

MAN DISPLAYED.

IN FOUR PARTS.

1ST—BEING A CHEMICAL ANALYSIS OF THE ELEMENTS WHICH
ARE FOUND TO EXIST IN THE HUMAN FRAME—THUS
SHOWING THE NATURAL ORIGIN OF MAN.

2ND—ALSO THE ANATOMICAL AND PHYSIOLOGICAL STRUCTURE OF
THE HUMAN FRAME.

3RD—THE POWERS OF THE ORGANS OF THE BRAIN, PHRENOLOGI-
CALLY CONSIDERED.

4TH—WITH THE STRENGTH AND POWER OF EXPANSION OF THE
IMMORTAL MIND.

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INTRODUCTION.

A great outcry has frequently been made by those who profess to be pious persons, about the vanity of human science. Certain preachers, in their pulpit declamations, not unfrequently have attempted to embellish their discourses by contrasting the truths of Scripture, with what they are pleased to call "the perishable treasures of scientific knowledge;" and thereby magnify the truths of the former, by showing the vanity of the latter. The knowledge we derive from Scripture, say they, "is able to make us wise unto salvation;" all other knowledge is but comparative folly. The knowledge of Christ and him crucified will endure forever; but all human knowledge is transitory, and will perish forever when this world comes to an end. Men weary themselves with diving into human science, while all that results to them is vanity and vexation of spirit. Men may become the greatest philosophers, and have their minds replenished with every kind of human knowledge, and yet perish forever. What have we to do with the planets and the stars, whether they are

peopled with human beings like ourselves, whether they are peopled with the spirits of the departed of this world, or whether they are merely composed of a thin luminous matter, placed in the firmament to give light to the inhabitants of this earth. Our business is to save our souls, and if we attend to that it is all that is necessary.

Now, although some of the above and similar expressions, when properly modified and explained, may be admitted as strictly true, the greater part of them, along with hundreds of others of like nature, are either ambiguous or false. But, although they are all admitted as true, what effect can the frequent reiteration of such comparisons have on the mass of the people to whom they are addressed, but only to make them think that such studies are useless; and it is to be regretted that many are already too much inclined to think so, without receiving encouragement from such sources; nay, some even think it dangerous to acquire a knowledge of some of the sciences, on account as they suppose, that a knowledge of them are opposed to the truths of Revelation. And what is the knowledge which the great majority of those who have acquired all their knowledge from the pulpit and by studying the contents the of sacred

oracles? It is too often, I fear, vague, confused and superficial; owing, in a great measure to the want of those habits of mental exertion which a moderate prosecution of useful science would have induced.

Such declamations as those to which I have now adverted, obviously proceed from a very limited sphere of information, and a contracted range of thought. It is rather a melancholy reflection, that any persons should attempt to apologize for their own ignorance, by endeavoring to undervalue what they acknowledge they have never acquired, and therefore, cannot be supposed to understand and appreciate. For, although several well informed and judicious ministers of religion, have been influenced by custom, and from copying the expressions of others, to use a phraseology which has a tendency to detract from the utility of scientific knowledge, yet it is generally the most ignorant, those whose reading and observation have been confined within the narrowest range, who are most forward in their bold and vague declamations on this topic. We never find in the sacred records, such comparisons and contrasts as those to which I allude. The inspired writers never attempt to set the word of God in opposition to his works, nor attempt to deter men from the

study of the wonders of Creation, on the ground that it is of less importance than the study of his Word. On the contrary, they take every opportunity of directing the attention to the mechanism and order, the magnificence and grandeur of the material world; and their devotional feelings are kindled into rapture by such contemplations.

When the Psalmist had finished his survey of the different departments of Nature, as described in the 104th Psalm, he broke out in the following devotional strain: "How manifold are thy works, O Lord! in wisdom hast thou made them all: the earth is full of thy riches, so is this great and wide sea. * * * The glory of the Lord shall endure forever, the Lord shall rejoice in all his works. I will sing unto the Lord as long as I live; I will sing praises to my God while I have my being." For the visible works of God display the same essential attributes of Deity, and of his superintending Providence, as the revelation of his word; and it is one great design of that word to direct man to a rational and devout contemplation of these works in which his glory is so magnificently displayed. And, therefore, to attempt to magnify the word of God by degrading his works, or to set the one in opposition to the other, is to attempt to

set the Deity in opposition to himself, and to prevent mankind from offering a certain portion of that tribute of adoration and thanksgiving which is due to his name.

It is true, indeed, that the mere philosopher has frequently been disposed to contemplate the universe as if it were a self-acting and an independent machine. He has sometimes walked through the magnificent scenes of creation, and investigated the laws which govern the motions of the celestial orbs, and the agencies which produce the various phenomena of our sublunary system, without offering up that tribute of thanksgiving and praise which is due to the great First Cause, or feeling those emotions of adoration and reverence which such studies have a tendency to inspire. But it is no less true, that the mere theologian has, likewise, not unfrequently, walked through the field of revelation, studied its doctrines and facts, and moral requisitions, written volumes in support of its heavenly origin and defended its truths against the cavils of its adversaries, without feeling that supreme love to God and affection to his neighbor which it is the great object of the Scriptures to produce, and displaying a disposition and conduct directly repugnant to its holy precepts.

An argument founded on the impiety of certain pretended philosophers, to dissuade us from the study of the material world would, therefore, be equally powerful to deter us from the study of divine revelation, when we consider that many who profess to receive its doctrines, live in open defiance of its most sacred requisitions. In both cases, such examples merely show, that man is a frail, inconstant being, and too frequently disposed to overlook his Creator, and to wander from the source of happiness.

It is a very vague, and in many points of view, a false assertion, which has so frequently been reiterated,—that what is generally termed human knowledge or science, has no connexion with an immortal existence, and, consequently, will be of no utility whatever, when this world comes to an end. Truth is, from its very nature, eternal and unchangeable; and it cannot be supposed a preposterous opinion that the established principles of several of our sciences will be the basis of reasoning and action in a future state as well as in this present. That a whole is greater than any of its parts; that the angles of a triangle are equal to two right angles; that the sides of a plain triangle are to one another as the sines of the angles opposite to them: these and many similar propositions

are equally true in heaven as on earth, and may probably be as useful truths there as in our present abode.

OBJECT OF SCIENTIFIC INVESTIGATION.

In order to avoid misconception on this subject it may not be improper to define and illustrate what is meant by the term *Science*.

Science, in its most general acceptation, denotes knowledge of every description ; in a more restricted sense, it denotes that species of knowledge which is acquired chiefly by the exercise of the human faculties, and in a still more restricted sense, it denotes that systematic species of knowledge which consists of rule and order, such as Geometry, Algebra, Chemistry, Natural Philosophy, Astronomy, Geography, &c.

By means of scientific investigation the powers of the mind have been strengthened, and our knowledge of the operations of the Creator extensively enlarged. Science has enabled us to transport ourselves across the pathless ocean from one continent to another, and to survey all the variety of scenery which the terraqueous globe displays ; it has taught us to mount upwards towards the clouds, and even to rise far above them, and soar beyond the eagle's most towering hight, and to penetrate into the

depths of the earth, and explore the changes it has undergone since the period of its creation ; it has laid open to our view the nature and constitution of the atmosphere, the principles of which it is composed, and its agency in supporting fire, and vegetable and animal life. On the principles which Science has established we have been enabled to ascertain the distances of many of the heavenly bodies, to compute their magnitudes, and to determine the periods of their revolutions ; and by means of the instruments it has invented, we have been enabled to take a nearer survey of distant worlds—to contemplate new wonders of creating power in the regions of the sky which lie far beyond the utmost stretch of the natural vision—and to explore those invisible regions, where myriads of living beings are concentrated within the compass of a visible point. In consequence of such discoveries we have been enabled to acquire more clear and ample conceptions of the amazing energies of Omnipotence, of the inscrutable depths of infinite wisdom, of the over-ruling providence of the Almighty, of the benevolent care he exercises over all his creatures, and of the unlimited extent of those dominions over which he eternally presides.

The faculties by which man has been enabled

to make the discoveries to which I have alluded, were implanted in his constitution by the hand of his Creator ; and the objects on which these faculties were exercised, are the works of the Creator, which, the more minutely they are investigated the more strikingly do they display the glory of his character and his perfections. Consequently, it must have been the intention of the Creator that man should employ the powers he has given him in scientific researches ; otherwise he would not have opened to his view so large a portion of his empire, nor endowed him with such noble faculties. Scientific investigations, therefore, are to be considered as nothing less than enquiries into the plans of the Eternal, in order to unfold the attributes of his nature, his providential procedure in the government of his creatures, and the laws by which he directs the movements of universal nature. It is true, indeed, that every one who calls himself a philosopher may not keep this end in view in the prosecution of his scientific acquirements. He may be actuated, perhaps, by a principle of curiosity, by a love of worldly gain, or by a desire to acquire a reputation among the learned, by the discoveries he may bring to light—just in the same way as some theologians are actuated in prosecuting the studies of the Christian

system. But the discoveries which have been made by such persons are, notwithstanding, real developments of the plans of the Deity, and open to a devout mind a more expansive view of the power and wisdom of Him who is "wonderful in counsel, and excellent in working." It is our own fault if we do not derive useful instruction from the investigations and discoveries of philosophy; it is owing to our want of intelligence to discriminate between the experiments of men and the operations of God, and to the want of that reverence, humility and devotion, which ought to accompany us in all our studies and contemplations of nature.

Science, therefore, from whatever motives it may be prosecuted, is, in effect, an enquiry after God: it is the study of angels and other superior intelligences, as the scriptures plainly inform us; and we cannot suppose there is a holy being throughout the universe that is not employed, in one way or another, in scientific research and investigation; unless we can suppose that there are moral intelligences who are insensible to the displays of the divine glory, and altogether indifferent whether or not they make progress in the knowledge of their Creator.

If, then, the study of the sciences be of such vast importance to the human race, in tending

to augment their eternal as well as their present felicity, are we not guilty of a wrong by omitting to improve every opportunity that presents itself of informing the mind of the wonders of creative power ? And if, as before remarked, God is the author of nature as well as revelation, is it not our bounden duty to investigate every scientific subject, so far as we are able, that will enable us to form just conceptions of the wisdom, power and majesty of the Almighty, as displayed throughout every part of the wonderful machinery, and organization of animate and inanimate nature ? And although we may, by the aid of the telescope, scan the starry vault of heaven, and assist the vision to range throughout the vast regions of space, and contemplate the nature, size, and revolution, as well as the distance from the sun, and also from the earth, of many of the heavenly orbs, and by the aid of numbers calculate the length of time it will take for the light of the sun to travel down to this earth ; and penetrate into the bowels of the earth, and by the aid of mineralogy disclose to the enquiring mind the riches which have lain concealed in its bosom ; though we may by the aid of mechanical skill and the science of navigation, be enabled to circumnavigate the globe, and range from clime to clime, and from shore to

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shore, and feast the mind on the beauties and grandeur of the tropical vegetation, and all the various scenes that may attract our attention ; and though they may be each and all of them in themselves useful and interesting ; yet, they are void of that interest which may be derived from the study, and investigation, and contemplation of the wonderful structure and mechanism of the human frame. The beauty, symmetry, elegance and wisdom displayed throughout every part of its organization present to us one of the most complicated pieces of mechanism that can anywhere meet the eye—whether we consider the immense number and variety of its parts, the numerous functions they perform, the rapid movements which are incessantly going forward throughout every part of this system, the amazing force exerted by the heart and muscles, the processes of digestion and respiration, the system of veins and arteries, the articulation of the bones, the structure and course of the lymphatics, the ramifications of the nerves, the circulation of the blood, the wonderful changes, dissolutions, and combinations going on, the chemical apparatus adapted for effecting these purposes, the organs of sense, by which an intercourse is maintained with the external world,—or the harmonious correspondence of all its parts and functions with the agencies of the surrounding elements.

MAN DISPLAYED.

OUTLINES OF ANATOMY.

PART I.

