The whole secret was revealed to me, with the understanding, that I should practice as a medium, when the girls were away. *Catharine* said, that, whenever I practiced, I had better have my little girl at the table with me, and make folks believe, that she was the medium, for she said, that they would not suspect so young a child of any tricks. After I had obtained the whole secret, I plainly told *Catharine*, that my only object was to find out how the tricks were done, and that I should never go any further in this imposition. She was very much frightened, and said, she believed, that I meant to tell of it, and expose them; and if I did, she would swear it was a lie. She was so nervous and excited that I had to sleep with her that night. When she was instructing me how to be a medium, she told me how frightened they used to get in New York, for fear somebody would detect them; and gave me the whole history of all the tricks they played upon the people there. She said, that once *Margaretta* spoke aloud, and the whole party believed it was a spirit.

"MRS. NORMAN CULVER."

"We hereby certify, that *Mrs. Culver* is one of the most reputable and intelligent ladies in the town of Arcadia. We were present when she made the disclosures contained in the above paper; we had heard the same from her before, and we cheerfully bear testimony, that there can not be the slightest doubt of the truth of the whole statement.

"C. G. POMEROY, M. D.
"REV. D. S. CHASE."

The Fox Girls and Joe Smith—A Coincidence.

The place where the *Fox* family resided was about five miles from Palmyra, N. Y.; and it is a curious coincidence, that *Joe Smith*, the founder of mormonism, also commenced his career about four miles from the same place, at the celebrated Mormon Hill, where he found the golden plates containing the great book of Mormon, giving an account of the immigration of the lost ten tribes of Israel to America.

Mr. Rodgers, in his work on Mysterious Agents, attempts to account for the spirit rappings, by referring them to geological causes; to sustain this conclusion, he shows, that similar noises and rappings happened repeatedly in the same locality; and, I suppose, to carry out his theory, we ought to explain geologically the fact, that the *Fox* girls, with their rappings, succeeded *Joe Smith*, with his book of Mormon, in the same vicinity. But, with great respect for the learning of *Mr. Rodgers*, I would suggest, that it is much more likely, that the successful imposition of the Mormon prophet operated as an example, to stimulate the ambition of the *Fox* family. to rival that of the *Smiths*.

I was lately in Palmyra, and, from the neighbors of *Joe Smith* and the *Foxes*, received a particular account of the earlier manifestations of them both. The following is a memorandum, which I made at the time, of the statements made concerning *Joe Smith:*

Major Gilbert said: "I was a journeyman printer, in the employment of *Mr. Grandin*, in Palmyra, in 1829, when the first mormon bible was printed by me. I set the type, and have now in my possession the proof sheets of the first impression. *Martin Harris* paid for the printing. He was a rich farmer who lived a few miles from here, and was *Joe Smith's* first convert and dupe; the result was, that he became poor. He now lives in Kirtland, Ohio, and, though still a believer in the mormon doctrine, repudiates the Utah saints, and denies their genuineness. His wife has always been opposed to mormonism, and is believed to have destroyed a part of the manuscript of the book of Mormon. The manuscript was brought to the office by *Hyrum Smith*, *Joe's* brother, buttoned up under his vest. He first brought twenty-four pages, and, when that was finished, took away the manuscript, and brought another twenty-four pages. At first, *Hyrum* came every night to get the manuscript, and to take charge of it during the night, returning it early in the morning; but, at length, upon the solemn assurance of the printer, that no one should see it, the manuscript was left during the night, until all of it was printed. *Hyrum* gave, as a reason for this cautiousness and secrecy, that he was '*commanded*' to do so."

Dr. McIntyre stated, that he practiced medicine in the neighborhood during *Joe's* boyhood, and knew the family well. *Joe's* father was named *Joseph Smith*, also, and was very much like young *Joe* in character and conduct—that is, old *Joe* was a loafer—and the females of the family had a bad name. A company of money-diggers came along, when young *Joe* was about eighteen, and old *Joe* joined them. They pretended to find the locality of money by looking into a hat, in which a white stone was deposited. They also used witch-hazel for the same purpose. One day, when *Joe* was about twenty-one, *Dr. McIntyre* was sent for, and arrived late, and, on entering, found, that the house was a perfect harem. These facts show the kind of school in which *Joe* got his inspirations concerning polygamy and deception. Young *Joe* joined the money-diggers, and became acquainted with their arts. Neither old nor young *Joe* were credulous, and there is no evidence that they believed their own stories; but the whole family were chiefly noted for a disposition to get rid of honest labor, by any means in their power. *Joe* used to get drunk occasionally; and, once, after a debauch, *Dr. McIntyre* was sent for, and found him badly bruised. *Joe* declared, that the devil had beaten him in this manner, because he had been digging for treasure, in a place which the devil did not choose to have disturbed. *Joe* gave a graphic account of the battle which he had with the evil one, mentioning time and place, and all the circumstances; but the doctor knew *Joe* too well to believe a word of it, and, upon subsequent inquiry, the doctor learned, that *Joe*, and a fellow by the name of *Stafford*, had been in the wood, together, and taken dishonest possession of a sap kettle and its contents; boiled down and wasted the sugar, and destroyed the property; and, to conclude, got drunk, and quarreled, and *Stafford* had given *Joe* the beating which he had falsely charged upon the devil. The owner of the sap works, afterwards, was unreasonable enough to insist upon receiving, in cash, the value of his property. These incidents give a key to the character and subsequent career of *Smith*, and show the nature of the influences and examples which infested the locality.

About this time, the belief was popular, that the Indians were the lost ten tribes of Israel; and a Methodist clergyman, named *Spaulding*, who resided in Ohio, had written a fictitious account of the immigration of the ten tribes to this continent, in imitation of the Bible. This was "The Book of Mormon." The clergyman died, and his widow took the manuscript to a printing office, and endeavored to sell it, or to induce some of the printers to publish it for her benefit. No one, however, considered it worth publishing, and it lay a long time, neglected. By some means, it at length fell into the hands of a wandering fellow, named *Sydney Rigdon*, who resided near Pittsburg; and it so happened, that *Joe Smith* and *Rigdon* became acquainted, and a plan was laid, by which *Martin Harris* was induced to pay for printing the book. The plan was this: *Joe* pretended to have received a spiritual communication, commanding him to go and dig into the side of a mountain — now known as "the Mormon Mountain" — situated about four miles from Palmyra, and assuring him, that he should there find a treasure. After much labor, and weary searching, he found an enormous pair of iron bowed spectacles, which possessed such peculiar virtues, when applied to the eyes of the prophet *Joe*, that they enabled him to read, in the dark, the inscriptions upon a set of golden plates, which he had found in the same mountain that yielded the spectacles. These spiritual spectacles not only enabled him to see in the dark, but to read, and interpret into old bible English, the Hebrew characters with which the golden plates were thickly covered. *Martin Harris* believed all this, and paid dearly for his folly.

Perhaps I have done the memory of *Joe Smith* and his "*circle*" injustice, in ascribing to *A. J. Davis* the honor of being the first modern spiritual medium, and to *Fishbough*, the honor of being the first scribe; for a fellow by the name of *Coudrey* was the scribe for *Joe*, and one of the witnesses who certified to the genuineness of *his* "Divine Revelations." The reader will notice, that there are many interesting points of coincidence between the origin of the epistle and the manifestations of the prophet *Joe*, and that of *Andrew*, the seer. The spiritualists are very fond of boasting, that there is as good evidence in favor of their dispensation, as of the Christian: let me ask them, if the mormons have not quite as good reasons for boasting as themselves?

About the same time that the rappings commenced in Rochester, they also began in Auburn. One of the *Fox* girls made a visit to Auburn, and astonished the good people of that city with the manifestations; whereupon, several of the women who had been the most intimate with the visiting medium, became themselves rapping mediums, as if by a species of spiritual imitation. The same thing has since happened in many other places; so that it may be regarded as a kind of natural law of spiritualism, as well as of material organism, that like produces like. If a speaking medium visits an unspiritual place, and excites much interest, not only are a certain number convinced of the truth of the new doctrines promulgated, and the reality of the manifestations, but, in most cases, several of the new converts become speaking mediums of the same stamp, and formed after the model of the visiting medium. This is equally true, if the visitor is a writing, a rapping, or a tipping medium. I leave those who admit the rapping mediums to be honest, to explain, as they best can, how this comes to pass; but those who, like me, have no doubt, that "the raps are always made by rogues," have a very simple and natural method of explaining the manner in which the imitation of visitors happens.

I gave a course of lectures in Auburn, in the summer of 1849; the rapping furor was then at its height in that place. *Capron* and *Barron*, the authors of the first book published on the subject of the "Rochester knockings," were then residing there. *Capron* was a kind of clairvoyant doctor, and a female relative was his mesmeric subject and rapping medium. *Barron* seemed to be a disciple of *Capron*, young, zealous, and inexperienced. By their invitation, I had the honor of being admitted into the "circle;" various questions were asked, but the answers were such as to satisfy me, that the medium was merely guessing, and that the rapping was done with the hands and feet of the persons sitting at the table. Once, when I happened to turn my eyes without thinking of detecting deception, I saw one of the gentlemen rap the table leg with his finger. The lady, during the evening, gave specimens of her clairvoyant powers, when I readily perceived, that she was not clairvoyant at all, certainly not on that occasion. In another place, I visited a house where hundreds had been convinced, and to which crowds of excited people were thronging. I went and heard raps upon the floor and table, which appeared, at first, to be unaccountable; the medium, being mistress of the house, invited me to call again, and investigate further.

At our next interview, she pretended to be a clairvoyant, and allowed me to mesmerize her, when she immediately began to converse freely with the spirits of Franklin, Swedenborg, and Bacon. I took an opportunity, when no one else was present, to tell her plainly, that her clairvoyance was a miserable deception. After a good deal of conversation; she finally acknowledged that the whole thing was a hoax, that she had learned from the *Fox* girls, how the raps were produced by the toes and joints, but that she was herself unable to produce them in that way, and was obliged to make them with her shoe or fingers, in a very unskillful manner; that she began it originally merely for sport, without having any idea of the excitement which it would produce, nor of the marvelous weakness and credulity of the community. She then explained, that the raps, which I had heard upon the table, were made upon the chair, which leaned against the table, and that we were easily deceived by sounds being made in one place, and seeming to proceed from another quarter to which our minds had been directed, with the expectation of hearing them come from thence.

She also described various expedients to which she had resorted, to produce mysterious noises; and in what way several confederates among her neighbors had assisted her. The most ingenious trick which she mentioned, was that of pushing a stick through a hole in the floor, so as to make it press against one end of a hanging board, and cause it to act like a lever, and strike the other end with great force against the floor, at the opposite end of the room from where we stood.

The Fox girls in New York. About a year after this, the Fox family exhibited themselves in New York city, at Barnum's Hotel: admission, one dollar. I was in the city at the time, and, in a conversation with Mr. Greeley, related my experiences, and stated what I knew of the origin and character of the rappers. Mr. Greeley, though he did not agree with me, that the whole thing was a sheer imposition, was a good deal interested in my statements, and requested me to give them to the Tribune for publication. I consented, and did so, only suppressing the names and residences of the parties. I believe, that this was the first expose that had ever been made of the rappers, and it produced a considerable sensation.

The same day that I published the expose, I went, at *Mr. Greeley's* request, to see the *Fox* girls at Barnum's

Hotel, with an understanding, that, while I tested their powers, I should not exhibit any signs of skepticism. On the door of the exhibition room was posted a handbill, notifying visitors, that they must conduct themselves as in a religious meeting. On entering, I found about a dozen persons waiting for the performance to commence. No one recognized me, and I, therefore, found myself at liberty to act the part of a believer. I won the good will of the rapping sisters at once, by quietly rebuking a newspaper reporter for manifesting an uncivil degree of skeptical zeal, in examining the feet of one of the girls, to see if she used them to rap the table. I seriously reminded him of the hand bill on the door, and further suggested the danger of offending the spirits, and thus preventing their manifestations. A man in the corner of the room expressed his approbation of my remarks, so decidedly, that I at once inferred that he was one of the managers of the show. When all were ready, and each one seated at a large table, the spirits refused to communicate with any one but me, and it was, therefore, evident, that I was one of their favorites! I drew from my pocket a paper, on which I had previously written several test questions. The first question was answered correctly by raps, which seemed to me to be made on the floor, or table-leg, by the feet of the girls. I was asked if the answer was satisfactory. I hesitated; when the man in the corner interposed again, and said, that he thought the answer had not been understood by us correctly, but that it should be the reverse of what we had understood it to be; and requested us to repeat it, and let the spirits have a chance to correct the error, if it was one. I, of course, readily acquiesced, and, sure enough, the spirits reversed their decision and gave the answer wrong. This little incident led me to look upon the man in the corner, as "a power behind the throne;" a kind of prime minister, who, by signs, advised the girls what raps to make. When all my questions were answered, and I had declared that the answers were satisfactory, the girls called upon some of the other visitors to ask questions; but the man in the corner proposed, that my paper should be first read for the gratification of the company. I declined, until the girls joined in the request. I then read it, and stated that every answer was erroneous; one question was, who is governor of New York? and, from a list of names, one of which was that of the actual governor, the spirits selected old *Dr. Jacob Townsend.* The reading of the paper produced a hearty burst of laughter, and the whole company perceived in an instant, that the spirits were "*sold.*" The girls were much irritated; the eldest, in particular, expressed herself in terms, any thing but spiritual. The man in the corner then inquired, whether I meant to publish an account of these proceedings? I answered, "Yes, I do." He then asked my name; I gave it, and, in return, was informed, that the man in the corner was *Wm. Fishbough,* the same person who was once the scribe of *A. J. Davis.*

The next day, I published a detailed account of the affair, in the Tribune, and this same *Mr. Fishbough* answered it, and accused me of falsehood, and misrepresentation. Several other spiritual scribes and scribblers attacked me at the same time; but I made no reply to any of them. I had denounced a gross imposition, and it was to be expected that I should be abused in return.

This transaction having brought me before the public, as the opponent of modern spiritualism, I afterward lost no opportunity of witnessing the manifestations. I have traveled all over the country, and lectured on the physiology of the nervous organism, in the places where the spiritualists "most do congregate." I have spared no pains nor expense to make myself thoroughly and practically acquainted with the subject. The result of my investigations is the conclusion, that:

1. The rapping, table-moving, and other physical manifestations, never take place without muscular agency.

2. The rapping noises, when made in answer to questions, so as to indicate intelligence, are always produced by some living person, with the design of deceiving.

3. The moving of tables, in spiritual circles, is always produced by juggling, or, involuntarily, by credencive mesmerism.

4. A mesmerized person moves a table, just as anyone else does, except that he does it unintentionally; and sometimes exerts extraordinary strength, when he sincerely declares, that he exerts none at all.

5. Speaking and writing mediums are, when honest, in no respect different from other mesmerized persons, and can produce no more, nor higher, manifestations.

6. There have been no phenomena nor manifestations exhibited, in public nor in private, under the name of spiritualism, which a skillful operator can not publicly produce by the mesmeric art.

7. Almost all the published accounts of spiritual phenomena are, more or less, erroneous; even those which appear to be the best authenticated, are, when severely scrutinized, adulterated with just enough of exaggeration and untruth to produce a false impression, and mislead those who confide in them.

Swedenborg and Dr. Bush.

The materials from which the modern spiritualists have manufactured their miracles and wonderful manifestations, are all, excepting the jugglery, stolen from mesmerism; while the spiritual machinery is, mostly, filched from the vast stores of *Swedenborg*. The terms, "medium," "spiritual spheres," "communications;" the idea of spiritual societies, and of gradual progression from lower to higher spheres and conditions, of the resemblance of spiritual to terrestrial characters and manners, are all from *Swedenborg*. They, however, generally—especially in Buffalo—differ from the great *Swedenborg*, in regarding Jesus Christ without reverence, and as not only a mere man, but as a man whose character is, on the whole, unworthy of imitation.

The originators of spiritualism were all, nominally, Universalists, excepting *Dr. Lyon*, who was a nothingarian; but, to make a marvelous and profitable story, spirits became necessary, and *Swedenborg* was, therefore, laid under contribution, and made to furnish the technical terms and plot of the solemn farce which was to be enacted. The indebtedness to *Swedenborg* was, in some instances, so palpable, that it must be evident, to any unprejudiced mind, that *Davis*, or his prompter, were guilty of gross plagiarism, and had taken a part of their pretended revelations from the writings of *Swedenborg*. *Professor Bush*, instead of pointing out this fact as a manifest proof of fraud, with the charitable good-nature for which he is remarkable, kindly volunteered to explain the circumstance away, by assuming, that the departed spirit of *Swedenborg* had spoken, by the mouth of *Davis*, the same sentiments, and nearly the same language, that *Swedenborg* had written and published while alive; and thus, *Prof. Bush*, in his book, sanctioned the claims of the pretended revelator, by his own learning and character; advertised the forthcoming work of *Davis*, and prepared the public to regard it, not only with wonder, but with some degree of respect. *Prof. Bush* may be regarded as the first author who advocated the genuineness of modern spiritualism; although his object was merely to show, that it afforded collateral and incidental evidence in favor of the doctrines of the church of the New Jerusalem, founded by *Swedenborg*. The effect of the writings of *Prof. Bush*, upon the minds of his readers, was quite as convincing and injurious as if he had been a partner in the fraud which he was led to endorse.

Mr. C. C. Burr and the juggling mediums.

Shortly after the *Foxes* began to give exhibitions, rapping mediums, mostly females, were developed in hundreds of the principal cities and villages of the country.

Mr. C. C. Burr made a tour, lecturing against the rappings, and attempted to account for them, by showing that they were made by the toes, or the fingers. So far as he went, I am confident, that he was perfectly correct. In a conversation which I had with him after he had dropped the matter, and engaged in other business, he assured me, that he had taken the trouble to make the personal acquaintance of every noted medium in the country, and that he had learned all the different modes by which the noises were produced, and could imitate them. He further declared, that he had never seen a rapping medium whose character and conduct were such as to inspire confidence; but, on the contrary, in most cases, they were low, cunning, and immoral. I must confess, that my own observations confirm his statement. I have, however, seen some painful cases, in which a young woman of seeming respectability, from a pitiful love of notoriety and of mystery, has deceived all her friends, and added volumes of falsehood to sustain the spiritual character of her petty tricks.

The advocates of spiritualism triumphantly ask, why do you not detect and expose this deception, if it is one? Let us consider this. A female — a lady — sits at a table, her feet and hands so placed that she can rap with them, without being seen. A rap is heard, which seems to proceed from that part of the table, with which she is in contact; she is asked if she makes raps — it is politely suggested that she does make them — just in sport. She decidedly and solemnly declares, that she does not make them at all, and appears to be surprised and annoyed that the raps are so near to her. How is this deception to be detected and exposed? If you suggest, in the most delicate manner, the necessity of so placing her hands and feet, as to prevent her from cheating, you will probably give offence, and be treated as a skeptic and intruder; you will be told that your presence prevents the spirits from operating. Now, I ask, according to the established laws of evidence, is not such evasion equivalent to a confession of fraud? Is it not, in effect, like the refusal of a witness, to testify, or be cross-examined, lest he should criminate himself? In such cases, though the guilt is not directly proved, no one doubts it. The presence of skeptics does not prevent the rapping, so long as the skeptics are unknown to be such. I have proved this by repeated experiments; but the moment the spectator demands a rigid scrutiny, and closely cross questions the spirits, with a view to test their honesty and intelligence, then it is, that the special pleading and evasion commences, and the manifestations cease, until the skeptic leaves the room. If the skeptic afterwards declares, that he considers the whole thing a rank imposition, is he not justified, by the established rules of evidence, in doing so?

Professor Lee, of the Buffalo University.

The *Fox* girls in Rochester, and in some other places, submitted to personal examinations, and boasted, that no one could detect them in making the raps ; but, in Buffalo, *Professors Lee* and *Flint* found a *Mrs. P.*, who could make the same noises as those produced by the *Fox* girls, by a peculiar movement of the bones of the knees. The professors naturally inferred, that the *Fox* girls made the sounds in the same way, and proceeded to test them. The following extracts from *Professor Lee's* letter give the results.

"To the editors of the Tribune:

"*Mrs. Fish* and *Miss Fox* were requested to be seated on chairs, their limbs extended, and their heels resting on cushions. The reasons for placing them in this position were stated — viz., that we believed, in order that the raps should be heard, that the feet should have some solid support, serving as a *fulcrum* ; else, the contraction of the muscles of the leg would not throw the bone (head of tibia) out of place ; or if so, no sound would be heard, unless the concussion, or vibration, which would be thus produced, could be communicated to some sonorous, or vibrating body. While thus seated, more than fifty minutes elapsed, during which no 'raps' were heard, though the 'spirits' were urged, and called upon, by *Mrs. F.*, to 'manifest' themselves. A part of this time, *Miss Fox* was allowed to seat herself on the sofa — her limbs and feet resting on the cushions of the same. No sounds having been heard, it was suggested, that the ladies be allowed to take any position they pleased, and see if any 'raps' were then heard. Accordingly, they seated themselves on the sofa, their feet resting on the floor, when, immediately, a loud succession of 'raps' followed, and continued for several minutes. We then proposed to try another test ; so, seating ourselves before the ladies, we grasped each of their knees firmly, so as to prevent any lateral movement of the bones ; the 'raps' immediately ceased, and were not heard while the knees were thus held, except near the close of the experiment, which continued, once, forty minutes, when two slight sounds were heard, on slightly relaxing my grasp, while, at the same time, I distinctly felt the heads of the bones grating on each other, and the muscles contracting, which, though a very positive kind of evidence to me, I am aware, is not so satisfactory to bystanders.

"I should state, that our hands were removed several times from the knees, during the trial, and 'raps' were always heard, during the interval of removal. At the close of the sitting, which continued till past eleven o'clock, *Miss Fox* was much affected, and shed many tears, which excited much sympathy on the part of some of the gentlemen present. I need not add, that our position was triumphantly sustained, and that public opinion here, is, now, almost universally, on our side.

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"You may, very naturally, ask, why has not this physiological phenomenon been known to physicians before? I answer, that it has, so far as the smaller joints are concerned. Every person, almost, can snap their finger-joints; many, also, as *Mr. Burr*, can snap their toe-joints, and some their ankles, producing a pretty loud 'rap,' when placed in contact with some sonorous body; but the same phenomenon is very seldom met with in the larger joints, as the knees; and when it is, it has escaped particular observation, and not been made known to physicians, as it neither requires, perhaps, nor admits, of medical aid.

"But it may be said by some, that the above explanation is not altogether satisfactory, inasmuch as these 'rappings' are heard in different parts of the room, at the same time; or, sometimes, on the table, then the door, then the walls of the room, and at a distance from the 'rappers,' &c. After spending several hours a day, for three days, with *Mrs. Fish*, and *Miss. F.*, during which, the 'raps' were invariably heard, whenever called for, without, as I recollect, a single exception, I found, that, in no one instance, did the sounds seem to proceed from the door, unless *Miss F.* was near enough to touch it with her heel; nor did the sounds seem to proceed from the table, unless she was near enough to the leg of the table, to touch it with her foot; but, generally, they proceeded from the floor, apparently, in her vicinity, although the floor could be felt to vibrate, at the same distance from her, just as the whole table would vibrate, when she placed her foot against one of its legs. Much of the confusion and error on this subject, arises, doubtless, from an ignorance of the laws which regulate the propagation of sounds."

Prof. Page, of Washington.