From the researches of the anatomist and physiologist we learn that there are in the human body two hundred and forty-five bones, variously articulated, each of them having above forty distinct scopes or intentions; and four hundred and forty-six muscles of various figures and magnitudes, connected with the bones, for producing the numerous movements of the animal frame—that more than one hundred of these muscles are employed every time we breathe—that there are thousands of veins and arteries distributed throughout every part of this wonderful system—that the whole mass of blood rushes with immense velocity through these vessels, and through the heart, fourteen times every hour—that respiration is nothing less than a species of combustion, in which the oxygen of the atmosphere is absorbed by the blood, and

diffuses heat and vigor throughout the system—that the lungs are composed of an infinite number of membranous air cells, variously figured, and communicating on all sides with one another, and that their number amounts to at least 1,700,000,000—that there are above 300,000,000,000 of pores in the glands of the skin which cover the body of a middle-sized man, through which the sweat and insensible perspiration are continually oozing—that thousands of lacteal and lymphatic tubes are absorbing and conveying nutriment to the blood—that the heart, in the centre of the system, is exerting an immense muscular force, and giving ninety-six thousand strokes every twenty-four hours;—and that all this complicated system of mechanism, and hundreds of other functions of which we are ignorant, must be in constant action, in order to preserve us in existence, and secure our enjoyment. This subject frequently engaged the attention of the pious Psalmist. With an eye of intelligence and devotion he surveyed the curious organization of the human frame, from the rude embryo in the womb, to the full development of all its parts and functions: and struck with the wisdom and goodness displayed in its formation, he raised his thoughts to God in grateful adoration, and exclaimed “I will praise

thee, for I am fearfully and wonderfully made ; marvellous are thy works ! How precious are thy wonderful contrivances in relation to me, O God ! How great is the sum of them ! If I should count them, they are more in number than the sand." This body, however, wonderful as its structure is, is liable to decay, and must soon be dissolved in the grave. But we are assured that a period is approaching, when all that are in their graves shall hear the voice of the Son of God, and come forth ; " when this mortal frame shall put on immortality," and when that which was sown in corruption " shall be raised in glory." If the human body, even in its present state of degradation, excited the pious admiration of the Psalmist, much more will it appear worthy of our admiration when it emerges from darkness and corruption to participate in the glories of an immortal life. But if we are startled or led to wonder at the display of omnipotent wisdom and power, as shown by the organization of the human frame, from our present birds-eye glance at its wonders, what will be our emotions when we have more minutely investigated each part, and considered the various functions of each part, in connection with the other organs of the physical frame ? For as yet, we have only been

introduced into the portico of this amazing temple.

Having now given the reader some idea of the greatness and beauty of the subject we intend to discuss in the following pages, we pass to notice the origin and formation of man in connection with the other parts of the material universe. With regard to the origin of man the sacred writers inform us, that "God made him out of the dust of the earth, and breathed into his nostrils the breath of life, and he became a living soul." Thus we find man composed of a part of two natures: from his being formed of the dust of the earth, he partakes fully of the animal or earthy nature; from his receiving the breath of life into his nostrils, he partakes of a sufficiency of the divine nature which enables his mind or spirit to run parallel to the Creator throughout eternity. In whatever light or character we view man, whether as a mortal or an immortal being, we find every state holding an undisputed pre-eminence over every other part of animate or inanimate nature. If we take into consideration only his physical organization, we discover the texture of the skin to be of a finer cast than that of any other of the animal species—the

same observation is equally true, if we examine every other part of the animal frame thus : if we examine the muscular system, the arrangement of each set as they are disposed through the body, they are of a decidedly closer and more compact nature than those of the horse or ox ; the nervous system of man is also far more sensitive than that belonging to the brute creation ; hence, if, in this light only, we investigate man, we shall find his physical organization to be the most complicated piece of machinery the mind can contemplate. But to extend our investigation still further and consider his immortality, his intimate connection with his Creator, the relationship existing between man and those higher order of intelligences which surround the throne of the Eternal, and reflect that after a few short years of probation on this earth he is destined to enjoy the companionship of angels and archangels during an immortal state of existence ; or else to dwell in the regions of darkness and despair forever. When we contemplate the whole subject of the origin and design of man's creation, the present power and faculties of his mind, the almost unlimited power of expansion of which they are possessed, and the eternal state of existence which he is destined to endure, con-

tribute to excite our admiration at the wonderful display of omnipotent wisdom as manifested in man's creation ; and in this position we behold him the great masterpiece of creation, and by his receiving a portion of the immortal essence of the Deity, is stamped with the insignia of royalty, and is amply qualified to become the Lord of all animate nature.

Thus we have glanced at the different parts of the subject under consideration in order to give the reader some idea of the merits of it at the onset, which will be discussed at considerable length in the following pages :

ORIGIN OF THE EARTH.

From Genesis, 1st chapter, we are informed that the Almighty created man out of the dust of the earth ; and many supposed from this that when the signal moment, which was predestined from all eternity, had arrived, that without any preparatory measures being adopted, or any circuit of means required, the Almighty rose in his might, clothed himself with the panoply of uncreated power, with one effort of his omnipotency spoke at once into existence that " noble creature, man," endowed with all the faculties and with the full power of

reason of which we see him now possessed. And not only man, but also our earth with all animate and inanimate nature which appears upon its surface; with the entire solar system, having the sun for its common center, (for it is said in Genesis i. 16, He made the stars also,) and in connection with these, all that vast retinue of worlds, and systems of worlds, which revolve around their own center—having suns of their own—far beyond our system, in the boundless regions of space, and for aught we know to the contrary, many of the worlds may be like this earth—the abodes of intellectual life. We hope the reader will excuse us here for asking the question: Are we to suppose that all this grand machinery of the universe, of which we have any conception, was created in the short space of six days? Be this as it may, we are certain that at the present time the Almighty works by means, and that every part of the works of nature are under the control of certain fixed and unchangeable laws; that these laws are fixed and unchangeable, both scripture and nature furnish us with unmis-takeable evidence. The promise to the husbandman is, that “seed time and harvest shall continue to the very end of all things.” The rotary motion of the earth and the heavenly

bodies ; the construction of the human frame ; the growth of vegetables ; and hundreds of other examples might be quoted in proof of our position.

We learn from the scripture that God is an unchangeable being, and from this we infer that as he does now permit these laws to exist and govern the works of nature, by these same laws nature's works were formed. Hence, then, if the works of nature were formed upon established principles, it is but reasonable to suppose that there was some means employed to bring those principles into requisition. For there can be but two ways by which the universe could have been created, namely, either by miracle, or upon natural fixed principles ; and as we have no positive proof of the former we must give credit to the latter until that proof can be produced. God is a being who always works upon reasonable principles ; and can we suppose any reason why he should create all nature in the short space of six literal days ? Surely he was not wanting time, for he was from everlasting to everlasting the same. Again, "one day with the Lord is as a thousand years, and a thousand years is as one day," implying that with the Almighty there is no reckoning of time. It could not have been for the purpose of showing

to man his mighty power, for this he has already done : every blade of grass ; every flower of the field ; every leaf of the forest ; and every star that decks the vault of night, proclaim the works of an almighty hand. It could not impart instruction to any of his intelligent creatures ; on the contrary, an instantaneous creation would involve the whole work in one impenetrable maze and would be far above the comprehension of any created intelligence. Hence, we can assign no good reason why the world should be created in six literal days. But not only so, the idea of an instantaneous creation seems to be in opposition to the established laws of nature ; if the works of nature were formed upon the principle of these unchangeable laws, there must have been a much greater length of time elapsed than six literal days before all the works of nature could arrive at that state of perfection to which they do at the present day. Upon the present established principle, it would be impossible for the little twig to become a large tree—and so with every other part of the works of nature.

I am aware that the Bible informs us that in six days God created the heavens and the earth, but it should be remembered that the term day in scripture does not always signify a term of

twenty-four hours duration, but it sometimes represents a long period of time, and is a term frequently used in all languages. See Luke xvii. 24, John viii. 56, Job xiv. 16. Hence, we see that we are not doing such vast injustice to the sacred scriptures by supposing that the works of creation were not performed in six literal days. But we will treat upon this more at large in another place.

Upon no principle then of logic, nature, or scripture can we see any reason for supposing that the work of creation was performed in six days of twenty-four hours each in duration.

Let us now examine the proof in favor of our position. 1st. We take it for granted that the laws of nature were in existence long before the creation of the material universe, and that these laws are unchangeable, and that these laws required the existence of certain material properties, and also their employment, to produce those effects which we discover in every department of nature's works.

Our reason for coming to this conclusion is, that as God is unchangeable and does now work by means or create a cause to produce an effect, it is evident that in all his works he has observed the same rule. The elements of light, heat, and moisture are the agents employed to

produce vegetation ; without the aid of these elements vegetation could never arrive at maturity ; and if it cannot do so now, it is probable it never could, unless we suppose these laws have changed since the creation ; and if so, the Almighty has also changed his plan of operations—and this supposition no one will be willing to admit for one moment.

Having, then, as we believe, fully established our position upon reasonable and tenable grounds, we proceed to notice what these agents were, that were employed by the Almighty in the formation and construction of the material universe.

In making our selection of the materials or essences, of which the universe is formed, it is necessary to find some property, or properties, which pervade all bodies or particles of matter; and in order to make this discovery we must analyze all material substances, and the component parts of which they are formed. In making this research we have become acquainted with the following elementary substances which pervade all bodies and particles of matter, namely, Heat, or Caloric, Electricity, Galvanism, Attraction, and the Gases, which are : Oxygen, Nitrogen, Hydrogen and Carbon ; and as these elements are so universally diffused

throughout all the works of nature, the respective property and office of each element will receive particular attention in its proper place.

As heat is the principal cause of the germination and growth of animals and vegetables, and without which no animal or vegetable could exist, no matter however favorably circumstanced in every other respect ; it will be the first element which will receive our particular attention. Heat is the sensation which one feels when he touches a body hotter than his hand ; and this sensation is caused by the passage of caloric into the hand. Thus caloric is the cause of the sensation we call heat, and heat is the effect of the passage of caloric into the hand. Caloric, then, is the matter, or principle of heat, while heat is the sensation of the transfer of this principle to the system.

ELEMENTARY PRINCIPLES OF THE EARTH.

HEAT. This principle is present in all bodies, nor is there any process by which it can be separated from any substance ; for, since heat constantly passes from the hotter to the colder body, until every thing in the same vicinity becomes of an equal temperament. For instance, if a piece of ice of 32 degrees of tem-

perature, could be transported to any place, as in Siberia, where the temperature is 60 degrees below 32° , then this piece of ice will continue to emit caloric until its temperature becomes only equal to that of the surrounding atmosphere, and it will give out 60 degrees of heat.

Heat and cold are, therefore, merely relative terms, and so far as our sensations are concerned, depend upon circumstances. Thus we call a body cold when its temperature is lower than our own, and it has at the same time, the power of conducting heat rapidly. On the contrary, we say a body is warm or hot, when it imparts heat to the hand more or less rapidly. But this sensation, to a certain degree, also depends on circumstances, and is connected with the relative temperature of the hand, and the conducting power of the substance touched. This principle is illustrated by the different sensations which men feel when transported from a cold or hot climate to one more temperate. A Russian would consider our coldest Canadian winter a comfortable and pleasant one, while an inhabitant of Sumatra or Borneo would tremble at the cold of our September. The same may be said in regard to animals; a white bear from Greenland, or a dog from Kamschatka, would constantly suffer from the heat, while an elephant or a naked dog

from Africa, would need to be covered to protect them from the cold.

NATURE OF HEAT. Of the nature of this universal and most important agent, there have been suggested two opinions, viz.: 1st. That it is material, or composed of particles of matter, so nearly imponderable as not to be weighed by any means in our power. 2nd. That it consists in nothing more than a quantity of matter pervading all space, and that its effects are produced by undulations. We can not now notice these theories, but merely mention them that the reader may have some idea of its nature.