Since the detection of the *Fox* girls in Buffalo, I have not learned that they have submitted to another personal examination; but they have, I understand, thrown themselves upon their dignity, and refused.

I received the following statement from such a source, that I have no doubt that it is substantially correct:

When the *Fox* girls visited the city of Washington, *Prof. Page*, the distinguished electro-motive inventor, formerly an examiner in the patent office, tested them, by making them stand upon pillows; but this did not prevent them from rapping. He noticed, however, that they *lowered* themselves a little when they rapped, and, upon reflection, he suspected, that they did this to step off the pillow, and get one foot in contact with the floor; accordingly, at the next interview, he arranged a mat so extensive that they could not step off, and then amused himself by hearing them call in vain upon the spirits to rap. They gradually, and with apparent indifference, got so near the edge of the mat, that they could get a foot over its edge without its being seen, and then, sure enough, the raps were heard. The professor was satisfied, that the whole was a deception, and so reported to the public. The spiritualists—that is, *Mr. Fishbough* and the *Fox* girls—claim, that electricity is the agent by means of which the spirits make the raps. No man in the world understands the principles and practicable application of electricity better than *Prof. Page*; but he found, that electricity had nothing to do with it, and was forced to the conclusion, that the raps are made by rogues.

Every one has heard of the wonderful things that took place in Stratford, Conn. The most minute accounts have been published in newspapers and books; geological, spiritual, and electrical theories have been brought forward to explain them. I went to Stratford after the manifestations had all ceased, and made enquiries of the nearest neighbors, who, of course, had the best means of judging, and found the opinion almost unanimous, that the whole thing was a farce.

The following letter from one of the shrewdest and most enterprising men in our country, gives what I believe to be the correct view of these so called "demonstrations:"

My Dear Sir: I had quite forgotten your request, for some notice of what I saw at *Dr. Phelps.* in Stratford, till my attention was called to it, &c. In my visit to the haunted house, I was accompanied by *Rev. Mr. Garfield*, *Mr. Babcock*, of the Palladium, and *Mr. Lucius G. Peck.* Nothing whatever occurred to gratify our curiosity or excite our wonder, while in the house; but, while conversing with the family, on the subject of their trials and perplexities, the lady of the house ran into the room, and said, her son, a boy of twelve or fourteen, was missing. Except on the face of the father, I saw no expression of alarm or apprehension. He seemed greatly excited; but the rest of the family, consisting of *Mrs. P.*, a daughter, a lady visitor, and her son, certainly manifested no extraordinary emotion. After a few hurried remarks, I noticed, that *Mrs. P.* led the way to the back yard. What reason there was for not first examining the house, did not appear. This was the first thing that looked suspicious to me, coupled with the general air of imperturbility over the family. The boy was found in the haymow, in an apparently comatose state, from which he recovered in the course of an hour. When the lad was brought down from the hay, *Dr. P.* was much agitated, but I saw no corresponding feeling on the part of others of the family. How a mother or sister could take it so coolly, was, and is, a mystery to me, supposing them to believe the absence of the boy supernatural. I think this fact had as much influence on the opinion I formed, as to the humbug of the whole concern, as any thing else; though the similarity of the writing, which *Dr. P.* showed me, as being spiritual, to that of the boy, when I got him into a room alone, together with the singular fact, that every broken window could be reached only from the doorway of the young ladies' bedroom, conspired to increase my contempt for the whole concern. Besides this, the strongest indifference seemed to prevail, as to the possibility of the strange doings, being the result of roguery. For instance, *Dr. P.* seems never to have recognized his son's handwriting, though his room was flooded with his lucubrations, in a regular school-boy's hand. The disposition was strongly manifested to set down everything, at all out of the way, as the devil's doings. The most wonderful of the doings at Stratford, as represented to me, did not come within a thousand miles of what *Signor Blitz* daily does. The impression on my mind, was, that some object was to be secured, by humbugging the old gentleman, and that the interested parties had been entirely successful in their object.

"Yours, truly,
"HORACE DAY."

Dr. Luther Bell.

It is unnecessary to recount, in detail, all the inter views which I have had, at various times, with mediums who pretended to be possessed with rapping spirits. It is sufficient to remark, that I never yet, in a single instance, have been present, when physical manifestations occurred, which were unaccountable, if we were willing to assume, that one or more of the company present desired to deceive us.

After I had settled my mind down to the conclusion, that raps are never made, nor tables moved, without apparent contact, except under circumstances which could be easily explained by jugglery, and that further investigation was useless, I was engaged in giving a course of lectures in Burlington, Vt., when one of the audience called my attention to the statements of *Dr. Luther Bell*, superintendent of the insane asylum at Somerville, near Boston, Mass. The high character of this gentleman for both integrity and ability, together with the clear and positive nature of his statements; his avowal of utter unbelief in spiritual agency, while he testified, that a large table actually moved fifty feet, without any apparent muscular or mechanical force, but by an agency not hitherto recognized by philosophers; that this took place, in the presence of a large company of people of the highest intelligence, again and again, so that deception and collusion were impossible;— I confess, this almost staggered me. As I had never been so fortunate as to witness any of the physical phenomena of spiritualism, but such as ought to excite contempt; and, as I had publicly asserted, that I had availed myself of every proper opportunity for investigation, with a sincere desire to arrive at the truth, I felt it to be my duty to examine this particular case, and, if possible, witness the performance which *Dr. Bell* had described, as so perfectly open, palpable, and above all suspicion.

I made the journey from Burlington to Boston, (nearly two hundred miles,) on purpose, called upon the *Dr.*, introduced myself, and frankly told him my errand. I assured him, that I had no doubt, that the physical manifestations, as they are called, are, in every instance, fraudulent; but that I had been powerfully impressed with his published statements, and, conscious that I might be mistaken, I was desirous to witness what he had witnessed, and, if possible, be, like him, convinced — not of spiritualism, but of the reality of the movements of a heavy table, under the circumstances described in his statement. I told him, that the only real wonder, in my mind, was, that such a man as *Dr. Bell* should make such a report.

The *Dr.* received me with great kindness and courtesy, and not only confirmed his published accounts with his own lips, but related some other experiences, still more extraordinary. He expressed his regret, that there was not much probability of my being gratified, as it was doubtful, whether the medium, in whose presence the table had moved, was then residing in the vicinity ; however, he would do all in his power to satisfy me.

He ordered his chaise, and took me several miles, to the house of one of the most respected and wealthy citizens of Boston. Before we entered, he advised me to conduct myself in their presence as if I was entirely unacquainted with the subject, or, at all events, whatever I might witness, to appear to be satisfied with it, and not to manifest skepticism, as it might prevent the success of the experiment. We found the family at home, and the doctor immediately stated the object of our visit. We were informed, that the medium was absent from town, but that it would make no difference, for a young woman was residing in the family, in the capacity of a superior servant, who was just as good a medium as the absent one; and that there would, probably, be no difficulty in getting manifestations. In a few minutes, arrangements were made, and operations commenced.

A large, black-walnut extension dining table, about ten feet long, was placed in the middle of the parlor, and we all took our seats around it. I was placed at one end, and the medium at the other. She was, apparently, about twenty years old, and well adapted, by nature, to the part which she had undertaken to perform. We had been seated but a few minutes, before the table suddenly opened, in the middle, about six inches, and the half nearest to me was thrust towards me. My expression of innocent surprise evidently amused the medium ; and I could perceive, that it was with difficulty she suppressed an inclination to laugh, at what she supposed was my verdant astonishment. The truth is, that, notwithstanding my apparent ignorance, I knew instantly how the trick was performed; for I have precisely such a table in my own dining room, excepting that the feet of my table are plain, whereas this had carved lions' claws, into which the castors were inserted. The medium, sitting opposite me, had her fingers upon the top of the table, and her thumbs on its under surface, so that she could grasp the table between her thumbs and fingers, and then, by placing her feet against the machinery under the table, she could push it so as to open it in the centre, and force it against my person; this was repeated several times. Instead of appearing to suspect the medium, and thus embarrass her, I said and did what I could to encourage her, and throw her off her guard. I tried to look pale, but, not having any looking-glass, I can not say whether I succeeded or not. I remarked, that I should think that such things would have a dreadful effect upon people with weak nerves, and enquired, whether it ever had any bad effect upon the health. I was assured, that there was not the least danger, and that there was no reason for viewing it seriously; for the spirit, or whatever the unseen power was, not only was perfectly harmless, but was often very merry, making the table dance to the tune of Yankee Doodle, or Auld Lang Syne, or any other tune which was played upon the piano. I remarked, that I had often heard of tables dancing when no one touched them, and that I should really like to see it done. A young gentleman present then played a tune upon the piano, and, immediately, the end of the table at which the medium sat began to move up and down, keeping time to the music; but the end where I sat was unmoved. That this was done by the muscular exertions of the medium herself, was evident enough; for her person, especially her shoulders and bosom, could be seen to move simultaneously with the table; this was the easier seen, as the lamp stood on the table, throwing its light full upon her. And, here, I should mention, that when the music was about to commence, she suggested that the lamp should be placed on the piano, behind her; but the lady of the house said, "No, no, let the lamp remain." And when the end of the table was moving up and down, the lady called the attention of the whole company to the fact, that the influence which moved the table, also moved the medium in unison with it. "See," said she, "how it draws upon her shoulders —this proves, that the influence reaches the table *through* the medium." I must confess, that the accomplished lady of the mansion expressed my opinion with perfect precision. At the moment, I could not understand how this feat was performed; for the whole company, including the medium, took their hands from the table and sat back in their chairs, so that the medium must raise the table with her feet. Before I left the house, I examined the feet of the table, and noticed the lions' claws above the castors, and projecting over them in such a way that the toes could be put under the claws, and, using the heel as a fulcrum, or point of support, I found I could easily make the end of the table dance in the same manner, when sitting in precisely the same position as that which the medium occupied. If any one doubts, let him procure such a table, and he will soon satisfy himself, that I am not mistaken.

I would also state, that *Dr. Bell* remarked, in the presence of the company, that, for some unaccountable reason, the manifestations would not continue, if we looked under the table, or watched it too closely, as if trying to detect some one in moving it. The rest of the company corroborated his remarks, and I, of course, acquiesced cheerfully, and avoided the appearance of watching, as much as my wicked curiosity would permit. This explanation is necessary, to enable the reader to understand, how it was possible for the medium to dance the table, without instant detection.

Dr. Bell then proposed, that we should place our hands upon the table, and ask the spirits to move it. He explained that, though that form of expression was used, he did not wish to be understood, as sanctioning the opinion that the spirits of the dead had any agency in producing the results. The table slowly moved obliquely, as if racked by some force which acted upon it at the end where the medium sat. *Dr. Bell* then remarked, that it would be much more satisfactory, if the table would move when no one touched it. I thought so too, and mentally thanked the doctor for the suggestion. We arose, and stood from six to nine inches from the edge of the table, holding our hands about six inches above it, we then fixed our eyes upon the middle of the table, and called upon the spirits to move it. I mentally wondered what was going to happen, and really did not expect to see the table move at all; for I could perceive no way in which it could be done by the medium, under such circumstances, without exposing herself to observation; and I was agreeably surprised, when the end of the table where the medium stood commenced moving laterally, and the whole table, a little from the medium, towards me. I instantly understood how it was done; though *a priori*, I should have supposed it impossible to move so heavy a table, by pushing against the castor, with one foot, while standing upon the other; but, in this manner, she moved it, the whole length of the room, through the double doors, over the trucks which the doors slide upon, into the adjoining parlor, and back again. This performance lasted more than an hour. I knew that she moved it with her foot, because,

First, Her feet were the only limbs with which she could touch it, unobserved; and, therefore, if she moved it at all, she did it with her foot.

Second, The table did not move *toward her,* in a single instance.

Third, The direction in which the table moved was, invariably, that in which it would have moved, if she had, openly, placed the inside of her foot against the leg, and pushed it, or, as it were, drew it.

Fourth, The movement of the table was spasmodic and irregular, generally commencing slowly, and gradually increasing in speed, until it had reached nearly *two feet.*

Fifth, During the journey of the table, she always had a position at the right side of one of the table-legs, so that she could stand upon her right foot, and act upon the table-leg with the inside of her left foot.

Sixth, On one occasion, *Dr. Bell* proposed, that the company should stand two feet from the table; and, when we did so, no movement of the table took place, because it was beyond the sphere of the medium's foot.

Seventh, It was proposed, that we should take hold of hands, and stand around the table, to see if it would make the *battery stronger!* In making this arrangement, I managed to change places, and got hold of the hand of the medium. At first, the medium was evidently watching me, to see if I was watching her; but I looked in an opposite direction, and gave her a good opportunity. Presently, the table moved bravely on. I waited until I had drawn her into such a position, that I could see the table-leg, without appearing to look at it; and if she put her foot against it, I could manage to see her do so. Presently, I felt, by the movement of her hand and arm, that she was balancing on one foot, and steadying herself a little by holding on to my hand. The table began to move — I looked suddenly down, and saw her left foot against the table-leg. I made a sudden movement, and let go of her hand, as if to brush something from my face, and she lost her balance, and was obliged to put her hand on the table, to keep from falling down. I observed, that, while the table moved to the right, her movement, in falling, was to the left. I pretended not to notice her misstep, but made some careless remark to *Dr. Bell,* as if I had observed nothing unusual.

I was satisfied, however, from the girl's conduct toward me afterwards, that I had not deceived her. She saw me look at her foot, and she knew, by my movement, that I threw her off her balance intentionally; at the same time, she discovered, that, for some reason of my own, I did not intend to expose her then, and, probably, she hoped, that I would not do so at all. Had it not been for *Dr. Bell's* public report, of course, I would not have deemed her petty maneuvers worth mentioning.

At ten o'clock, after thanking, as I did most sincerely, the kind people who had afforded me such convincing proofs of the real character of the manifestations, we returned to the asylum, where I accepted the hospitable invitation of the doctor, to spend the night.

As soon as we were alone, the doctor asked me what I thought of what I had witnessed. I replied, "Before I answer that, doctor, I wish you would tell me what you think of it." "Well," said he, "it is very nearly the same as that which I published. The house is the same, the table the same, and the experiments almost precisely the same; but it was another medium." This was all I wanted the doctor to say. I then told him plainly what I had observed, and that the medium had, undoubtedly, moved the table with her foot.

The doctor seemed to be disappointed, and remarked, that he supposed, by my manner and language during the evening, that I was convinced. I reminded him that he had himself suggested the propriety of my performing the part which I had, and that I had done so willingly, to draw the medium out more fully. When I told him, that I saw the girl push the table with her foot, he declared, that my prejudices had given obliquity to my perceptions, and that my statement was more incredible than the manifestations themselves; for it was utterly impossible for her to move such a heavy table, in such a manner. I replied, that I had, myself, tried it during the evening, and eould easily move it, and would, in his presence, at any time, move it just as the medium had done; and, furthermore, I would give the medium a thousand dollars, if, through her, the table would move one foot, provided the arrangements were such as to prevent her from touching it. The doetor replied, that, if possible, he would make arrangements to give me another opportunity, and that we would test it in the manner I proposed: and thus we parted, the doctor, I fear, regarding me as almost rudely skeptical and prejudiced, and I wondering, that a gentleman of his extraordinary abilities, and great experience, could be so easily deceived.

I must do the doctor the justice to say, that, unlike the spiritualists, he did not attempt to conceal the weak points of his case, but seemed to be desirous to have the matter tested as fairly and openly as possible. He appeared like a man who is so confident that he is right, that investigations and tests must necessarily result in favor of his views, unless the inquirer is blinded by his prepossessions. As an instance of his candor, I will mention, that he stated, that the *Hon. Charles H. Warren*, formerly a judge of the Supreme Court, and one of the most sagacious men in the country, had been with him, and witnessed the same performances, and had arrived at the same conclusion that I had. I was very much obliged to him for this admission. No ordinary man would have dared to make it; for it is almost, of itself, fatal to his case. Here is a phenomenon, proclaimed as perfectly demonstrable; as having occurred under circumstances which rendered mistake or collusion impossible; and yet, two experienced men, unknown to each other, examine it with a desire to learn the truth, and conclude, that it is an arrant imposture — one of them offering to lose a thousand dollars, if the phenomenon can be reproduced when all chance for contact, which is admitted to be unnecessary, is excluded.

RULES OF EVIDENCE APPLIED TO CHRISTIANITY AND SPIRITUALISM.

The spiritualists are in the constant habit of boasting, that the human testimony in favor of their physical manifestations, is of the same nature as that upon which the Holy Bible is received; and, that any facts or arguments which will overturn the one, will, necessarily, endanger the other. There are, also, many pious Christians, who prefer to admit the truth of the alleged facts of modern spiritualism, and to account for them as they best can, rather than to show so little respect for human testimony, as to deny them. (See *Miss Catherine Beecher's* Letters to the People.)

In courts of justice, there are certain *rules of evidence*, universally admitted, which may properly be applied to this question of spiritualism. One of these rules is, that, when any thing is to be proved, *the best evidence which the nature of the case admits, must be produced, before any other kind of evidence can be admitted.*

To illustrate: suppose, that I claim a piece of land, and go into a court of law to prove my title. The best evidence would be, *my deed;* but I refuse to produce it, and offer, instead, to bring twenty witnesses, of the highest character, who will testify that they saw me purchase it, pay for it, and receive possession; that they saw the deed signed, witnessed, sealed, and delivered to me, in due and legal form. Under these circumstances, if I prove, that the deed is lost by accident, and no true copy can be obtained, the court will allow a sufficient number of the witnesses to testify, to prove my title in that way. But, if I admit, that I have the deed at my disposal, and can produce it, but will not, and insist upon introducing the verbal testimony of the witnesses, the court will promptly refuse to allow a single witness to be sworn, and will regard the attempt to keep back the best evidence, as an indication of some fraudulent design, which a rigid scrutiny of the deed will be likely to disclose.

I conceive this to be a perfect illustration of the position of the spiritualists, in regard to their rappings, and tippings, and musical performances in the dark. They are indignant, that we will not receive the testimony of the thousands who have heard the rappings made in a convincing manner; but if I call for the *best evidence*—namely, the rapping experiment itself, with all chance for deception excluded—they can not produce it. They will tell the most incredible stories, of the moving of tables and other articles, without human contact, or mechanical agency; and will offer to prove their statements, by the testimony of scores who have seen the tables move; but I call in vain for evidence such as the rules of all courts require—namely, the evidence of the tables themselves. A gentleman of perfect responsibility has authorized me to offer a thousand dollars reward, for a single rap which will visibly move a small board, suspended from the ceiling by a string or a wire. He will pay the same, to have it demonstrated, that a table can move, a single inch, when so placed that no deception can be practiced, and no mechanical force employed. He will pay the same, to have a single mental question answered, or even one word of the question itself known and revealed; the question to be written on a piece of paper, folded, and laid in the presence of the company. I have made this offer, all over the country, and, especially, where the spiritualists boast the loudest and oftenest, that these very things are of daily occurrence; but, hitherto, the money is unclaimed, nor has any one been found, willing even to attempt to earn it; though scores of mediums can be found, who will rap tables, and pretend to answer mental questions, for fifty cents an hour; and thousands of people, who claim to possess good sense, profess to believe in them.

When the Christian clergyman is called upon to prove the truth of the Holy Bible, he produces the Bible itself. He gives you the best evidence, and all the evidence, which he ever had himself. He keeps nothing back. If, after an examination, you are still skeptical, and deny the authenticity of the sacred Scriptures, you do so upon your own responsibility: you can not complain, that the clergyman and a few select persons have enjoyed the privilege of receiving proofs, which are kept from you. Neither the writers of the Bible, nor the persons mentioned therein, now live on earth. The best evidence which exists concerning them, is found in the records, monuments, and institutions, which they have left behind for our inspection. These evidences are open alike to all. There is, therefore, no foundation for the oft-repeated boast of the spiritualists, that the evidence is the same in both cases.

When Jesus Christ was on earth, one of his disciples refused to admit such evidence of his resurrection as we now possess, but insisted upon receiving the very best evidence which the circumstances, at that time, permitted. Jesus did not rebuke the disciple for his skepticism, but, rather, impliedly, approved of it; for, when Thomas demanded the privilege of thrusting his hands into the wounds which Jesus had received on the cross, he was graciously permitted to do so. Such a demand, however, would be unjust and unreasonable, after the whole generation has passed away, and no such proofs are in existence. Let the spiritualists, then, meet the requirements of their case, or let them cease their senseless boasting, that the spiritual character of their manifestations is established by proofs as strong as Holy Writ, and much stronger; while the truth is, that their evidence is so weak that no court in Christendom would allow it even to be introduced, much less to be weighed, and still less to produce conviction. Let it be clearly and distinctly understood, that the evidence which they produce is rendered void, by the suspicious and guilt-betraying manner in which they keep back the best, and only proper, evidence.

Another rule of evidence, universally admitted, is, that *no one is bound to prove a negative.*

When the spiritualists affirm, as they do, that raps are made, or tables moved, in a new and peculiar manner, they have no right to throw themselves upon their dignity, and defy skeptics to disprove their assertions. They have no right to take offence, if any one denies the truth of their statements, and calls for proof by the best evidence. On the contrary, they ought, in decency, to speak modestly concerning phenomena which they can not prove, except by secondary and inferior testimony, such as no court of justice would admit. When they will state clearly and definitely what phenomena can be exhibited, and when and where the exhibition will take place, and allow skeptics to be present and witness the manifestations, and so vary them as to exclude jugglery, fraud, delusion, and other causes of error, in a fair and impartial manner, then, and not before, will they fulfill the conditions required by the ordinary rules of evidence.

The courtesies of society forbid, in ordinary cases, that we should question the veracity of any respectable person, however extraordinary may be his statements. But when those statements aim at the destruction of our dearest hopes, and our most cherished institutions; when they directly or impliedly charge all our past experience and past teachings with folly and falsehood, courtesy can interpose no shield to protect the author. He must expect to hear his assertions positively and indignantly denied, even by those who, personally, knew nothing concerning them, but their hostile tendency. He must stand ready to prove his assertions by the best evidence which the case admits; and, if the circumstances are such that the best evidence can not be produced, he must show this clearly, amply, positively; there must be no evasion, no trifling, no special pleading. If there is, no mercy will be shown—none is deserved. We have a right to treat the statement as an enemy of truth; and its author, as a knave or a dupe.

Another rule of evidence, admitted by all experimentalists, and approved by common sense, is, that when any proposition is to be proved by an experiment, the experiment must be repeated and varied in such a manner as to exclude, if possible, all causes from producing the effects in question, except the one cause alleged; and thus determine whether that one cause is the real and only one.

The spiritualists, when they propose to prove the truth of their manifestations by experimental tests, adopt precisely the plan of the jugglers: they arrange what they call "*the conditions*," in such a way as to avoid detection, by preventing a fair and thorough investigation. It would, however, be doing gross injustice to professional jugglers, to compare them with the rapping spiritualists, for the jugglers admit, that their most astonishing feats are performed by skillful deception, while the spiritualists perform but a few tricks, and those in an unskillful manner; but, by dint of barefaced falsehood, and appeals to the credulity and superstition of their dupes, they oftentimes succeed in imposing upon men and women, whose pretensions to dignity are such, that a common juggler could scarcely be allowed to approach them.

The spiritualists are like the jugglers in this, that they so arrange the "*conditions*" of their operations, that the actual causes of their manifestations cannot be detected and exposed directly; and they refuse to allow their experiments to be so varied, as to enable the spectators to detect the actual means by which the effects are produced.