ANIMAL HEAT. The real cause of animal temperature has not yet been explained, although the subject has excited considerable attention—has been an object of experiment among physiologists in all ages, and many ingenious, and some plausible theories have been invented and detailed, in order to give satisfactory explanation of its cause. Among those who have given the subject their attention, may be noticed Dr. Crawford, Dr. Davy, Dr. Turner, and Mr. Brodie. Among those theories, that invented by Dr. Crawford was, perhaps, the most plausible, and certainly the most beautiful. But that, as well as the others, have been shown to be in some respects incorrect in its leading facts, and

consequently, the theory itself cannot stand. That the oxygen of the atmosphere is one of the principal causes of animal heat, can not be doubted, from the fact, that no animal can live without it, and that the heat of animals is in some proportion to the quantity of this principle consumed. This fact is shown by birds that respire most frequently, and consequently consume the greatest amount of this gas, have a temperature of from 106 to 117 degrees, while man and the horse, which respire a less number of times, have only 98. (Liebeg's Chemistry.) But, as this principle can have no effect, except through the lungs, if it is admitted that heat is evolved there, there is still much difficulty, either why the lungs are not at a higher temperature than the other parts of the system; or if they were, how the heat could be conveyed to the other parts of the system, from its fountain.

On the whole, it appears that the cause of animal heat is one of the arcana of nature, into which man has not yet been permitted to look, and therefore, we must be contented at present to attribute it to the vital principle.

SOURCES OF HEAT. The sources of heat may be reduced to six causes, namely, the Sun, Combustion, Electricity, the bodies of living animals, Chemical action, and Mechanical action. The

sun constantly radiates heat to the earth, and is also the great source of heat to the whole solar system. Combustion ; this supplies the heat employed in the arts, and for culinary purposes. In this process the caloric is extracted from the oxygen of the atmosphere, as it unites with the burning body, and supports its combustion. Electricity : whenever two bodies in opposite electrical states are made to approach each other, so as to produce a discharge through the air, or along a non-conductor, there attends a flash of light accompanied by heat. By the action of galvanism, which is only a modification of electricity, the most intense heat hitherto discovered has been produced. Vital Action : The bodies of air-breathing animals are a continual source of heat.

INTERNAL HEAT. That heat has the power of liquifying all particles of matter, is a fact every one conversant with chemistry is acquainted with. And by referring to geology, we are informed that the internal matter of which the earth is composed is in a fluid state ; this fact is demonstrated by the melted lava which is emitted from time to time from the different volcanic mountains on the earth.

Another proof of this fact is the increase of the temperature of the atmosphere, experienced when

we descend into wells and other subterranean vaults. Again, if we examine the crust of the earth, we find it composed of layers one above the other, which shows that at some period of creation the whole mass of matter comprising the body of the earth was in this fluid state, and that this fluid mass has been cooled through the influence of some element of an opposite nature acting upon it; and the force of cohesive attraction and gravitation acting upon these cooling particles, has brought the crust of the earth to its present consolidated form. The further we descend into the bowels of the earth towards the center, the higher the temperature becomes. The average increase of heat throughout the world, so far as the experiment has been tried, has been found to be about 45 feet for each degree; then supposing the temperature on the surface to be 50 degrees, a heat sufficient to boil water would be found, at the depth of one mile; at the same rate a heat of 7000 degrees would be obtained at the depth of 48 miles, and continuing the preceding ratio, the heat at the center of the earth would amount to 757,000 degrees. A heat far greater in intensity than we have any conception of. We have been thus particular in describing the nature, property, and source of this universal and useful element, from the

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important office it performs in every part of creation. Its influence upon the growth of men, animals, and vegetation, is illustrated by comparing the products of the animal and vegetable kingdoms of the frigid zones with those of the torrid. Where its invigorating influence is withheld the diminutive size of the object is immediately perceived; men instead of possessing that vivacity and that mental and muscular prowess that characterize those who live in the torrid zone, are of a dull, sluggish disposition, and totally incapable of performing any noble action, dwarfish in size, and in every way disgusting in their appearance. The same remark is equally true with respect to the animals of the different zones; and if we compare the vegetable kingdoms of the two places together, the difference between them is more perceivable. Instead of the magnolia, the bannian, and the beautiful palm trees of the torrid zone, nothing but a few stunted birches and some scattering pines, appear as signs of vegetation to cheer the weary traveler in his toilsome journey over those lonely hills.

ELECTRICITY. That electricity is one of the principal agents employed in the construction of the material world, is certain. From the researches of geologists we learn that the ear this

the great reservoir of electricity. By investigating the properties of this element, we find its nature to be cold, and passing with immense velocity through all the work of nature, at the rate of 288,000 miles per second. Electricity is considered as an exceedingly subtle fluid, so light as not to effect the most delicate balances, and pervading all substances. It is, therefore, in its effects on other bodies only, which it is in our power to explain. The ancients knew nothing of this element as a science. They knew, indeed, that amber and glass when rubbed would attract light substances: and about the middle of the eighteenth century, it was discovered that a certain kind of stone called tourmaline, when heated, would attract feathers and hair, and that some precious stones, when rubbed would do the same. As an important science, it can claim no higher date than the age of Franklin.

THEORIES OF ELECTRICITY. Dr. Franklin supposed that all terrestrial things had a natural quantity of Electricity, but that its effects became apparent, only when a substance contained more or less than the natural quantity, which condition is effected by the friction of an electric. Thus, when a piece of glass is rubbed by the hand, the equilibrium is lost, the electri-

cal fluid passing from the hand to the glass, so that now the hand contains less, and the glass more than their ordinary quantities. These two states he called positive and negative, implying the presence and absence of the electrical fluid. But if the conductor be made to touch a negative body, then the conductor will impart a share of its own natural quantity of the fluid to that body, and consequently will contain less than ordinary; also, when one body, positively, and the other negatively electrified, are connected by a conducting substance, then the fluid rushes from the positive to the negative side, and the equilibrium is restored.

There is another theory, that of Dufay which is embraced by some writers. He concludes that electricity consists of two distinct fluids, which exist together in all bodies: that these two fluids attract each other, but that they are separated by the excitation of an electric, and that when thus separated, and transferred to non electrics, the mutual attraction of the two electricities causes light substances to rush toward each other. Electricity may be excited by several modes: 1st. By friction, called frictional electricity; 2nd. By chemical action, called galvanic electricity; 3rd. By the action of heat, called thermo electricity; 4th. By

mesmerism. The following substances are good conductors of electricity, namely, living animals, metals, amber, charcoal, and caloric.

ATTRACTION. Another important agent employed in the construction of the material universe, is Attraction. By attraction is meant that property in bodies which gives them a tendency to approach each other, whether they exist in atoms, or in masses. Attraction has received various names, according to the circumstances under which it is observed to act. Thus, that kind of attraction that extends to all kinds and quantities of matter, and to all distances, is called the attraction of gravitation. This attraction extends reciprocally from one planet to another, and from all the planets to the fixed stars, and is the cause of the orbicular motion of the heavenly bodies. It also extends to all terrestrial masses of matter, and is the cause of their weight, and their tendency to approach each other, and to draw toward the center of the earth. The force of gravitation is directly as the quantity of matter, and inversely as the square of the distance. Thus, if one body attracts another at the distance of two feet with a force equal to thirty-six pounds, then, at the distance of four feet, will only be nine pounds, and so on in this ratio, as the distance may be. Cohesive Attraction is

that property which tends to preserve bodies in masses by acting on the particles of which they are composed. This attraction is supposed to act only at insensible distances, as when the bodies of matter touch each other. Chemical Attraction is that power which forces the particles of matter of different kinds to approach each other, and form a compound. It differs from cohesive attraction by acting upon particles of different kinds of matter. From the preceding facts we can form some idea of the important office which attraction performs in the formation of the earth: first, By drawing those particles of matter of which it is composed together; and, secondly, by causing them to adhere together after they had come in contact with each other.

OXYGEN GAS. Another agent, which we believe was employed by the Divine Architect, in the great work of Creation, is Oxygen Gas. The term oxygen, is derived from two Greek words, and signifies the generator of acids, and was formerly considered the only acidifying principle in nature. It was discovered by Dr. Priestly, in 1774. Its specific gravity is 1.11, air being 1. It is a non-conductor of electricity, like common air. Its electrical state is always negative, and when suddenly and forcibly com-

pressed, emits light and heat. It is an invisible transparent fluid, like air, and has neither taste nor smell. It is sparingly absorbed by water; 100 cubic inches will take up three or four inches of the gas. Oxygen has the most universal affinity of any known substance; it unites with all simple substances, and especially with all metals forming an extensive class of compounds, known under the name of oxides.

SOURCES OF OXYGEN. It appears from experiment that vegetation is a source from which oxygen may be obtained. Growing plants during the day, absorb carbonic acid from the atmosphere, decompose the gas, emit the oxygen of which it is in part composed, and retain the carbon to increase its growth.

HYDROGEN. Another important element to be found in the material universe, in connection with those already noticed, is Hydrogen. The name of this gas is derived from two Greek words, signifying the generator of water, because it enters largely into the composition of that fluid. It was discovered by Mr. Canendish in 1776. Its specific gravity is 0.069, air being 1. It is 14 times lighter than water, and is just 16 times lighter than oxygen gas, and is the lightest of all known ponderable bodies. Its electricity is positive.

Hydrogen may be obtained by several processes, but never without the presence of water, it being evolved only by the decomposition of that fluid.

NITROGEN. Nitrogen Gas is likewise one of the elementary substances which pervades every part of the material universe, and consequently, its properties and office will receive a passing notice in this place.

This gas was formerly called azote, which signifies life-destroyer, because no animal can live in it. The atmosphere is composed of about four-fifths of this gas. It is destructive to animal life, and is a non-supporter of combustion. A lighted candle when plunged into it, is immediately extinguished—any animal soon dies when confined in it. Yet it exerts no injurious influence on the lungs, the privation of oxygen being the sole cause of death. Its specific gravity is a little less than that of atmospheric air, nitrogen being 0.9722, air being 1000. One hundred cubic inches weigh 29.7 grains. Nitrogen exists in all animal substances and in such vegetable substances as emit animal odor during their decomposition.

CARBON. The last general principle or element, whose properties and office we shall examine, in connexion with our subject, is Carbon.

Nature furnishes carbon in its purest state in the form of that precious gem the diamond. That the diamond is nothing more than pure carbon is proved by chemical analysis. Carbon may be also produced from charcoal. This gas is unodorous, colorless, and elastic. It extinguishes burning substances of all kinds, and is so poisonous that according to M. Halle, it will destroy animal life in the space of two minutes. It is this gas which destroys the life of a person in consequence of warming close rooms with open vessels, containing burning charcoal. In such cases the air becomes noxious, from two causes ; the charcoal, by abstracting the oxygen from the atmosphere, leaving only the nitrogen, which, as we have already seen, will not support animal life. The mere absence of the oxygen would, therefore, be the negative means of destroying life. But this is not the most active cause of destruction. The air is not only deprived of its oxygen by the burning charcoal, but the oxygen uniting with the charcoal becomes an absolute poison ; this is indeed of so deleterious a nature, that, when pure, causes death by producing a spasm of the glottis, those closing entirely the passage to the lungs, ; and when mixed with the atmospheric air, in such proportions as to be taken into the lungs, it then acts as a nar-

cotic poison, producing dimness of sight, loss of strength, difficulty of breathing, then entire suspension of respiration, and finally, insensibility, apoplexy, and death. M. Foder states, that in the year 1806, a family consisting of seven persons, residing at Marseillies, were all rendered apoplectic in consequence of inhaling carbonic acid, which was extracted from an oven in the yard of the house where limestone was burning. The gas came into the house through the doors and windows; by some means it was found, during the night, that the family were in danger, and the alarm was given, but not in time for any one to escape. In the morning all the seven were found in different places, with lamps in their hands in the attitude of escape—but the deleterious gas had taken away their strength, and put out their lights. They all appeared to have fallen down of apoplexy, while attempting to escape death by flight. Five were dead beyond recovery, but the other two were brought to life. Some people, who are perfectly aware of the deleterious effects of the air arising from ignited charcoal, which is prepared in coal pits, still, unaccountably, believe that the coals from a common fire are innocent. But there is no difference in the poisonous effects of this gas, whether prepared

from the coal charred in a pit or on a common hearth.