It is an outrage upon common sense, for the spiritualists to boast, that they prove their manifestations by physical experiments, while their success depends upon such conditions as no philosopher would admit, and none but tricksters and gamblers require. If raps are to be made, or a table to be moved, they have it for one of the essential "*conditions*," that you must not look under the table, or the medium must sit very near, and place his or her hand upon the table; or the room must be darkened, or skeptics removed. According to the last dispensation of spiritual experiments, not only must the room be darkened, while fiddles and pianos are played, but the company must all keep their places, lest the falsehood should be felt, though it may not be seen.

WRITING, SPEAKING, AND TIPPING MEDIUMS.

I have sufficiently illustrated my ideas of the causes of the merely *physical* manifestations, and attributed them to fraud, in all cases, without any exception. I now propose to give a more particular account of the *mental* manifestations; and will begin, by stating that the writing, speaking, and tipping mediums, may be, and generally are, perfectly honest. Some are, undoubtedly, impostors; but this is no valid argument against those who are, unquestionably, genuine mediums, or temporary credo-maniacs. Many of these mediums have, unfortunately, become permanent maniacs, as a consequence of their " circle " of friends tampering with a power which they did not understand; thus illustrating the common maxim, which teaches, that unskillful persons should not meddle with dangerous instruments.

All the spiritual phenomena which are not referable to jugglery may, probably, be arranged in the same class with mesmerism; and they must all be explained on the principles of phreno-physiology and credo-mania.

By the term credo-mania, I mean such an abnormal excitement of the phreno-organ of Credenciveness, as to destroy the proper influence of the governing self-will over the other powers of the mind and body, and give supreme control and dominance to the ideas which are received from the testimony of others.

Dominant Ideas, and the Will.

The fact, that the medium places his hands upon a table, and moves it without his will, is now admitted by all experimenters, except a few spiritualists. When the tipping mediums first visited London, *Faraday* demonstrated, that the table was tipped by muscular agency alone, and not by any unknown power.

He constructed a table, in such a manner, that, when any one placed his hands upon it, the exact amount and the direction of the force employed could be mathematically ascertained; and he found, that the mediums actually applied muscular force to the table, enough to account, on mechanical principles, for all its tippings and turnings. These experiments have been published, all over this country, and yet, we hear people, almost every day, declaring, that their tables move by mere contact, and without force enough being applied to account for their movements. Let me advise these table-tippers to put a piece of soft dough, or putty, on the table, and place their fingers upon that, and see if they can tip the table over without the impression of their fingers being made in the dough. Admitting it as proved, that the muscles move the table, the question is yet unsettled, as to the nature of the power which moves the muscles; and this I propose to explain. All the writers upon the subject agree,that, in these manifestations, there are two distinct sources of power.

1. The spiritualists declare, that disembodied spirits oust the will, and take possession of the mind, producing movements, writings, and speeches, which the rightful mind knows nothing about; but, when the spirit vacates the premises, the "right mind" is reinstated, and may move the table, speak, or write, as usual.

2. Some theologians agree, with the spiritualists, that there are two or more minds in possession of one body; but they insist, that one is a human mind, and the other is the devil or one of his subordinates.

3. *Dr. Dods* admits the phenomena, but explains them by saying, that they are produced by two distinct brains, one of which is the cerebrum, and the other the cerebellum.

4. *Dr. Carpenter*, also, has a theory, that mesmeric phenomena are produced by the automatic, or *involuntary*, action of the cerebrum, while the *will* is passive. This is obvious enough to me, and, I may add, was first promulgated in my Etherology, in 1844. I went further, and definitely pointed out what portion of the cerebrum is the source of the automatic action, and what of the will.

I stated the fact, that the mesmeric phenomena, which have since been improperly denominated biology, were produced by an excitement of the conforming group of social organs, (see bust,)—Submissiveness, Kindness, Imitativeness, and Credenciveness—causing them to dominate over the other portions of the cerebrum, and especially, over the governing group—Imperativeness, Approbativeness, Firmness, and Equity. This doctrine, at the time, was ridiculed by the mesmeric practitioners, and doubted by the physiologists; but one of my pupils, *Dr. Darling*, went to Europe, and lectured, and repeated my experiments in the presence of *Sir David Brewster* and the *Duke of Argyle*, and was favorably noticed in the Westminster Review; and it was after this, that *Dr. Carpenter*, in a new edition of his Physiology, stated, that the phenomena are owing to a "*dominant idea* in the cerebrum, while the *will is passive*."

The following is from *Carpenter's* Comp. Physiology:

"Very distinct proof has been afforded by recent inquiries, that there are acts of mind upon the body which are neither volitional nor emotional, but originate in the intense excitement of *ideas* which have, for the time, full possessiou of the consciousness, and express themselves in muscular movements. Such ideas may have been either directly excited by sensations, or secondarily developed by reasoning processes; they may either remain obstinately fixed in the mind, or they may be capable of being displaced by others newly excited through internal or external suggestion. In any case, nothing more is required than that they should possess a certain degree of intensity, and that the will should exert no antagonizing influence, for them to operate directly upon the motor nerves; and this they may do when the will is in a state of abeyance, (as in the states of dreaming, somnambulism, or abstraction,) or when it simply exerts a permissive influence, (as in a large proportion of our ordinary actions, which may be traced to the influence of the ideas that occupy our minds at the time,) or even, provided that the ideas attain the force of "convictions," in opposition to the will, (as we see in "biologized" subjects who are made to believe that they *must* do *this*, or *can not* do *that*, however much they may strive to act in opposition to the assurance.) It is in those peculiar states of the human mind, in which, the power of the will over the current of thought being entirely suspended, any idea that may for the time be present to the consciousness acquires a complete "dominance," (however much it may be opposed to the ordinary experi ence and common sense of the individual,) that we have the most remarkable exemplification of this kind of action, which may be designated as *ideo-motor*. But that which is abnormal in man seems to be the normal condition of the animals which most nearly approach him; for, so far as we can judge of their physical endowments from their actions, these seem to operate "automatically;" their ideas expressing themselves directly, in action, without being subject to any volitional regulation, just as do those of a somnambule; and the course of their thoughts being entirely governed by external impressions, or by the remembrance (automatically excited) of past ideas or emotions."

At the time that I published the explanation of mesmeric phenomena, *Dr. Elliotson*, the distinguished physiologist, of London, was declaring to his professional brethren, that the cerebrum could be excited, by touching it with his finger, and was looking for a theoretic *rationale* of his experiments. The explanation which I proposed was, that his fingers had no effect whatever, but that the excitement was owing to ideas conveyed by his language to the upper front part of the cerebrum, where Submissiveness and Credenciveness are located, and that this excitement enabled these organs to become *dominant* over the governing organs posterior to them. My book was published, in Boston, by James Munroe & Co., and in London, Strand, Edward T. Whitfield, 1844. I extract from it the following remarks:

Credencive Induction.

"While engaged in performing various experiments, I made a very important discovery, which I have never before communicated to the public, in writing, though I have frequently mentioned it privately to my friends, and publicly in my lectures. It is this: that, when a subject is but slightly affected, and when any of the operators in mesmerism, or neurology, or pathetism, would send him away as unprofitable — merely by the application of a very simple stimulus, which every one has always at hand, the subject may be brought perfectly under your control. Do you ask me what this simple and powerful stimulus is? I answer, that it is *an assertion.*

"Assert to the subject, in a decided tone, for instance, '*You can not open your eyes,*' and if his eyes were shut when you made the assertion, he can not open them afterwards, until you again say, '*Now you can open them,*' or something to that effect. Again, say to the subject, '*Put your hands together, and you can not separate them.*' If, now, he puts his hands together, he will try in vain to separate them until you reverse your assertion. Say, 'The floor is hot,' and instantly, to him, it seems hot.

"In order to explain these experiments, we must first understand the nature of the organ of *Credenciveness* — the impulse to act upon testimony or assertion. It is a *conforming social impulse, and its natural stimulus is an* ASSERTION.

"When greatly excited by any extraordinary stimulus, it governs the individual, and produces such uncontrollable tendencies to gratify itself, as to constitute a peculiar species of monomania.

"It is generally supposed by those who see experiments of this kind performed, that the operator accompanies his assertion by an effort of his will. This, however, is not the case. If the operator makes an assertion, it will have nearly as much effect, though he wills that it shall have no effect whatever. This proves, that it is the assertion and not the will. We are so constituted, that we take the assertions of our fellow-beings as the true expressions of their will, and we sometimes believe them, in spite of all our efforts to resist the belief.

"If the process of induction did not operate as a stimulus to the conforming Socials in particular, if it stimulated the governing equally with the conforming Socials, the experiments which depend upon the influence of assertion could not be performed at all.

"Strange as it may seem, however, it is a fact, that a person of intelligence and education, with whom I am acquainted, although I have explained to him the nature of the influence which I have obtained over him — although he knows as well as I do that it is his own Credenciveness that paralyzes his muscles, yet when I assert that he can not open his eyes, he instantly loses all control over them."

The reader will perceive, by the foregoing extract, that I announced the idea of the involuntary response of a portion of the cerebrum to an idea, while the other parts were passive, several years before *Dr. Carpenter* broached the subject. The learned doctor has now adopted the doctrine which I then advanced, but has stripped it of its original phrenological verbiage. It is very likely that he never read my book, but received the idea, at second hand, from some one who had, or, indeed, it may have occurred to him originally; but it is certain, that he did not publish it until several years after the above mentioned work was issued.

I do not wish to be understood as claiming any credit for being the first to perform credencive experiments, nor for referring them, generally, to an excitement of the imagination, or of apprehension, or suggestion; for *Mesmer* himself performed, in effect, the very same experiments, and produced the same results as those which have since been known under the names of pathetism, neurology, and spiritualism. The committee appointed, in Paris, to investigate the subject, among whom was *Dr. Franklin*, reported, that the results appeared to be principally owing to the impressions made upon the minds of the subjects, by the people about them, exciting their imaginations. But I do claim, that I am the first to discover and publish, that the conforming social organs in the upper front part of the cerebrum, are the real mediums, through which all the mesmeric and spiritual phenomena are produced, and that the special will which they overcome is principally constituted by the governing Socials, which are located posterior to them.

I was, also, the first that announced the theory, that the susceptibility is a debilitating disease, instead of a gift and a blessing, as it was previously claimed to be. I make these remarks, because several authors have made incorrect statements concerning my position, in regard to this subject. My ambition has been, to discover the principles of physiology involved in the mental phenomena which have excited so much attention, under the various names of mesmerism, psychology, and spiritualism; what organs are excited, antagonized, or diseased; and the processes by which the results are produced: the external manifestations I have considered as important, principally, because they throw light upon the physiology of the brain and the body.

It is useless for *Dr. Carpenter*, or any other physiologist, to undertake to explain mental phenomena without the aid of phrenological principles; especially, while he admits, that those phenomena depend upon the cerebral organs. He might as well attempt to explain the phenomena of astronomy, by estimating the various celestial influences, without attempting to learn the number, size, and locations of the various planets in our solar system, from which the influences proceed. But, admitting the natural system of phreno-physiology, advocated in this treatise, we are able to give a reasonable theory of the matter.

The will is said to be passive, when the mediums, or mesmeric subjects, are in the abnormal state. We are told that a "dominant *idea* has acquired the supreme control of the will, and of the muscles." What can be meant here by "*the will?*" Is it not generally understood, that the dominant idea *is*, for the time being, the will *de facto?* and are we to understand, that the will *de jure*, or the legitimate will, has been dethroned, and a usurper foisted into its place by the aid of foreign auxiliaries, in the form of external impressions, proceeding from the operator? What is this will, which is thus continually liable to be overcome? Where does it reside? What is the extent of its proper jurisdiction? What are its resources and means of resisting those audacious ideas, that presume, thus, to set aside the authority of their natural sovereign?

Social Will, or Governing Socials.