The specific gravity of this gas is 1.52—air being 1—so that it is about one-half heavier than common air. It may be poured from one vessel to another, like water; and as it instantly extinguishes flame, lights may be put out with it in a manner which will astonish and puzzle those who are not acquainted with the secret.

The large quantities of this acid which are formed by combustion and respiration, it might be supposed would increase the quantity in the atmosphere, particularly in crowded cities, so as to make the air poisonous. But the wisdom of Omnipotence has prevented the accumulation of this gas in particular places, in consequence of its specific gravity; for experiment shows, that notwithstanding the great difference existing among them, they all mix uniformly. Hence, by this wonderful provision, or exception to the general law of gravity, this gas, though extricated in immense volumes in the open air, soon diffuses itself on all sides, and mixes with the surrounding atmosphere, so as seldom to prove deleterious by local accumulation.

ATMOSPHERE. The Atmosphere which we breathe is composed of 20 parts of oxygen and

80 parts of nitrogen, to every hundred by volume.

These proportions are found never to vary, except from local causes. Gay Lussac, in an aerial voyage, carried with him an exhausted bottle, closely corked, and when at the height of nearly 22,000 feet from the earth, he uncorked the bottle and let in the air. It was then closely corked again, and brought to the earth. On examination, this air was found to contain precisely the same proportions of the two elements as that taken from the surface of the earth. Specimens of air have also been brought from Chimborazo, Mount Blanc, from the deserts of Africa, and from the midst of the ocean, and on analysis they have all been found to contain the same proportion of the two gases.

These proportions are found by experiment to form the most agreeable air for respiration, and to be the best fitted for the support of animal life. Animals confined in air, containing more than the ordinary proportion of oxygen, have their respiration hurried and become feverish by over excitement; while those confined to air containing a less proportion of that gas become languid and faint from the want of its stimulating effects.

Besides these two gases, the atmosphere contains variable portions of carbonic acid gas and aqueous vapor. Saussure found it in the air of Mount Blanc, taken from the height of sixteen thousand feet above the level of the sea. Its proportions never exceed one part in 100 in freely circulating air.

The oxygen of the atmosphere being the principle which supports life and flame, it is obvious that large quantities of it must be consumed every day, and therefore that its quantity must diminish, unless there exist some source from which it is replaced. The quantity consumed, however, must be exceedingly small, in a definite period of time, when compared with the whole, for the atmosphere not only surrounds the earth, but it extends above it, at every point, about forty-five miles. Now when we consider how small a portion of this immense mass comes into contact with animals or fires at any one time, and that it is only these small portions that become vitiated, we may suppose that ages would elapse before any difference could be detected in the quantity of oxygen, even were there no means of replenishment provided.

But the wisdom of the Deity is manifestly displayed in providing for the replenishment of

this universal element which is ordained to promote the happiness of mankind, by causing it to originate from vegetation. (See Oxygen).

When wood or carbon is burned, oxygen is thereby converted into carbonic acid gas, and a greater or lesser portion of this gas contained in the atmosphere may be attributed to this source. Here, then, we are able to trace another instance of the order and design of Omnipotence. The destruction of plants by burning, while the process absorbs oxygen from the air, furnishes carbonic acid, which, in its turn, is decomposed by growing vegetables, the carbon being again converted into wood, while the oxygen goes to replenish the loss created by the burning and to purify the atmosphere for the use of man.

WATER. We will next notice the chemical properties of that useful element, Water. The purest water, not having undergone distillation, is that which is obtained from the clouds. It is transparent, and without either taste or smell; and being perfectly bland and neutral, it is to all animals the most agreeable of drinks.

The weight of water is the standard by which the weight of all solids and liquids are estimated. The weight of a cubic foot of pure water is $62\frac{1}{2}$ pounds avoirdupois. At a tem-

perature of 60 degrees, oxygen and hydrogen unite in proportion of 1 to 8 to form water. The effect of temperature upon liquid water is distinguished by a peculiarity of a very striking kind, and exhibits a departure from the general laws of nature, for a purpose so obviously wise and beneficent, as to afford one of the strongest and most impressive of those endless proofs of design and omniscience in the frame of creation, which it is the most exalted pleasure of the chemist and naturalist to trace and admire.

Water, in its natural state, always contains a quantity of air. This may be shown by placing it under the receiver of an air pump, for as the air is removed from the receiver, bubbles will be seen to rise from the water. The air in water is found to contain a larger quantity of oxygen than the common air of the atmosphere. The lives of all such fishes as live entirely under water depend on the quantity of oxygen it contains, as no animal can exist without it. Although water contains a considerable quantity of air in its natural state, amounting to 2 cubic inches to 100 of the fluid; yet it absorbs some of the artificial elastic fluids with great avidity, and a few of them in great quantities.

VEGETABLE CHEMISTRY. Notwithstanding the great diversity of plants existing in the

vegetable creation, the elements of which they are composed are exceedingly few in number, therefore, the great variety which we observe in plants, and their different parts, must arise from the different proportions in which these few elements unite.

The constituents of vegetables are carbon, hydrogen, and oxygen, and the great variety which we observe in the texture, color, taste, smell, hardness, &c., as well as their several parts, such as flowers, seeds and fruits, arise from the different composition of these elements. From the account given by a great Swedish naturalist there are 100,000 different species of plants growing out of the earth. The essential organs of plants are, the root, stem, leaves, flowers, and seeds. The root serves to attach the plant to the soil. The stem which is usually erect, serves to elevate the leaves, flower and fruit from the ground, by which they are exposed to air and light. The leaves are the respiratory organs of the plant, and the flower performs the important office of giving rise and nourishment to the seeds, by which the plant is reproduced.

VEGETATION. Germination of seeds. The circumstances necessary for a healthy germination and growth of plants is a proper access to

air and temperature above 32 degrees, and below 100 deg., with sufficient moisture. Seeds will not vegetate without the aid of these agents, as has been proved by experiment. Seeds planted at a temperature below 32 will not germinate, though not absolutely killed by the frost. Nor will seeds vegetate without the contact of air, though both heat and air be present. This is known by burying seeds in the earth, where they have been known to lie for years, and even for ages, in a torpid state, for want of the germinating power of oxygen. Experiments have proved that seeds will not grow under any circumstances without the presence of oxygen, although it appears that a very small portion of this gas is necessary for this purpose. It being thus certain that seeds will not germinate without the aid of oxygen, it need hardly be stated that the future growth of the plant must require the presence of the same principle. The fact that plants absorb carbonic acid was first discovered by Dr. Priestly. But subsequent experiments have shown that pure carbonic acid stops the growth of plants, but that a small quantity is absolutely necessary to healthful vegetation. If a growing plant be exposed to the sun in a glass vessel filled with water, it constantly emits from its leaves small bubbles or

air, which, on examination, are found to be oxygen gas.

Plants, during the night, or when the light of the sun is withdrawn, absorb oxygen, and form with it carbonic acid, a part of which they emit, and a part is retained. According to experiments made by Dr. Hales, a cabbage during the day will transmit a quantity of water nearly equal to half its weight. The great effect of dew or sprinkling water has upon flowers, is a proof that the leaves imbibe moisture. In addition to heat, moisture, oxygen and carbonic acid, healthy vegetation requires a certain amount of light. This is proved by the disposition plants have to incline towards the light, when it is stronger in one direction than another.

RECAPITULATION OF VEGETABLE CHEMISTRY.

—Vegetable substances are chiefly composed of carbon, hydrogen, and oxygen, but sometimes certain portions of nitrogen.

Healthy germination does not proceed without the combined presence of heat, water, and oxygen.

Seeds will not germinate in a vacuum, or in any gas which does not contain oxygen, though heat and moisture be present.

Plants receive nourishment from the air as well as from the earth. In the day-time plants

absorb the carbonic acid, retain the carbon, and emit the oxygen. In the night they absorb oxygen, and give out carbonic acid. Plants do not live without they are permitted to absorb oxygen during the night; nor will they live unless they absorb a portion of carbonic acid during the day.

Vegetation will continue for some time, either in carbonic acid or oxygen gas.

Healthy vegetation absolutely requires the agency of light. Plants which grow in the dark are white. They show their propensity to enjoy the light by leaning or creeping toward it. Plants growing in the dark do not absorb and decompose, but emit carbonic acid, and hence they contain a deficiency of carbon.

Observation. We have now briefly noticed the elementary principles of which the atmosphere and water is composed, and by chemically analyzing the body of matter which composes the surface of the earth we find these same principles existing there in abundance. This fact is also demonstrated by Vegetable Chemistry, from the circumstance that as the whole vegetable creation is alone composed of these gases; and as each seed germinates in the earth, and each plant proceeds from the earth, and receives its nourishment from it and the surrounding elements:

It is evident, I say, from this consideration, that all earthy matter is composed of the same principles which form the surrounding elements.

ANIMAL CHEMISTRY. In relation to Chemistry the circumstances which distinguish animal from vegetable substances are the large quantity of nitrogen which the former always contain, their strong tendency to putrefaction, and the offensive products which they exhale during decomposition.

Animal substances are essentially composed of carbon, hydrogen, oxygen, and nitrogen; and in addition to these they sometimes contain sulphur, phosphorus, iron, and small quantities of saline matter.

FIBRIN.—The lean part of animals consists chiefly of fibrin, which is composed of 18 parts of carbon, 14 of hydrogen, 5 of oxygen, and 3 of nitrogen.

The fat of animals is very analogous in its composition and proportions, to the fixed vegetable oils, its ultimate principles being carbon, hydrogen, and nitrogen.

There is a considerable variety in the appearance and generalities of the fatty principle contained in different animals. The solid fat of land animals is called tallow, while the corres-

ponding substances from fish, which is fluid at common temperature, is called oil.

All these substances agree very nearly in respect to composition, the principal difference being in respect to form and appearance.

Observation. From the preceding analysis we find that not only the atmosphere, and water, and vegetable substances are composed of these elementary principles which we have before noticed ; but also the earth, and the animal organization of the human frame is composed of the same agencies. Perhaps the enquiry may suggest itself to the mind of the reader, What is the necessity of investigating all the properties and offices of these Elementary Principles, as you are pleased to call them, merely for the sake of discovering the origin of man ? I admit that it may at first appear rather a strange course of procedure, but a little reflection upon the subject will justify the course we have taken.

REASONS ASSIGNED WHY MAN WAS CREATED FROM THE DUST OF THE EARTH.

From the Scriptures we learn that God made man out of the dust of the earth ; but of the manner of the creation, the length of time required to perform that creation, or the agencies employed to produce the work, the sacred his-

torian does not inform us. Hence, if we desire information upon this subject, we must obtain it from some other source. The Almighty having seen fit in his wisdom to endow man with the power of investigating natural subjects, and judging of cause and effect; and in order to elevate him still higher in the scale of intellectual existence, the Almighty also granted him the desire to search after and obtain a knowledge of the wisdom, power, and wonders of creation by investigating the works of nature. Hence, man having the power, and desire, and the means of obtaining a knowledge of his Creator, all placed within his reach, he has become a secondary cause of his own moral and intellectual elevation, not only here in time, but also in eternity. For it is evident that as these desires originate in our moral nature, and proceed from a good source, they will not only accompany us to a higher state of felicity, but will also attend our immortal principle or spirit throughout the rounds of eternity, where they will enjoy a boundless range of space for their expansion, and undoubtedly an endless variety of objects and scenes for their contemplation, untrammelled by those natural weaknesses and impediments which continually retard our intellectual march in this world. Upon this principle of

progression who can contemplate the boundless extent of space over which the immortal mind will range, while enjoying the eternal felicity which can be obtained from no other source, save of a continual companionship of angels, archangels, "and the spirits of those who have washed their robes and made them white in the blood of the Lamb." Thus we find a reason why the Almighty adopted this course which we have supposed in the construction of the material universe, in order that man, either by revelation or nature, or by both combined, may have a perfect knowledge of the wisdom, power, and beneficence of the Creator, in his dealings to man, so far as the moral and the intellectual enjoyment of man is promoted, either in time or eternity, by being in possession of this knowledge. Who, then, can go through the field of scientific knowledge, as it lies open before him, and not wonder at the power, goodness, and condescension of the Creator, in bringing the system and order, as well as the agencies employed by which, and with which, the mighty fabric of creation was formed, to the comprehension of his finite creature, man; and for no other reason that we know of, only that man might be perpetually happy in contemplating the goodness of his Creator.

But another reason why we think this course was adopted by the Almighty in creating the universe : Man has ever been prone to scepticism wherever he imagined the least shadow of a doubt to exist, and more particularly with regard to the truths of revelation than almost any other subject. The history of the ancient Jewish nation is an illustration of this fact in that age of the world ; and at a still later period the French have shown to the world that the same principle still exists. Even in this hemisphere, and in the present day, notwithstanding the light which modern travellers and historians have thrown upon many passages of scripture, we see many who affect to discredit many of the truths contained in the sacred pages. If, then, there can still be found a lurking place for the sceptic concerning the authenticity of the scriptures, what room might they not have had for caviling if the works and operations of nature did not prove the existence of a great First Cause. But by the present arrangement the works of nature become a key to revelation, so that though man were ever so much disposed to doubt the truths of the latter, the operations of the former are so comprehensible in all their parts, and every plant, tree, shrub, and animal is produced and brought to maturity by such a regular and

systematic course, that all scepticism concerning the existence, power and wisdom of Jehovah, must inevitably come to naught ; for it is certain that Chance could never have formed such a magnificent, yet complicated structure as the material universe.

Again, the Almighty designed that man should become a responsible being, and in order that man should be an accountable creature to his Creator for the improvement or misimprovement of the time allotted to him here, it was necessary that he should be so situated as to have the opportunity of obtaining all the needful knowledge concerning the attributes of Jehovah, and man's dependence upon His bounty, as should call forth the warmest expressions of gratitude from the creature, and the most humble and devout submission to the divine will and government. And yet, after all the Almighty has done for the present and future happiness of his intelligent creatures, and the convincing proof they have so often had of their own utter helplessness, and of the beneficence of the Creator ; still in the day of prosperity how quick they are to forget all his benefits, and betake themselves to the giddy and vain things of time and sense, and boast of their

own strength, rather than acknowledge the goodness of God.

If man will then be so ungrateful still to his Creator, after all these proofs of Omnipotent goodness and power, and of his own accountability for his conduct here on earth, who dare set bounds to the demands of retributive justice, or say to the Almighty, "Thus long shalt thou punish such ingratitude, and no longer?" If man is so unwise, and exhibits such unprecedented folly by his conduct with regard to what most tends to promote his future happiness, he is certainly equally incompetent to judge of the amount of punishment due him for his ingratitude to his Creator; and as the laws of nature can furnish us with no means of judging of its extent, all conjectures concerning its duration is imperfect, except drawn from revelation alone.

Again, the Almighty is a reasonable being; and he has given abundance of proof of this by the works of creation. By this we know that he who created all is Lord of lords, and King of kings; and by this, too, we know that it is no vain thing to serve God, that he is before all things, and by him all things exist.

Hence we discover, by thus tracing the works of creation from their original essences to that

noble creature, man, that God is a God of order, and not of confusion, which illustrates the truth of that remark that God is "too wise to err." From the preceding facts and reasons we come to the conclusion that considering the attributes of Jehovah, as displayed by revelation and the works of nature, that the position we have undertaken to prove with regard to the construction of the universe, is the only one that will correspond to the account or description of his character and attributes as described by the sacred writers. We see that in order that there may be left no room for scepticism with regard to the existence of Jehovah, that the Scriptures and nature exactly coincide in establishing the fact beyond all controversy; and the works of nature teem with evidences that he fully possesses every attribute of power, wisdom, order and beneficence which the Scriptures ascribe to him; and the whole mystery, so far as our happiness can be thereby promoted, brought to the level of human comprehension.

Time will not permit us to carry our investigations and reasonings any further. Enough has already been said to convince the reader that the ground we first took was not altogether untenable. In conclusion, let us enquire which looks or appears to be the most reasonable and

systematic course for the Almighty to proceed, as we have supposed, in the construction of the universe, or to speak it at once into existence. He brought those different elements into existence, and by his wisdom brought them together to form the different elements which compose the material universe. We do not wish to be understood to deny that God is able to create the world from nothing ; but we disbelieve that he adopted this course, as it seems incompatible with his wisdom. Again, it seems unreasonable to us that those elements which we have before noticed should be in existence before the work of creation was commenced, and pervade all particles of matter, and yet not be instrumental in producing any part of the Almighty's works. Again, as we have before remarked, that it was not for the want of time that caused the Creator to hasten on his work—for he was before all things, and eternity itself was at his disposal—it would not promote his glory by forming the work instantaneously ; neither would it make any of his creatures adore and wonder at his power and might, by being thus kept in ignorance of his plan of creation. Neither does Geology give us any intimation of any instantaneous creation ; but, on the contrary, gives every evidence against such a course

being pursued. From Geology we find the earth below the surface is composed of layers or portions of its matter, which have at some time, some period or another, been once in a fluid state; and by the power of radiation this fluid matter, which was made so by heat, has been cooled off, and become solid earth; but by no known principle of radiation at the present day could this fluid mass be cooled off instantaneously; neither was this the case, for if it had been so, the earth would have presented the same appearance as the ground around the summit of a volcano, after the melted lava which it has emitted has been cooled off; but that it has been cooled by a slower process is evident from the regular succession of layers of earth which compose its body. Hence from no source or argument that we can adduce from nature can we find any proof that the world was created in the short space of six days, each of 24 hours duration; and not only this earth, but likewise everything pertaining to it, with the solar system, and the numerous host of worlds which are spread out in that broad expanse of space which are stretched far beyond the power of the most powerful telescope to discover, for it is said in Scripture that he made the stars also. I am aware that the Scripture informs us that in six

days God made the world, but how long those days were we are not told, and from this fact many have supposed that the days mentioned in the Bible were of the same length as they are now; but this could not have been, for it was not until the beginning of the fourth day that the sun was put in the firmament, to rule the day; hence time was measured by some other mode, which we find to be light and darkness, and how often these divisions succeeded each other we are not informed. From these considerations, then, we cannot see in what way we are doing any injustice to the Scriptures, or the writers of them, to suppose that the world was not created in six literal days.

Having, as we think, satisfied the objector as to the probability and plausibility of the truth of our position, in supposing that the universe was created out of those elements which we have before noticed, we will now notice those days of creation called the Demiurgic days.

DAYS OF CREATION.

As we have before observed, the term day, in Scripture, does not always signify a period of time of 24 hours duration, but sometimes a much longer period. See Luke xvii. 24, and several other passages, as proofs.

Bishop Horsely and Professor Jameson suggest that the revolution of the earth on its axis was at first inconceivably slow, and that it did not acquire its present rate until the fourth day, so that the first four days was of vast duration. (Philosophical Magazine, vol. 46, page 227 ; also vol. 243.) Still more recently this theory has been ably elucidated by Dr. Keith, in his *Demonstrations of the Truths of Christianity*, page 147. Others, as Professor Hensler, in Germany, and Professor Bush, in the United States, suppose that each of the days of creation called the demiurgic days, as the representation of distinct periods of time, and perhaps of unequal lengths. (Biblical Repository, vol. 6, page 236.)

That there was some other division of time beside day and night is certain, from the fact that it was not until the fourth day that the Almighty placed the sun in the firmament. Moses tells us that the division of time adopted was light and darkness, and how often these periods succeeded each other he does not inform us. These interpretations agree very well with the cosmogonies of many heathen nations—as the Etruscans and Hindoos ; their ancient traditionary tales represent these demiurgic days as immense periods, which, says Professor

Jameson and others, developes a striking coincidence between the epochs of creation, as described by Moses, and Geologists. (Blakewell's Geology, page 450.) For a fuller investigation of the preceding theory consult Faber's Treatise on Providential and Christian Dispensation; DeLuc's Letters on the Physical History of the Earth; Blakewell's Geology, by Professor Silliman, page 436; American Biblical Repository, for October, 1835; Buckland's Bridgewater Treatise, vol. 1, 2d edition, page 597. Some suppose that the Mosaic account of the creation is a pictorial representation, having truth for its foundation, but not to be taken as exactly and literally true. (Knapp's Theology, vol. 1.) It is maintained by some able writers, such as Dathe, Doederlin, &c., in Germany, Milton in England, and Professor Bush, in the United States, that the language employed by Moses in the first chapter of Genesis does not mean a creation of the world out of nothing, but only a renovating or remodelling of pre-existing materials. Such writers admit the existence of the globe during an indefinite period, before the six demiurgic days. The Scripture phrase, "In the beginning," is certainly indefinite as to time; and therefore Moses, in Genesis, does not fix the time of the original creation, and therefore it is

doing no violence to his language to admit this long intervening period between the creation of the universe and the creation of man. This view of the account of the time given in Genesis has been adopted in essence by many christian writers, both ancient and modern, among whom may be reckoned, Augustine, Theodoret Rosenmuller, sen., Bishop Patrick, Buffon, Hamilton, Dolomieu, Faujas D. St. Fond, and others. If such an interval be admitted, it is entirely sufficient to reconcile the Scripture and geological accounts, because during that interval all the fossiliferous rocks, except the alluvia, might have been formed.

Astronomy shows that probably some of the planets undergo similar changes, to become habitable globes, so that the universe itself is affected by the change. Dr. John P. Smith, late head of a Theological Seminary, in Homer-ton, near London, supposes that the first verse of the first chapter of Genesis only refers to the collecting together of the materials or elements, and that the formation is only of a small part of the present habitable globe. That the parts of the earth fitted for the abode of intellectual life, lying between the Caucassian mountains, on the Caspian sea, and Tartary on the north, and the Persian and the Indian seas on the

south, and the high mountain ridges which run at considerable distance on the eastern and western flank. That the Noachean deluge was limited to that part of the world then inhabited, and, consequently, we need not look any farther for its effects.

We have been thus careful to give the author from whom we have taken the above extracts for the reason that some may think these ideas were some wild speculation of the author's own invention ; but if it be known that they originated in the minds of those theologians who are admired for their profound reasoning on the truths of revelation, the ideas and arguments would receive that weight which they deserve. However, be this as it may, certain it is that some of the above arguments look quite as reasonable as the supposition that the world was made in six literal days, and especially so, if we take the works of nature for our guide ; for if we descend into the bowels of the earth we shall find facts that will argue strongly against the supposition of an instantaneous creation. That the land is increasing in extent in many parts of the globe, on the shores of many of the seas and rivers, is certain. From the accounts of travellers we learn that along the river Nile, and the coast of the Mediterranean, cities that

formerly stood by the water side are now several miles from it. Again, many islands have risen out of the midst of the ocean, of several miles in circumference; also fossil remains are found several feet below the surface of the earth; the remains of cities and fortifications, and monuments of art, have been excavated from the earth, which has collected upon them even since profane history has received an authentic shape. All of these facts go to prove that the surface of the earth has not yet received all the additions of land which may yet belong to it; or in other words, that the land on the surface of the earth has not reached its utmost extent. If, then, such changes have occurred in the formation of the land on the surface of the earth, within a few centuries, or a couple of thousand years, upon the same principle of progression what might not have been those changes which probably took place during a period of several thousand years that the world was probably in existence before it became fit for the abode of man. That there have been great changes in the animals, or in the climate, is certain; whether that change was the effect of the deluge, or produced from some other cause, is not known. As proof of this, the remains of the carcasses and tusks of

elephants have been found in a fossil state on the shore of the White Sea, in the northern part of Russia ; these tusks have been found in such abundance that the principal part of the ivory used by the inhabitants of Moscow and St. Petersburg was brought from that place. Again, the fossil remains of the Hyena have been found in England, and it is well known that neither of these animals can exist at the present day in either of these places, nor have they been able to do so, from their difference of constitution, or in other words the temperature of these places would not admit of the existence of these animals there, in a wild state : hence, the change in one or the other must have been very great ; and as these and similar changes are still going on, they probably have been since the first particles of matter were brought into existence.