Amos Dean, Esq., in his "Philosophy of Human Life," defines will, as "the decision of the whole mind, in view of the whole matter." I accept this as a definition of what the will should be, and what, in well disciplined minds, it may be; but, in practice, most men make their decisions, without half of the powers of the mind being allowed to have any "view of the matter" at all. Most men have a set of dominant ideas put into their minds during early life, which give character to their wills ever after, and prevent them from viewing any matter in its true light, in opposition to their dominant ideas.

If the mesmeric process consists in inspiring the mind of the subject with a set of extraneous and artificial ideas, and making them influence his thoughts, feelings, and conduct, we may truly say, that all education is but a species of mesmerism, in which certain ideas are becoming impressed upon the mind, forming the character, and constituting the future will of the pupil.

Those who have had much experience in education, or in preaching, know too well, that there are some individuals whose wills are indigenous — their ideas are almost exclusively of home manufacture. If they receive a lesson, or a sermon, instead of allowing it to dominate in their minds, they treat it as an orderly sergeant does a new recruit — measure it, quiz it, turn it about, and then reject it; or, if they consent to receive it, they make it put on the uniform, submit to the regulations, and sign the articles, by which it becomes a mere instrument of their own dominant will.

There are other individuals who are said never to have a will nor an opinion of their own, nor do they desire such a commodity. If, by any combination of circumstances, they are required to decide important matters for themselves, or for others, they are uneasy, until they have found, in a book, or somewhere else, a master mind, to impress them with a precedent, or dominant idea, which will give authority and support to the decision.

If we take these two opposite characters, place them before us, and view their heads in profile, we shall find, that the one who is remarkable for *self-will*, is larger in the region of the governing Socials, and smaller in the conforming region, than the one who is said to have "no will of his own." From this we learn, that self-will has a special locality in the brain, and that it may be possessed, in different degrees, by different persons. This is the self-will which is passive in the mesmeric subjects, and spiritual mediums, when they are operated upon; and the conforming Socials are the instruments through which the governing Socials, or self-will, is overcome and dethroned, when the spiritual manifestations are produced.

When a person is alone, and is totally uninfluenced in his conduct, by education or anything else but his own individual experience, his largest ipscal phreno-organs will, all else equal, constitute his will, and produce his dominant ideas; but, the moment he enters the presence of others, his governing and conforming Socials are both excited, one tending to rule and to resist social influences, thus keeping the will independent, and the other tending to conform, submit, oblige, imitate, and believe. Which of those two groups of organs in the upper part of the head will prevail, depends upon their relative sizes, the state of the health, the amount of knowledge, and mental discipline, and, finally, upon the stimulating circumstances in which the person is placed.

Some young persons have the governing social organs so large, and the conforming so small, that they are in continual trouble; they disobey their superiors, and treat them with contempt, and, at the same time, assume a despotic and offensive manner toward their inferiors. Such persons seldom become mesmerized. But, when the conforming Socials are large, and the governing small, the mesmeric state is easily induced. Instead of cherishing their own ideas, and endeavoring to impress others, they bend all their faculties, willingly, to receive impressions from others. The governing will is easily made passive, and the operator has nothing to do but to direct the mind into any channel he pleases.

It will readily be perceived, that, since the mesmeric, or medium making, process consists in giving the conforming social organs the predominance, and through them ruling the mind and body of the medium, any organs which tend to oppose the experiment must be quieted. Sometimes the circumstances are such, that Cautiousness becomes excited and opposes the experiment through fear of injury to the health; in this case, the operator should, if he knows it, assure the medium that there is no danger, but that, on the contrary, if it has any effect upon the health, it will be beneficial. Sometimes Approbativeness is opposed to the experiment, because the subject thinks that he may do or say something ridiculous. Again, Combativeness or Imperativeness may be roused against the operator; and therefore, if he would be practically successful, he must bear all these influences in mind, and endeavor to win them to the side of the conforming organs; for, in this way, he may succeed in obtaining a mastery over a mind, which, otherwise, would resist his influence successfully.

CLAIRVOYANCE AND ETHERIUM.

When I published my work on mesmerism, in 1844, I had not made myself acquainted with some of the physiological principles which are explained in this volume. I had no idea, at that time, of the reason why the mental phenomena were always accompanied with a corresponding condition of the vital organs; and I attributed many of them to the influence of an imponderable etherium, which I now perceive are due to the influence of the brain upon the capillaries. I still think, however, that the few well authenticated and demonstrable cases of clairvoyance must be accounted for by the agency of a modification of the same etherium which produces light, heat, and electro-magnetism; but I am convinced, that not one mesmeric phenomenon in ten thousand is produced on clairvoyant principles; and I should be unwilling to undertake to demonstrate to others, that any of them are, though I have no doubt of it myself.

The Baron Reichenbach.

In reading the works of the learned *Baron Reichenbach*, I found, that most of his observations upon what he calls "the odic force," may be much better explained by the more simple principle of credencive mesmerism, by which he was, evidently, misled. I would, also, remark, that there is no special objection to the term "od," or "odic force," but I had, long previously, assumed the existence of a similar force, under the name of etherium; though I laid no claim to it as an original discovery, as some authors seem to suppose.*

While I am not, by any means, disposed, strenuously, to advocate clairvoyance, or the influence of the silent and unexpressed will, candor compels me to state, that I have known several cases of dreaming, and of the apparent transfer of mental impressions, which I could account for in no other way as well as by assuming the existence of an invisible and imponderable etherium, which nature uses as a "medium" by means of which to com-

* "*Reichenbach* claims to have discovered a new power in nature, which he calls od, or odic-force. If such a power does exist, he has been preceded in its discovery, by *Professor Grimes*, of Lansingburgh, N. Y., who is certainly entitled to the claim of priority. He published a work, I think, in 1844, in which he contends, that there exists, in nature, a substance more sublimated and subtile than electricity, and which he calls *etherium*, and that this is the cause that induces the mesmeric state. It is a production I would advise the admirers of *Reichenbach* to read. It certainly contains many valuable thoughts." (*Dods on the Human Mind*. 1854.)

municate, as it were, by a natural system of telegraphs, her various mysterious influences, from one planet, or one brain, to another.

The fact, that ordinary, healthy persons do not manifest clairvoyance, is no valid argument against it, nor is the fact, that it has been but occasionally observed; for the same might have been said, five hundred years ago, concerning any form of electricity.

The power of the will, to silently propagate its movements to a distant brain, has its analogies in the mutual planetary influences, which, though exerted invisibly, may be mathematically demonstrated. It has a much more striking analogy in the power manifested by the electric fishes, of sending death to their enemies, by an organic telegraph. So much of exaggeration and folly has been mixed up with the very few well proved cases of clairvoyance, that I can sympathize with any amount of skepticism which may be manifested in reference to it, provided it does not exclude further investigation. It is worthy of especial remark, that most of those who have manifested clairvoyance, were suffering from diseases which give peculiar sensitiveness to their nervous impressoria, and that they were very short lived. It seems to be the effect of a species of "nervous consumption," which produces an exaltation of the sensory nerves, at the expence of the vital and muscular powers.

Rev. Mr. Mahan.

Several very learned authors have attempted to explain the rappings, the tippings, and the answering of mental questions, by the odic force, and by clairvoyance. But, though I may be permitted, after sixteen years of constant practice in all parts of the country, to claim to know as much on the subject as any one else, I am confident, that neither odyle, etherium, nor clairvoyance, has any agency whatever, in producing the spiritual manifestations. A few years ago, those who were so bold as to openly profess a belief in any of the phenomena of mesmerism, were unmercifully scoffed at, by the most respectable and conservative portion of the public; but now, in order to combat the errors of spiritualism, thousands of those same conservatives admit, upon very slight evidence, the most marvelous pretensions of the clairvoyants. The *Rev. Mr. Mahan* has written a very able work against spiritualism, in which he has assumed, that the mental questions are answered on odylic and clairvoyant principles; and he certainly arrays an amount of testimony in favor of his position, which is very imposing, and which, I have no doubt, will be convincing to many minds.

The most important witnesses which he introduces, to sustain his position, are *Dr. Bell* and *N. J. Bowditch Esq.*, of Boston; and I must confess, that, were I to be influenced by testimony alone, in opposition to my own experience and judgment, I should be unable to resist the impression which the statements of these two distinguished gentlemen are calculated to produce — that some of the mental questions are actually answered by clairvoyance. I was, however, determined to examine the subject for myself, and I did so; but, first, let me quote the statement of *Mr. Bowditch*, from *Mr. Mahan's* book, p. 220.

"I have found my most successful sessions to be those where I was alone with the medium, or attended only by one friend. During the whole two hours, I have had often entirely accurate answers to a series of mental questions, some of them such that the answer could not be known to any other human being than myself.

For instance, I wrote certain lines, as from a young girl lately dead, to her father, describing her reunion with her deceased mother, the love they bore him, etc. The answers gave the character of the paper, the number of its lines, and, at my request, accurately repeated the lines of the last stanza.

"I am satisfied, as you are, that the answers are according to our thought, or belief, even if erroneous. On two different occasions, once, when I was in communication, a spirit gave its own name as William, instead of Thomas, because I thought it was William. And, at another time, when a friend was in communication, a wife made the same mistake in her husband's name. My friend announced the mistake, as a gross failure. I suggested this disturbing influence, and shut up my eyes, while he tried the question again, and got the true name, Thomas.

"A strong and determined will can also get answers known to be false. *Dr. H. T. Bigelow* went with me to *Mrs. Heyden*. * * * The letters touched by him would be negatived, (by single raps,) some of them, five or six different times; but, after knocking at a particular letter, over and over again, three raps would at last come. Having once come, *Dr. B.* would say, 'Are you sure that this is the right letter?—three raps, or yes. In this way he compelled the spirit to say, that his name was 'Miserable Humbug,' that spirits lived on 'pork and beans,' etc., through a series of absurdities. Had I never been present at any other session, I should, unhesitatingly, have arrived at the conclusion—namely, that the medium knew, by his loud and emphatic pointing and striking, at particular letters, where the raps were wanted, and made them, accordingly; and that it was all a delusion.

I ought to state, that *Dr. Bell* has published a long and interesting account of similar experiences to those of *Mr. Bowditch*, from which he was, also, satisfied, that no answers could be obtained but such as were in the mind of the questioner.

Now, while I do not deny the possibility of the questions being answered by clairvoyance, yet I protest, that, with a hundred times more experience than all these gentlemen together, I must differ from them totally;

and, so confident am I that the mediums can not answer questions in the way supposed, that I will make the following proposition: I will write three words upon a piece of paper, fold it, and place it upon a table, and fasten it there, and, if requested to do so, I will leave the room and the city, so that my will can have no disturbing influence; and if, without removing or opening the paper, *Mrs Heyden*, or any other medium, will state correctly the three words, I will pay one thousand dollars, as a reward "for distinguished services."

After the publication of the statement of *Mr. Bowditch*, I was in Boston, and met an old friend, *Mr. S*——, one of the most intellectual and accomplished gentlemen in that city. He well knew my sentiments upon this subject, and endeavored to weaken my confidence in my own conclusions, by relating the experience of *Mr. Bowditch* and himself. I think he stated, that he was present at some of the interviews of *Mr. Bowditch* with *Mrs. Heyden*, and he declared, that my hypothesis appeared to be untenable. Our conversation ended by my proposing to him to go with me to *Mrs. Heyden's*, to test her powers. When we entered, she was engaged in making a medical examination of a young gentleman who was laboring under some chronic disease. The concluding part of her advice to the patient was made in my presence. She told him, in a very solemn and impressive manner, that the difficulty was not in his heart, as he apprehended, but in his liver! The expression of his countenance was such, that I felt confident, that, if his case was not utterly incurable, his beautiful faith in her powers would save him.