Having chemically analyzed the body of matter of which the earth is composed, we have found that the earth and surrounding elements are all formed of the same universal principles, from the circumstance that these principles pervade all particles of matter ; we have thereby shown that the world was not formed out of nothing, as many have supposed. But it may

be asked, What does it signify to us to know whether the world spoken into existence at once by the power of God, or whether those agents were employed? In reply we would ask if it is of no consequence to us whether we believe in truth or error? If one is as good as the other, then we have labored in vain. Upon the same principle, then, the labors of the missionary are vain; and all efforts to moralize the world are equally vain; but as it is admitted that error is productive of evil, is it not a matter of great consequence to us whether we believe in truth or in error? But the evil of ignorance is progressive, and one error always leads to another; hence it is that we often see discord and strife abroad in the world, the peace of society destroyed, nay, even civil war and bloodshed itself originating from one single error. In the present case, however, the error may not, it is true, lead to such events; yet it leads to the evil of supposing that the plan and works of creation are all beyond our comprehension, and consequently involved in mystery; and we thereby deprive ourselves of the possession and enjoyment of a fund of useful knowledge that we might have obtained had we believed otherwise, and investigated the works of nature as we

ought and probably would have done. Another position we have proved is that the works of nature are governed by certain fixed and unchangeable laws, which were established upon reasonable principles, and accounts for many of the wonders and phenomena of nature which to the ancients were nothing short of miracles. It also demonstrates the truth of the Scripture declaration that God is a God of order, and not of confusion. By these investigations we are able to form higher conceptions of the attributes of Jehovah than we would otherwise do were we ignorant of these facts. Our minds, too, are freed from the apprehensions of evil that would frequently take possession of them at some strange appearance of the sky, of a comet, or an eclipse, if we did not know that all these appearances and changes were produced by the operations of these laws, and consequently these changes were productive of good instead of evil. It is a well known fact that fear produces torment; then if the study of the works of nature were productive of no other good, it would dispel many of the groundless fears that fill the minds of the ignorant.

Again, we have shown that in all the works of creation there has been throughout the whole

plan a regular systematic course of progression, which shows us that the Creator not only possessed unlimited power, but also matchless skill and wisdom ; and, therefore, Chance has had nothing to do in the work. Hence, as we have before remarked, all scepticism concerning the existence of the Deity, in reality, must be forever silenced, and the christian can have the consolation of knowing that he is acting forever under the eye of an all-wise and beneficent Creator, who watches over his life and protects him from all harm ; and he has also an inward assurance that after a few years of probation in this world have come to an end, he has inward principles, an immortal mind, a strange mysterious something, within this earthly tenement, implanted there by his Creator, that will be transplanted to a higher state of intellectual felicity, where he will forever wonder and adore the glories of creating power.

With regard to the time of the creation, and the length of time it took to perform it, all we have to say is, that the reader has been presented with suppositions respecting it, and the causes or theories upon which these suppositions were founded, and he is now left to form his own opinion concerning their merits : if they

will coincide with the laws and regulations of nature, they will certainly deserve some credit; if not, they will receive their deserts by being cast aside as wild and chimerical speculations.

Having now traced all the works of nature, as well as man, to its original essence, and given our reasons for doing so, we will endeavor to investigate the structure of the animal frame, as that is the casket of the immortal mind, by which an intercourse is held with the material world.

PART II.

ANATOMY OF THE HUMAN BODY.

GENERAL REMARKS.

Anatomy is a description of the organs or parts of a body.

The teeth, stomach, and heart are some of the organs of the human body.

Physiology is a description of the functions or use of the organs. Anatomy and Physiology are divided into two kinds—Animal and Vegetable.

Animal Anatomy and Physiology are again divided into Human and Comparative.

Human Anatomy and Physiology describe the structure and functions of the organs of man.

Comparative Anatomy and Physiology describe the structure and functions of the organs of other animals than man.

Hygiene is the art of preserving health, or that department of medicine which treats of the preservation of health.

THE BONES.—The bones are firm and hard, and of a dull white color. In all the higher

order of animals, among which is man, they are in the interior of the body; while in lobsters, crabs, &c., they are on the outside of the body, forming a case, which protects the movable parts from injury.

ANATOMY OF THE BONES.—There are two hundred and forty-five bones in the body of man, besides the teeth. These, for convenience, are divided into four parts, viz.: The bones of the Head, the bones of the Trunk, the bones of the Upper Extremities, and the bones of the Lower Extremities. The bones of the head are divided into those of the skull, ear, and face. The skull is formed of eight bones; these are joined together by ragged edges called sutures.

Observation. The sutures stop, in a measure, the jars caused by external blows. Children should never strike each other upon the head, as the bones in the skull are then softer than in adults.

In the ear are four small bones—they aid in hearing. In the face are fourteen bones—they support the softer parts outside of them. The trunk contains fifty-four bones, twenty-four ribs, twenty-four bones in the spinal column, (back-bone), four in the pelvis, sternum, or breast-bone, and one at the root of the tongue.

All the ribs are joined to the spinal column. There are twelve on each side. The seven upper ribs are united in front to the sternum by a yielding substance called a cartilage—gristle; the remaining five are not attached directly to the sternum—three are joined to each other by cartilage, two are not confined; hence they are called “floating ribs.” The cavity formed by the sternum, ribs, and spinal column is called the chest. It contains the heart, lungs, and large blood vessels. The shape of the chest is conical, or like a sugar loaf.

Observation. The lower part of the chest is broader and fuller than the upper part, unless it is made smaller by tight lacing.

The spinal column is composed of twenty-four pieces of bone. Each piece is called a vertebra. Between the vertebra is a thick piece of cartilage, which springs like India rubber; this not only unites the vertebra, but permits them to move in different ways. There is an opening in each vertebra; by a union of these openings a canal is formed the whole length of the spinal column, in which the spinal cord, or pith of the back-bone is placed.

Observation. A good idea of the structure of the vertebra may be obtained by examining the spinal column of a domestic animal.

The spinal column is a very curious and perfect piece of mechanical art; by its structure great strength and flexibility are combined. The vertebra are so firmly joined together that they are seldom dislocated without fracture.

The pelvis is composed of four bones. They are so arranged as to form a long basin. The spinal column rests on these bones, and they also serve to support the lower extremities. In the sides of these bones is a deep, round cavity, called *a-ce-tabulum*, in which the head of the thigh-bone is placed.

The upper extremities contain sixty-four bones—the scapula, or shoulder-blade; the clavicle, or collar-bone; and the bones of the arm, fore-arm, wrist, and hand. The scapula is a broad, irregular bone, situated upon the upper and back part of the chest. The clavicle is a thin bone at the base of the neck; it is joined at one extremity to the sternum, at the other to the scapula.

Observation. The use of the clavicle is to keep the arms from sliding toward the breast. Children should frequently throw their arms backward, as this exercise would increase the length of this bone, and also enlarge the chest. The arm is formed by a single bone, this is called the *hu-mer-us*.

The fore-arm is formed of two bones—the ulna and the radius—the one on the inside and the other on the outside, on which the thumb is placed. By a beautiful arrangement of these bones the hand is made to turn, and permits its varied movements.

The wrist is formed of eight irregular bones, which move but little upon each other.

The hand consists of nineteen bones—five in the palm, and fourteen in the fingers and thumb. Each finger consists of three bones, of different lengths; the thumb has but two. Proofs of a divine and all-wise Creator are nowhere more visible than in the formation of the human hand.

The lower extremities contain sixty bones—the femur, or thigh-bone; the patella, or kneecap; the tibia, or shin-bone; the fibula, or small bones of the leg; and the bones of the foot.

The femur is the longest bone in the body. It supports the weight of the head, trunk, and upper extremities. The tibia and fibula are situated between the knee and ankle. The foot is formed of twenty-six bones—seven in the instep, five in the middle of the foot, and fourteen toe-bones.

Observation. The bones of the foot are so united as to give it the form of an arch, convex

on its upper surface, and concave on the lower surface.

The bones consist of animal and earthy matter, the earthy matter being phosphate and carbonate of lime. To show the animal without the earthy matter of the bones, immerse a slender bone for a few days in a weak acid, one part muriatic, and six parts water; it can then be bent in any direction. To show the earthy without the animal matter, burn a bone in clear fire for a short time, and it will become white and brittle.

Joints form an interesting part of the body. They are composed of the extremities of two or more bones, cartilages, synovial membrane, and ligaments.

Cartilage is a smooth, solid, elastic substance that covers the ends of the bones that form a joint. It prevents the ends of the bones from wearing off, and also diminishes the jar that the joints receive in walking or leaping.

The synovial membrane is a thin membranous layer which covers the cartilages, and is thence bent back upon the inner surface of the ligaments which surround and enter into the composition of the joints. This membrane forms a closed sac.

The ligaments are strong unelastic substances ; they serve to connect and bind together the bones of the body.

Observation. The joints of the domestic animals are similar to those of man in their construction. To illustrate this part of the body a fresh joint of a calf may be used.

PHYSIOLOGY OF THE BONES. The bones are the frame work of the body. They support all the soft parts of it, as the flesh and vessels, and likewise afford a firm surface for the attachment of the ligaments. The use of the various bones is different : some protect organs, as those of the skull and chest ; while others are used when we move, as those of the spinal column. The bones are covered with a firm skin called periosteum. This membrane and the bones, when healthy, give but little pain ; but if wounded, as in "felons," the pain is very severe. The joints are supplied with a fluid synovia. This acts like oil upon a machine. By the smooth cartilages and synovia the joints are enabled to bear all their motions during a great number of years. The joints vary in their functions : some are movable, others are immovable. The union of the spinal column with the skull is one of the most ingenious contrivances to be met with in

the body, permitting its motion of nodding, bowing and turning the head from side to side. This admirable piece of mechanism affords great protection to the spinal cord at the top of the neck, this being, perhaps, the most vital portion of the whole body ; injury to it, or pressure upon it, is instantly fatal. Some joints move but in one direction, like the hinge of a door, these are called hinge joints ; others move in different directions, like a ball in a socket, as the shoulder and hip joint.

Observation. The more movable the joint the less firm it is, and the more easily dislocated. It is for this reason that the shoulder joint is more frequently put out than any other in the body.

THE MUSCLES. All the great motions of the body are caused by the movement of some of the bones which form the frame work of the body ; but these, independently of themselves, have not the power of motion, and only change their position through the action of the other organs attached to them, which, by contracting, draw the bones after them. These moving organs are the muscles.

ANATOMY OF THE MUSCLES. A muscle is composed of many little strings called fibres.

Some of these fibres run in straight lines, others spread like a fan, while some are inclined like the feathery part of a quill. Towards the extremity of a muscle the fibres unite, and form a substance of a whitish color, harder and tougher than the muscle; this is called a tendon, or sinew.

Observation. A piece of boiled beef, or the leg of a fowl, will illustrate the structure of the fibres and tendons of a muscle, with the attachment of the tendons to the bones.

Tendons have different shapes. Sometimes they are long, slender strings; sometimes they are short and thick; again, in other situations they are thin and broad. They serve to fasten the muscles to the bones and to each other.

Observation. When the synovial membrane, which forms the sheath of the tendons, is ruptured, and the synovial fluid escapes, it is called a weeping sinew; on horses it is called a wind gall.

In some parts of the body there is but one layer of muscle over the bones; in other parts there are five or six layers, one above the other. They are separated by a thin whitish membrane, called fascia. In general the muscles form two

layers about the bones, called the external and deep sealed, or those nearest the bone. There are four hundred and forty-six muscles in the human body; to these, and the fat that surrounds and fills the spaces in the muscles, we are indebted for the roundness of our limbs.

Observation. When we are sick, and cannot take food, the body is fed with this fat; the removal of it into the blood causes the sunken cheek, hollow eye, and prominent appearance of the bones after a severe sickness.

When we look at this "harp of a thousand strings," and mark the rapid, complicated, yet accurate movements it performs in a day, our thoughts are lost in wonder in contemplating this superb and intricate machine, framed by the divine Architect.

PHYSIOLOGY OF THE MUSCLES. Every motion of the body is made by the contraction of the muscles, from the firm and steady step of the soldier, to the light and fairy-like step of the dancer.

Illustration. The muscles are to the bones what the ropes are to the sails of the ship; by their action the sails and yards are changed; so, by the action of the muscles, the position of the bones of the body is changed. Each fibre of the several

muscles receives from the brain, through the nervous filament appropriated to it, a certain influence called nervous fluid. It is this that induces contraction; they are full, hard, and more prominent when they are contracted than when they are relaxed. It is a suspension of this fluid that causes relaxation of the fibres. The eyebrows are elevated or raised by the contraction of the muscles on the forehead. The eyes are closed by the contraction of the muscle that surrounds them. The spinal column is kept erect by the muscles at the lower and back part of the trunk. The body is bent forward and the ribs brought down by the contraction of muscles on the front and lower part of the trunk. The muscles that bend the lower limbs, at the hip, are situated at the lower and front part of the trunk, and the upper and front part of the thigh.

The lower limbs are extended at the hips by the muscles on the lower and back part of the trunk, and the upper and back part of the thigh.

Observation. It would weary the patience of the reader, and be uninteresting to him, to know the location of each muscle that governs every motion of the body. It, however, would be a profitable exercise for pupils to press their fingers upon prominent muscles, and at the same

time vigorously contract them, not only to learn their situations, but their use ; as the one that bends the arm.

DIGESTIVE ORGANS. The food, whether animal or vegetable, has no resemblance to the bones, muscles, or other parts of the body to which it gives sustenance. It must undergo certain essential alterations before it can become a part of the different structures of the body. The first change is effected by the action of the digestive organs.

ANATOMY OF THE DIGESTIVE ORGANS. The digestive organs are the mouth, teeth, salivary glands, pharyn, esophagus, or gullet ; stomach, intestines, lactaels, thoracic duct, liver, and pancreas, or sweet bread.

The mouth is an irregular cavity which contains the teeth and the organs of taste.

The salivary glands are six in number : three on each side of the jaw. They are called the parotid, the submaxillary, and the sublingual.

The pharynx is a muscular membranous sac that leads to the esophagus.

The esophagus is a large membranous tube, through which the food and drink pass into the stomach.

The stomach is in the left side of the body, below the lungs and heart ; it is composed of

three coats or membranes, which are thin and yielding; the external is called siroux; the middle, muscular; the inner, mucas.

Illustration. The three coats of the stomach resemble tripe, which is a preparation of the largest stomach of the cow or ox; the outer coat is smooth and highly polished; the middle coat is composed of minute threads which are arranged in two layers; the fibres of these layers cross each other; the inner coat is soft, and presents many folds usually called the "honey-comb."

The intestines are divided into two parts, the small and the large; the small intestine is about twenty-five feet in length; the upper and most important division is called the duodenum; the large intestine is about five feet in length; the largest division is called the colon. The duodenum or second stomach, is the most essential part of the small intestine; it is about twelve inches in length, and commences at the lower orifice of the stomach.

The lacteals are minute vessels which open upon the mucous surface of the small intestine; from the intestine they pass through small glands to the thoracic duct.

The thoracic duct commences behind the liver and ascends in front of the spinal column;

at the lower part of the neck it turns downward and forward, and pours its contents into the vein behind the collar bone; this duct is about the size of a goose quill in diameter.

The liver is on the right side of the body, below the right lung; on the under side of this organ is a small sac which contains a yellow, bitter fluid called gall.

Observation. The bile does not flow into the healthy stomach, but in into the duodenum.—With some persons the imagination is bilious not the stomach.

The pancreas is a long flattened organ, situated behind and below the stomach; from it there flows a fluid into the duodenum, called the pancreatic juice.

The spleen or milt, so called, because the ancients supposed it to be the seat of melancholy, is an oblong flattened organ, situated in the left side in contact with the stomach and pancreas; its use is not well understood.

The caul is composed of a depose matter, deposited between layers of sirous membrane; it is attached to the stomach and lies on the anterior surface of the intestines. In some persons of gross habits, the caul is large.

PHYSIOLOGY OF THE DIGESTIVE ORGANS.—Substances taken into the stomach as food, must

necessarily undergo many changes before they can become parts of the animal frame ; the solid portions are reduced to a fluid state, and those parts that will nourish the body are separated from the waste material. The first change in the food is made in the mouth, by the action of the teeth, and the saliva or spittle from the salivary glands. The teeth divide, while the saliva moistens the food, so that when carried into the pharynx, it is passed with ease through the esophagus into the stomach ; as soon as the food is passed into the esophagus its muscular coat contracts upon it successively from above downward, and the alimentary ball is pressed onward into the stomach.

Observation. The process of swallowing or deglutition, is easily observed when a person passes either fluid or solid food into the stomach. The next change in the food is in the stomach ; the coats of the stomach contract and the food is moved round, while at the same time a peculiar fluid is supplied by the stomach called gastric juice, which mixes with the food, and reduces it to a soft, pulpy mass called chyme.— This pulpy grayish substance is passed into the duodenum, and by the action of the bile and pancreatic juice it is changed into two parts, a milk

like substance called chyle, and residnum or waste matter.

The chyle or residnum passes from the duodenum to the remaining portions of the small intestine, and are moved along by a worm like action of its parts. As these two substances move along the intestine, the chyle is sucked up by the lacteal vessels that pass through the small intestines, and the residnum is carried into the large intestine, and excreted from the system.

To Capitulate. The food passes through five changes before it becomes a part of the human frame. 1st. It is changed in the mouth by the action of the teeth and saliva ; this is called mastication. 2d. By the action of the stomach and gastric juice ; it is changed into a pulpy mass ; this is called chymification. 3d. In the duodenum, the bile and pancreatic juice change the chyme into chyle ; this is called chylication. 4th. By the action of the lacteal vessels and thoracic duct, the chyle is poured into a vein behind the collar bone and passes through the heart to the lungs ; here, by the action of the air it becomes blood. 5th. The separation and excretion of the residnum.

CIRCULATORY ORGANS. The blood is distributed to every part of the system ; there is

no part so minute that it does not receive this circulating fluid; this distribution is effected by the agency of the heart, arteries, veins and capillaries.

ANATOMY OF THE CIRCULATORY ORGANS.—The heart is situated in the chest, between the lungs; it is a double organ, or has two sides, called right and left, which are separated by a muscular septum or partition; each side of the heart has two cavities, the upper cavity is called the auricle or deaf ear, the lower cavity is called the ventricle. These cavities are separated from each other by folds of membrane called valves.

Between the auricle and the ventricle of the right side of the heart, there are three valves, called tricuspid. Between the auricle and ventricle of the left side of the heart, there are two valves, called mitral.

Observation. The heart of the calf when examined, will give a correct idea of the situation of these valves. The arteries are the vessels that carry the blood from the heart. The right ventricle of the heart gives rise to the pulmonary artery; the left ventricle gives rise to the aorta. At the commencement of both of these vessels are valves, and from their shape they are called semi-lunar.

Observation: The parts of the circulatory organs most liable to disease, are the valves of the heart, particularly the mitral. When these membranous folds become ruptured the blood regurgitates and causes great distress in breathing.

The Pulmonary Artery commences in front of the aorta. It ascends obliquely to the under surface of the arch of the aorta, where it divides into two branches, one of which passes to the right, and the other to the left. This artery conveys the venous blood to the lungs, and with its corresponding veins establishes a pulmonic circulation.

The aorta proceeds from the left ventricle of the heart, and contains the pure or "arterial" blood. This vessel gives off branches which divide and subdivide as they advance, until they are distributed to every part of the body. This artery with its corresponding veins, establishes the systemic circulation.

The veins are the vessels which return the blood to the auricles of the heart, after it has been circulated by the arteries through the lungs and other parts of the body. At certain intervals they are furnished with valves which allow the blood to flow toward the heart only.

In general, they are nearer the surface of the body than the arteries.

The Capillaries constitute a microscopic network, and are so distributed through every part of the body, as to render it impossible to introduce the smallest needle beneath the skin, without wounding several of these fine vessels; they establish a communication between the termination of the arteries and the beginning of the veins.

PHYSIOLOGY OF THE CIRCULATORY ORGANS.

—The walls of the cavities of the heart are composed of muscular fibres, which are endowed with the property of contracting and relaxing its muscles. The contraction and relaxation of the muscular fibres of the heart increase and diminish the size of its cavities. The two auricles dilate at the same instant, and also contract at the same instant. The two ventricles contract, while the auricles dilate. Thus the blood is forced to every part of the system, from the the heart, and received again on its return. The course of the blood through the heart, arteries and veins, may be easily comprehended by attention. The heart aids in forcing the blood through the arteries to the different parts of the body. Every time the heart contracts, there is a "pulse" in the arteries.

Experiment. Apply the fingers upon the artery at the wrist at two different points, about two inches apart; if the pressure be moderately made, the "pulse" will be felt at both points. Let the upper point be pressed firmly, and there will be no pulsation at the lower point; but make strong pressure on the lower point only, and the pulsation will continue at the upper point, proving that the blood flows from the heart in the arteries, to different parts of the system.

The frequency of the pulse varies according to the age, sex, and degree of health. In adults it is usually from seventy to seventy five "beats," in a minute. There is no pulsation in the veins, and the return of the blood to the heart through them, can be shown by the following experiments.

Experiments. Press firmly on one of the veins upon the back of the hand, carrying the pressure towards the fingers; for a moment the vein will disappear. On removing the pressure of the finger, it will reappear, from the blood rushing in from below. If a tape be tied round the arm, above the elbow, the veins below will become larger, and also a greater number will appear. At this time, apply the finger at the wrist, and the pulsation of the arteries

still continues, showing that the blood is continually flowing from the heart, through the arteries, into the veins ; and the increased size of the veins shows that the pressure of the tape prevents its flowing back to the heart.

ABSORPTION. Absorption is the process by which the nutrient portion of the food is removed from the alimentary canal, to be conveyed into circulatory vessels. It is likewise the process by which the particles of matter that have become injurious or useless, are removed from the mass of fluids and solids, of which the body is composed. These removing processes are performed by two sets of vessels.

ANATOMY OF THE LYMPHATIC VESSELS. The vessels that act exclusively for the growth and renovation of the system, are found only in the alimentary canal. They are called lacteals.—The vessels whose whole functions are to remove particles of matter already deposited, are called Lymphatics. The radicals of the veins, in many, and it may be in all parts of the body, perform the office of absorption.

The Lymphatic vessels are very minute at their commencement ; so much so that they cannot be seen without the aid of a magnifying glass ; as they proceed, they unite and form larger trunks that open into the veins.

Lymphatic vessels are found in every part of the body except the brain, yet it is supposed they exist in this organ. The knotted appearance of these vessels, is owing to the arrangement of their internal coats to form valves. In certain parts of the body, as in the neck, these vessels pass through small, soft bodies, called Lymphatic glands, which are to the vessels what the mesenteric glands are to the lacteals.

Observation. Sometimes when we are afflicted with a cold, these glands in the neck enlarge; they are then usually called "kernels."

PHYSIOLOGY OF THE LYMPHATIC VESSELS.—Though the lacteals and lymphatics resemble each other in their structure and termination, yet they differ as to the nature of the fluids which they convey, as well as the nature of their functions. The lacteals open into the small intestine, and possess the power of rejecting all substances in the passing of food but the chyle. The Lymphatics on the contrary, not only imbibe or suck up all the various constituents of the body, both fluid and solid, when their vitality has ceased, but they absorb extraneous matter when presented to their mouths.

Observation. When little or no food is taken into the stomach, life is supported by the lymphatics imbibing the fat, and reconvey-

ing it to the circulatory vessels. It is the removal of this substance which causes the emaciation of the face and limbs of a person recovering from a fever. In Consumption, the extreme attenuation of the limbs is caused by the absorption, not only of the fat, but also of the muscles and more solid parts of the body. Animals which live in a half torpid state during the winter, derive their nourishment from the same source; in other words, half starving animals live for a time on themselves. The most absorbing surfaces are the stomach, intestines, lungs and skin; through the lungs, absorption is not only very great, but extremely rapid.