When the company were gone, we made known our errand, and proceeded at once to ask mental questions, by pointing to an alphabet which was marked on a large card. When I touched the right letter, "the spirit" rapped the floor or table so near to where the medium sat that I had no doubt, that she rapped it herself intentionally; but that was to me immaterial; the only question was, whether she could answer a mental question without any clue; and I determined to give her a fair trial. With me, she not only failed in every instance, but perfectly satisfied me, that all her success and all her extensive reputation were owing to her extraordinary shrewdness. She is a woman of very great capacity, with a large brain, quick intellect, and a vigorous, energetic temperament. She has the very combination which is necessary to give firmness, coolness, and self-control; modified by the tact and adaptiveness which enables her to cope with the great variety of characters, with whom she has to deal. I admired her skill, and told her so, plainly; but I also told her, that I would give five hundred dollars for a single correct answer.

But the most instructive part of this interview is yet to be stated, which is, that my friend, *Mr. S*——, got several correct answers to his questions, while mine continually failed. This was explained, by saying, that it was owing to his mind and will being in a proper state, while mine were not. Such was *Mr. Bowditch's* hypothesis; but I overthrew it in a moment, by making the medium turn her face, so that she could not see my friends movements, and then, the failure was as complete as in my case.

SUSCEPTIBILITY, OR MEDIUMSHIP, A DEBILITY OF THE VITAL ORGANS.

There is one feature in the mesmeric and spiritual phenomena, which no physiologist has ever attempted to explain, and which I have not seen even described, and that is, the sympathetic effect upon the vital organs, especially the heart, lungs, and skin. I have sufficiently explained these effects, in the section on the moderating ganglia; but I would here remark, that I am now inclined to the opinion, that the susceptibility to the mesmeric influence is entirely owing to a debility of the moderating ganglia, and a morbid excitability of the arterial system. In other words, *the susceptibility to the mesmeric and spiritual influences depends upon a debilitating disease of the body, and the respiratory and pro-vital nerves, and not of the brain.* I am led to this conclusion by many observations.

1. Some persons are in no degree susceptible, although the conforming social organs of the brain are very large, and the governing small; and, so far as the proportions of the head, or temperament are concerned, the conditions are all apparently favorable.

2. Some persons have an idea, that nothing is necessary to the success of a mesmeric experiment, but to find a person who is weak-minded, credulous, and ignorant, and to operate on his imagination by extravagant statements and mysterious ceremonies; but I have demonstrated, by thousands of experiments, that no degree of mental weakness, of ignorance, or of credulity is of any avail, unless there is a peculiar susceptibility besides, which has never yet been recognized by any physiologist.

3. In experimenting upon a large number, a majority may be affected in some degree; but those who will make

good mediums constitute about one-twentieth of the whole, and they are of every degree of intelligence, and of every species of character; but the most susceptible and interesting subjects, or mediums, are those whose vital powers are deficient in energy. So true is this, that the *Baron Reichenbach* denominated his best subjects "sick sensitives." I have, however, seen a great many good subjects who *appear* very robust; and I regard this fact as evidence, that the debility which constitutes susceptibility is not necessarily general, but is probably confined to certain definite localities in the body, and the nerve centres.

4. The first effect which is observable when a subject is in any degree affected, is in his respiration, which becomes hurried, and apparently difficult, something like that of a person who is stepping into cold water; the pulse is, also, more rapid, but generally weaker, than usual, the skin colder and paler, and the perspiration more profuse. Medical men will perceive, that all these symptoms indicate a partial suppression, or arrest, of the respiratory and arterial powers.

5. In some instances, the person experimented upon will have his lungs greatly affected, and an inexperienced operator will suppose, that he is passing rapidly into the mesmeric state; but, presently, he will find, that the influence passes away without taking more than a slight hold of him. In these cases I have noticed, that a reaction takes place in the respiratory powers, the hands become warm, and the face flushed, as if the expansive powers of the brain, and, perhaps, the moderating ganglia, resist the mesmeric, or depressing, influence.

6. I have often observed, that, when persons whose organizations of head indicated great independence of character, intelligence, and firmness of purpose, were very

susceptible to the mesmeric influence, it was after they had been suffering from disease of the heart or some of its auxiliary organs.

7. I have noticed, that severe mental affliction, such as the loss of friends, or religious anxiety, is sometimes followed by susceptibility which they did not previously manifest, as if the severe shock which the mind received by the affliction, was so great as to weaken the moderating ganglia, and give the brain an undue influence upon the heart. So great is this influence in some cases, as to produce a disease of the heart, or what is popularly called "a broken heart."

8. I am happy to say, that, in many instances, I have had the consolation of knowing, that I have relieved distressing symptoms which originated in mental impressions, by a process which is called mesmerism, but which consists in making powerful counteracting impressions upon the patient, who is voluntarily passive; and it may be useful to state, that mesmeric mental impressions produce good effects upon the health, even when no *apparent* effects, or what are commonly called *experiments*, can be exhibited. Even the language and manner of a physician to his patient is powerfully mesmeric, or credencively inducting; and is often more influential, for good or evil, than his medicine. But, to make these impressions judiciously, and with the desired effect, he must understand the principles of phreno-physiology, which I have endeavored to explain in this treatise, and the distinction between the expansive and restraining impulses.

9. The manner in which the arteries, under mental influence, operate to produce the mesmeric phenomena, is, in my opinion, by a contraction or expansion of their coats, which varies their calibre, so as to increase or diminish the flow of blood; giving incredible vigor to

some functions, and cutting off the supplies so as to entirely suspend others.

10. When the brain acquires abnormal and undue power over the arteries, in consequence of the weakness of the vital powers, or of their moderating ganglia, it sends the blood to, or withholds it from, any part of the body in which the mind is especially interested. It does this with a degree of intensity which produces the exaggerated effects denominated mesmeric, or spiritual, phenomena.

Let me endeavor to state briefly, and illustrate clearly, the physical principles upon which the mesmeric phenomena depend.

1. There is such a relation existing between the body and the mind, that, whatever state the mind is in, it has the power, through the impulsive nerves, to bring the heart and arteries into precisely that degree of activity which is necessary to execute the purposes of the mind.

2. The power of the mind is limited by an antagonistic set of moderating nerves, which protect the vital organs from undue mental influences.

3. In persons who have such a debility of the vital organs and moderating nerves that they can not resist the influence of the mind, the heart and arteries become unduly expanded or contracted, whenever the mind is excited or depressed. This debility constitutes mesmeric susceptibility, or mediumship.

4 Under these circumstances, if the subject will voluntarily suspend his own independent will—that is, his governing Socials—and allow one whom he respects and confides in, to excite his mind by language, his mind will be put into such a state as the operator chooses to excite, and his body will, of course, be influenced by his mind, to assume a corresponding state, but exaggerated in

degree, because not antagonized by the self-will, or governing Socials of the subject.

With these principles for our guidance, let us proceed to an experiment:

We call up from an audience a dozen persons, and ask them to stand in a row, and close their eyes, to shut out the external stimulus, and to put themselves into a respectful attitude, with their open hands together. We inform them, that we propose to operate on them; and if they do not know, by previous reports or lectures, what to expect, we explain it to them, and describe the expected effects. In this way, we put their minds into the proper condition. If we pass near to them, and listen to their breathing, we shall find, that some of them breathe in a hurried manner; examine the pulse, and it has greatly increased in rapidity. Others we find breathing in a regular manner, totally unaffected by the stimulus of our language, or their situation. Those who have the most unusual beating of the heart, and moistness and coldness of the skin, will generally be found the best subjects, or mediums, Select one of the most promising of them, make a few passes over his eyes, and say, in a low voice, "you can not open your eyes." He attempts it, and fails. You say to him, "you can not speak," "you can not step," "you can not put down your hands," and, upon trial, he finds that it is so. He can do nothing that you forbid, and feels irresistibly impelled to do what you require. He evidently struggles at first, and endeavors to resist your influence, and, if the governing Socials are larger than the conforming, he will be likely to succeed. If the conforming Socials are large, that alone will not produce susceptibility, but it will make much more manageable subjects of those who are susceptible. The phreno-organs do not produce the susceptibility but they take advantage of it; and it is through them that the operator produces his effects upon the mind, and through them and the mind, upon the body.

When the operator says, "you can not open your eyes," that assertion puts the brain and mind into such a state as to prevent even an exertion to open them. When the subject is told to put out his hand, and is told that he can not put it down, his conforming organs not only control the mind, to prevent it from moving the voluntary muscles, but, if you will examine the arm you will notice, that it is colder than the other; its nutrition is being suspended, to harmonize with the state of the mind.

Tell the subject to look up and he will see a rainbow, and, if he is deeply affected, he will appear to see it; but he is seeing it as we see things in a dream. It is what *Shakspeare* calls "the mind's eye" that sees it. Tell him that there is a river, a bower, a company, the form of a spirit—it is a departed friend. He sees, or rather he dreams that he sees, all that you describe. Tell him to listen—the spirit speaks—what does he say? The subject hears the voice, and will tell you what the communication is which the spirit makes. Thus you lead the subject from one vision to another. Tell him to put his hands on a table, and that the spirit will tip it over; and he will tip it over himself as unintentionally as he sees the vision. The language of the operator affects his muscles, just as it does his mind: indeed, it is through his mind that the operator's words affect his muscles, as well as his heart, and arteries. Now ask him to listen again, and request the spirit to rap on the table in answer to his mental questions. Tell him to ask a question—he listens, and declares that he hears the raps distinctly, and feels the table jar, and that his mental questions are all answered with perfect accuracy. Let him join any spiritual circle, and he will be continually blest with satisfactory communications, because his mind is in a conforming condition, and his arterial system is susceptible; he therefore, "catches the spirit" of the circle, with which he associates.

The spiritualists suppose, that mesmerism can not be identical with spiritualism, because the mediums go into "the superior state" without the aid of any operator. But, from what I have said, it will be perceived, that nothing more is wanted to produce the "superior state," than to get the mind of a susceptible person to be quiet and passive, and allow the ideas which proceed from the conforming social organs to overrule the whole brain and become dominant. Those ideas may come from the mouth of the operator or from the memory of the subject. About one person in ten may become a writing medium, if he will take a pen and hold it over a sheet of paper, as if he is about to write, and remain passive: he will, ultimately, find that his hand will move and write something, over which his will seems to have no more control than it has over a dream.

Any man who is naturally susceptible can mesmerize himself, by sitting down alone, and allowing his conforming organs to become excited by the stimulus derived from memory. Indeed, in such cases, the memory, as well as the imagination, is wonderfully prolific of ideas.

Some persons have the power of mesmerizing themselves, who can not be mesmerized by the influence of any one else — that is to say, they have the power of passing voluntarily into that peculiar condition called trance, and which appears to consist in the passiveness of all the expansive powers of the mind, and the activity of all the restraining, or contractive, powers. While they are in this condition, they are capable of indulging in dreams and visions, which indicate the special activity of the conforming social organs; for the dreams are generally of a religious and marvelous character, like those of *Tennant, Davis, Cora Scott, Miss Sprague, Miss Jay, Foster,* and *Randolph.* The character of the thoughts uttered by mediums is different from their normal manifestations, and bears a certain degree of resemblance to those of men of natural genius who have a large development of the head in the region of the conforming Socials—that is, in the upper front of the head—such as *Shakspeare, Swedenborg, Scott, Edward Irving,* and *Bunyan.* This fact further confirms my idea, that the conforming Socials are specially concerned in producing the trance state of mind. The same organs which give exaggeration to poetry and the arts, romance to story, and a bright radiance to the hopes of immortality; that loosen the tongue of eloquence, and elevate the soul of the enthusiast above the dull common-places of reality, into the delectable regions of a fervid imagination—these same organs are specially called into action by the very circumstances which produce the mesmeric trance. The consequence is, that the entranced medium far surpasses himself—his normal and healthful self has more sober sense, but not as much genius, exaltation, refinement, dramatic religiousness, and poetic fervor. The spectators of his outpourings, unlearned in cerebral lore and mental physiology, ascribe his credo-mania to the inspiration of immortal and unearthly beings. If you previously instruct him, and then let him, in the trance, repeat the ideas, he will surprise and delight you by his glowing style and gorgeous imagery. He may not give you any ideas which, in a scientific sense, are absolutely new; but he will lay the whole universe under contribution to beautify the ideas which he does express. The stars of heaven, the flowers of earth, the gems of ocean, and the sweet music of the air—all things excellent and magnificent, splendid and lovely, gentle and soothing—find in him a worshiper and an advocate.

It has often been noticed, that persons who have been thus entranced did not seem weary, although the mind appears to have been a long time actively engaged. The reason of this appears to be, that all the organs of mind and body which are not required to act, are passive and resting. A violent exertion of body and mind wearies them, precisely as it does others.

It is my opinion, that a judicious and scientific physician can, in some cases, render essential service to his patients, by the practical application of these principles; but I would advise unqualified persons not to tamper with the constitutions of others. Above all, let me warn the spiritual experimenters, to beware how they allow their mediums, or converts, to be too deeply and continuously impressed with the reality of their dreams; for experience has given us melancholy proofs, that there is great danger of the delusion becoming chronic and permanent, and their conduct so consistent with their insane dreams, that the mad house is their only fit abiding place.

If, when the subject is entranced, his mind is only impressed with pleasant and agreeable images, or is made to dwell but a short time on one subject, he will afterwards suffer no ill effects; on the contrary, he generally feels much more free than usual from unpleasant sensations. The credencive force operates to increase or diminish the energy of any faculty of body or mind, according to circumstances. Thus, in some subjects, there is a degree of bodily weakness which assumes the alarming appearance of death itself. Again, there is a manifestation of strength which appears superhuman. According to our theory, the explanation of this is, that the credencive force, not being antagonized by other cerebral powers, produces extreme effects upon the arteries which nourish the muscles, and thus expands them, and enables them to act with all their latent energy; or, on the other hand, the capillary arteries may be so contracted, as to cause the suspension of the local functions altogether, just as sleep is produced by the suspension of circulation in the nerves.

I know no other way of explaining the fact, that the credencive force, alone, can prevent the sensation of pain when a tooth is extracted. I have repeatedly seen teeth extracted without pain, merely because I stood by and excited the credencive impulse, by asserting, positively, that no pain would, or could, be felt.

In these cases, I have noticed, that the colder the patient is made by the experiment, the more perfectly successful it is. I take it, that the *modus operandi* is, that the credencive force operates upon the arteries of the proper locality, to contract them, and thus prevent them from transmitting the requisite sensation to the mind. Of course, under these circumstances, the pain can not be felt.

Analogy of Chloroform to Mesmerism.

I have never seen a rational explanation of the effects of chloroform, and the manner in which it operates to prevent the sensation of pain; but I will venture to suggest, that it does so upon the same principle as that which I have just applied to mesmerism. It suspends the circulation of arterial blood in the capillaries of the ultra-vital nerves; and, by checking the nutrition of the nerves, it checks their functions, and prevents the transmission of sensation.

The same principle applies to freezing. When the vitality of the blood is invaded by chloroform, or by cold, it shows its effects, first, in the ultra-vital parts that is to say, in those parts which are not immediately necessary to life : these are the same parts whose functions are suspended in sleep — namely, the brain, limbs, face, and vocal organs. If the chloroform or the cold continues, the vital functions begin to sink, and, at length, death ensues.

A person under the influence of chloroform, may be said to be half dead, for half of his organs have suspended their functions, and the others are fast doing so.

The spiritualists declare, that it must be some intelligent spirit that moves the hands to write, because they are utterly unconscious of what they are writing. One of them says : "The spirit used the muscles of my hand and arm, but they did not use my conscious mind ; for I had no consciousness of what I was writing, and did not know what it was about until I heard it read to me." This is very curious, certainly ; but, that the spirits have nothing to do with the matter is proved by the fact, that I can, at any time, from a large company, find a person — perhaps several — who can be made to write, in the same manner, communications which purport to be from the spirit world ; and he will declare most solemnly, as *Judge Edmonds* does in his case, that none of the ideas written were in his mind. My explanation of this fact is, that the thoughts were in the mind at the time that they were written ; but that the same credencive power that produced the writing and the dreaming state of mind, produced a state of forgetfulness the instant that the words were written. This species of forgetfulness is one of the known peculiarities of mesmerism. It is common to see the mind suddenly roused from the credo-mesmeric state, and have no recollection of the experimental exercises in which they have just been engaged.

HOW TO RESIST THE CREDO-MESMERIC AND SPIRITUAL INFLUENCES.

Every one who has witnessed credo-mesmeric experiments, or honest spiritual manifestations which they were convinced were of a mesmeric character, must have felt, that it is a dangerous power; and it is but reasonable to expect, that one who has devoted so much time to make himself acquainted with its nature, would suggest some mode of preventing the evils which may arise from the abuses to which it appears liable. In 1844, I felt it to be my duty to warn the public of the coming danger; though I had, then, no idea of the form which it was about to assume. This will appear by the following quotation from "Etherology:"

"Others can judge, as well as I, how far this power will, in future, be abused; but I perform my duty in giving a warning to susceptible subjects, let them not lightly disregard it. The subject should know, that all his property and other legal rights would be at the mercy of the operator. He could be made to sign any thing — a deed, or marriage contract —a confession of murder, or any thing else.

"It is my opinion, founded upon experiment, that one person in ten is susceptible of this peculiar influence.

"There is another abuse of credencive mesmerism to which I deem it my duty to allude. I refer to the influence of immoral associates upon susceptible persons. I have, in several instances, seen persons, whose organizations indicated honesty, sobriety, and virtue, but who were notwithstanding reputed to be the very reverse. These persons were highly susceptible to credencive influence, and, having fallen into vicious society, were unfortunately inducted and vitiated so as to conform to the will of their vicious companions. It is true, that neither the subject nor the companions intended to produce this result, nor even suspected the nature of the agent which was active between them; perhaps neither of them ever heard of mesmerism, nor credencive induction, nor animal magnetism, yet they unconsciously employed it, and the subject was innocently inducted and seduced by its agency. I would, therefore, advise those who are aware of their susceptibility, or that of their friends, especially the young, to avoid the society of those whose examples or conversation are of an immoral character. Vice and virtue are capable of being imbibed with wonderful facility by persons susceptible of credencive induction, and this fact, being known, may be of infinite service to some who would otherwise be ruined."

The first and most important defence against the influences by means of which mediums and converts are made, is a knowledge of the organic laws and the constitutional defects upon which the mesmeric condition depends; for it will readily be perceived, from the explanations already given, that a person who is ignorant concerning the real nature of mesmerism and spiritualism, will be unable even to exert his powers of resistance. If, in addition to his ignorance, he has been led to adopt an erroneous theory on the subject, his weakness is still greater; for his credulity and his fears will be likely to aggravate the symptoms. If, for instance, he believes, that he is under the influence of departed spirits, the more he reasons, and reflects, and struggles, the more entangled he gets, until he is fortunate if he does not become insane. If he attributes it to the *will* of a mesmeric operator, he greatly overrates the power of the mesmerizer, and thus increases that power. But, let him thoroughly understand the subject, and know, that the influence is identical, in nature and kind, with the persuasive power which all men use, and that he possesses the power himself; let him know, that an active exercise of his own will, and his own independent judgment, will generally enable him to resist the influence, when he understands its real nature; that the susceptibility through which the influence is produced, is a chronic weakness of the vital organism; and that, when he supposes that he communes with spirits, he is merely in a dreaming state of mind, such as *Shakspeare* describes under the name of *ecstasy*, when the dreamer sees, with "the mind's eye," "more devils than vast hell can hold;" let him know, that when any impulsive affection is excited, it has a natural tendency to monopolize the *attention* to its peculiar range of ideas, until it spurns the control of the other mental faculties and the proper self-will, and, in a weakened condition of the constitution, overmasters the judgment, and imposes its own dream upon the mind as a spiritual inspiration—let him be made clearly to understand all this, and he will be forearmed to defend his mind's integrity, and maintain its normal independence.

Since 1844, I have endeavored to ascertain the physical causes of susceptibility, not only on account of its scientific importance, but with a hope, that some means of curing it may be discovered. According to the explanations which I have already given, it is plain, that any cause which powerfully affects the feelings and crushes the ambition, tends to produce susceptibility, by giving the mind undue influence over the body. It also appears, that diseases of the body, especially of the heart and respiratory organs, have the same tendency. In some families, the susceptibility is hereditary, and follows the same laws as every other quality which may be transmitted. It is obvious, that the remedy for the debility, in any case, is in removing or avoiding its causes, and that they must be in most instances very complicated, so as to require the advice of a judicious and scientific physician; but, when it is ascertained, that a person is very susceptible, although it may not be at once entirely cured, its dangers may be, in a great measure, obviated thus: let the subject employ an operator in whom he has confidence, to affect him as deeply as possible several times, and when under the full measure of the credencive influence, let the operator impress, as powerfully as possible, upon his mind, an antipathy to any thing improper, or which it is desirable to avoid, and extort a promise from him that he will resist all temptations to act contrary to his present resolution. I have seen many instances of persons who have been temporarily cured, in this way, of such habits as drinking, smoking, and swearing. But, in order to be effectual and permanent, the credencive influence should be repeated many times, and not be counteracted by the hostile influences of associates. I have known persons who have, by this method, acquired the ability to resist every effort to mesmerize them, even when they externally complied with all the requisitions of the operator; though, before they were trained in this manner, they found it impossible to do so. Every thing which tends to give self-hood, individuality, and independence to the character, tends also to counteract credencive susceptibility; and, on the other hand, every thing which subordinates the will to that of others, tends to increase it. As an illustration, I will mention, that at West Point, I failed to affect, decidedly, a single officer of the forty that I tried there; but I succeeded with a great number of other persons. The habits of authority and self-reliance, acquired by the officers, together with their manly exercises, and good constitutions, sufficiently explain their want of susceptibility,

When any one passively surrenders his self-will, and rightful prerogative of private, independent judgment, and submits to be influenced by the assertions of another, he must have a very healthful brain and nervous organism, if he does not, ultimately, become a convert to his peculiar views on any subject upon which the attention is for a long time fixed. In this way, religious teachers are always successful in giving "dominance" to their peculiar ideas, in any locality where they are permitted to exercise exclusive influence.

When the fact is known, which is demonstrated by the experiments described in this volume, that at least one in ten can, if voluntarily passive, be made to believe any thing which is asserted, the success of false teachers can easily be accounted for.

Thrice happy is that community whose public instructors, subduing their own ambition, selfishness, and sectarian prejudices, are only anxious to impress upon the minds of the people the sacred principles of God's holy truth, who, while they draw lessons of Divine wisdom from the records of ancient inspiration, which have been handed down to us through human testimony, point, also, with unshrinking confidence, to the more ponderous volumes of nature, in which the laws of the Creator are inscribed, for our contemplation, by his own unerring hand.

I originally intended to review, in detail, the works of the most distinguished writers in favor of spiritualism; but I am not only prevented from doing so by a want of space, but the kindlier feelings of my nature prompt me to forbearance.

Regarding, as I do, the volumes written by *Judge Edmonds*, on the subject of spiritualism, as the products of a credo-mesmeric disease, operating upon a superior, and highly-cultivated mind, I doubt the propriety of subjecting them to that severity of criticism which they would otherwise deserve. Considering the high judicial position on the bench of our Supreme Court which he has held with usefulness and honor, it would, perhaps, be more becoming in us to pass over his errors of judgment with respectful charity, adopting the mournful expression of Ophelia, concerning Hamlet, the royal medium of Denmark,

"Oh, what a noble mind is here o'erthrown!"

Similar remarks may justly be applied to *Prof. Hare*, whose many and valuable contributions to science entitle him to our gratitude but whose shattered faculties, like the fragmentary asteroids, must now be regarded as merely the relics that survive a splendid catastrophe.

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