Illustration. In inhaling sulphuric ether, or lethion, it is introduced into the vessels of the lungs in the form of vapor, and through them it is rapidly conveyed to the blood, and thus influences the nervous system.

SECRETION. In the human body are found many fluids and solids of dissimilar appearance and character. These are produced by the action of the organs called secretory. Some of these organs are of simple structure, while others are very complicated in their arrangement.

ANATOMY OF THE SECRETORY ORGANS.—The secretory organs are of three kinds, namely:—the exhalents, follicles and the glands.

The exhalents are supposed to be the termination of the arteries; they are of two kinds, external and internal, the latter terminate on the surfaces within the body, and the former on the outside.

The follicles are small bags in the deeper layer of the skin and mucous membrane; the pores seen on the outside of the skin are the outlets of these bodies.

The glands are the chief agents of secretion in the body. They are formed of minute arteries, veins, and tubes wound together; these organs vary in size from a mustard seed to that of the liver, which weighs from two to four pounds. Every gland, however minute, has a small duct for collecting and carrying off the secreted fluid.

PHYSIOLOGY OF THE SECRETORY ORGANS.—Secretion is one of the most obscure functions of the body; it has the same meaning as separation. Not only is the process by which substances are separated from the blood, called secretion, but the same term is applied to substances thus separated. All the fluids of the body are derived from the blood, and this fluid when distributed to the different glands and follicles is similar in composition; but the fluid secreted by them, varies in appearance in a remarkable degree.—The office of the glands is principally to form

different secretion; thus the salivary glands secrete the insipid saliva; the liver, the yellow ropy bile; and the kidneys, the acrid urine. When any substance which is not wanted for nutrition, or does not give nourishment to the system, is taken up by the lymphatic vessels and conveyed into the blood; it is discharged by secretions.

Illustration. A few years ago a poor inebriate was carried to a London Hospital in a state of intoxication; he lived but a few hours. On examining his brain, nearly half a gill of fluid, strongly impregnated with gin, was found in the cavities of this organ; this was secreted from the vessels of the brain.

NUTRITION. The blood is the nutritive fluid of animals. It is composed of two parts, a watery fluid called serum, and a solid portion called clot. In healthy blood, these two parts separate spontaneously on standing; the crassamentum or clot coagulates and forms a red solid mass, while the serum surrounds it in the form of a yellowish fluid.

SERUM. The serum contains a small quantity of soda in a free state, and is 29 parts in 1000 heavier than water; it consists in part of albumen, and is coagulated by heat, acids and alcohol. The crassamentum consists of two parts, the fibrin and the coloring matter; the

fibrin does not differ, except in form, from that obtained from lean flesh.

Observation. Fibrin is the lean part of the flesh of animals. This may be separated and observed in its pure state by removing the soluble parts of lean beef, cut into small pieces, by repeated washing, and digestion in water. Fibrin is composed of 18 parts of carbon, 14 parts of hydrogen, 5 of oxygen, and 3 of nitrogen.—Iron is found to exist in the red globules of the blood. It is inferred from this, that it is the presence of this metal which gives the blood its red color, though its quantity is found to be only half a grain to 100 grains of globule. The blood is not necessarily red; it may be white as in the fish, transparent as in the insect, or yellowish as in the reptile. There is no animal in which the blood is red in all parts of the body. The ligaments and tendons in man, are not supplied with red, but with white blood.

Nutrition is the vital act by which the different parts of the body renew the materials of which they are composed. Digestion, circulation, absorption and respiration, are but separate links in the chain of nutrition, which would be destroyed by the absence of any one of them.—The nutritive process is a kind of secretion, by which particles of matter are separated from

the blood, and conveyed with wonderful accuracy to the appropriate parts of the body. The functions of the nutrient vessels antagonize those of absorption. While one system is constructing with beautiful precision the animal frame, the other is diligently employed in pulling down this complicated structure ; but amid this simultaneous renovation and decay, the form and beauty of the organs are preserved.

Observation. This everchanging state of the body is shown, by giving animals colored matter mixed with their food, which, in a short time tinges their bones with the same colour as the matter introduced. Let it be withdrawn, and in a few days the bones will assume their former color—evidently from the effects of absorption. The changeful state of the body is also shown by the losses which it sustains—by the necessity of aliment—by the emaciation which follows abstinence from food.

The body loses 20 ounces of refuse matter every 24 hours. The renewal of every part of the body is not perfected merely by the passage of the blood through the arteries of the systemic circulation, but by the smallest capillary vessels called the vessels of nutrition. As the blood goes the round of circulation, the nutrient capillary vessels select and secrete those parts which

are similar to the nature of structure, and the others pass on, so that every part takes up and converts to its own use the very principles which it requires for its growth; or, in other words, as the vital current approaches each organ, the particles appropriate to it, feel its attractive force—obey it—quit the stream, mingle with the substance of its texture, and are changed into its own true and proper nature.

Illustration. When a bone is broken, or a nerve wounded, minute vessels shoot out from the living parts, and immediately commence their operation by depositing bony matter where it is required to unite fractured bones, and nervous substance to heal the wounded nerve.

RESPIRATORY ORGANS, OR RESPIRATION.—Respiration is the act of breathing, and consists of nothing more than alternately drawing into and throwing out of the lungs a quantity of atmospheric air, and it appears that this process, or an equivalent one, is necessary to support animal life.

The atmosphere, as formerly shown, is composed of 79 parts of nitrogen, 20 parts of Oxygen, and 1 part of carbon, and it is found by experiment, that no other gaseous compound can be substituted for respiration; nor can these proportions be varied without injury to its qualities.—

The immediate effects of respiration is to produce a change in the color of the blood as it passes through the lungs, thus indicating that it suffers some change in its properties at the same time. The change from venous to arterial blood, seems to be produced entirely by the loss of carbon, which the former suffers while passing through the lungs. The nutrient portion of the food is poured into the vein, at the lower part of the neck, and is carried to the right cavities of the heart. The fluid in these cavities consists of the chyle mixed with the venous blood; neither of these two elements is fitted to promote the growth or repair the waste of the body. They must be subjected to a process, by which they can be converted into blood, and the second freed from its impurities, carbonic acid and water; this is effected by the Respiratory Organs.

ANATOMY OF THE RESPIRATORY ORGANS.—

The organs of respiration are the lungs; trachea, bronchia, the air cells: diaphragm, ribs and several muscles aid in the respiratory process. The lungs are conical in shape, one on each side of the chest, embracing the heart, and separated from each other by a membranous partition. The color of the lungs is a pinkish grey, mottled and variously marked with black.

They are composed of air cells and air tubes, besides many small blood vessels. Each lung is surrounded by a membrane called the pleura, which not only surrounds these organs, but is reflected upon the walls of the chest. The lungs however, are on the outside of the pleura, in the same way as the head is on the outside of a cap when doubled upon itself.

Observation. When this membrane that covers the lungs, and also lines the chest, is inflamed, the disease is called pleurisy.

The trachea is situated in the front part of the neck, and extends from the mouth to the lungs; it is composed of cartilagenous rings, which are very elastic.

The bronchia are the divisions of the trachea at its lower extremity, behind the upper part of the heart; one part or branch passes to the right lung, and the other to the left; these branches, upon entering the lung, divide into almost an infinite number of smaller branches.

Illustration.—The trachea may be compared to the trunk of a tree, the bronchia to two large branches, the subdivision of the bronchia to the branches, and twigs, the air cells to the buds seen on the twigs in the spring.

AIR CELLS. These are very small bladders at the end of the minute divisions of the bron-

chia ; their walls are very thin, the interior of which, as well as the trachea and bronchia, are lined by mucous membrane ; these cells are variable in size, and are most numerous in the middle and lower part of the lungs.

Observation. When the mucous membrane of a few of the larger branches of the wind pipe is slightly inflamed, it is called a cold ; when the inflammation is greater, and extends to the lesser air tubes, it is called bronchitis ; coughing is a violent expulsive effort, by which air is suddenly forced through the bronchia and trachea, to remove offending matter.

The diaphragm is a flexible, circular partition, that separates the respiratory from the digestive organs, and the chest from the abdomen. Its margin is attached to the spinal column, the sternum, and the lower ribs. In a state of repose, its centre rises into the chest in the form of an arch. When air is forcibly expelled from the lungs, its upper part reaches as high as the fourth rib ; it is depressed as low as the seventh rib, when air is drawn into the lungs.

PHYSIOLOGY OF THE RESPIRATORY ORGANS.

When air is drawn into the lungs, the muscular margin of the diaphragm contracts, which depresses its central portion ; the chest is then enlarged at the expense of the abdomen. At the

same time that the diaphragm is depressed, the ribs are thrust forward and upward by means of muscles placed between and on them ; thus the chest is enlarged in every direction. The lungs follow the variations of capacity in the chest, expanding their air cells when the latter is enlarged, and contracting when the chest is diminished. Thus when the chest is expanded, the lungs follow, and consequently a vacuum is produced in the air cells ; the air then rushes through the mouth and nose into the trachea and its branches, and fills the vacuum as fast as it is made ; this mechanical process constitutes inspiration. After the expansion of the chest, the muscles that elevated the ribs, relax together with the diaphragm. The elasticity of the cartilages of the ribs depresses them, and the cavity of the chest is diminished, attended by the expulsion of a portion of the air from the lungs, At the same time, the muscles that form the front walls of the abdominal cavity, contract and press the alimentary canal, stomach and liver, upward and against the diaphragm ; this, being relaxed, yields to the pressure, rises upward and presses upon the lungs, which retreat before it, and another portion of air is expelled from these organs ; this process is called expiration. Thus it is obvious that the enlargement of the chest

or inspiration, is produced in two ways:—1st. By the depression of the central arched portion of the diaphragm. 2d. By the elevation of the ribs. On the contrary, the contraction of the chest, or expiration, is produced by the depression of the ribs and elevation of the central part of the diaphragm. These movements are successive during life, and constitute respiration.

Experiment. Place the ear upon the chest of a person, and a murmuring sound will be heard, somewhat like the soft sighings of the wind through the forest trees. This sound is caused by the air rushing in and out of the lungs, and is peculiarly distinct in the child.

As before mentioned, the dark impure blood, that passes from the heart to the lungs, is unfit to sustain the vital action of the various organs of the body. Its impurities must be removed. When this is done, the blood loses its blackish red colour, and become of a bright scarlet red. The dark color of the blood is owing to the presence of carbonic acid gas, this is formed in the blood vessels by the union of carbon and oxygen; the carbon is the principal element of the dead waste atoms.

Observation. The presence of carbonic acid and watery vapor in the expired air, can be proved by the following experiments: 1st. Breathe

into limewater, and in a few minutes it will become of a milk white color ; this is owing to the carbonic acid of the breath uniting with the lime, forming the carbonate of lime. Breathe upon a cold dry mirror, for a few minutes and it will be covered with moisture ; this is condensed vapor from the lungs. In warm weather, this watery vapor is invisible in the expired air ; but, in a cold dry morning in winter, the successive jets of vapor issuing from the mouth and nose are sufficiently obvious.

We will now pass to the change which the air effects when it comes in contact with the blood in the lungs ; as the impure blood is passing in the minute vessels over the air cells, the oxygen passes through the extreme thin coats of the air cells and blood vessels, and unites with the blood ; at the same time the carbonic acid and watery vapor leave the blood, and pass through the coats of the blood vessels and air cells, and mix with the air in the cells, these are expelled from the air cells every time we breathe. This interchange of the gasses produces a change in the color of the blood.

Experiment. To show that gasses may be interchanged through membranes : fill a bladder with dark blood, tie the bladder closely, and suspend it in the air. In a few

hours, the blood next the membrane will have become of a bright red color; this is owing to the oxygen from the air through the bladder, and uniting with the blood, while the carbonic acid has escaped through the membrane.

THE VOICE. The beautiful mechanism of the vocal instrument, which produces every variety of sound, from a harsh, unmelodious tone, to a soft, sweet, flute like sound; can never be imitated by art. It has been compared by many physiologists to a wind, reed, and stringed instrument. This inimitable, yet simple instrument, is the Larynx.

ANATOMY OF THE VOCAL ORGANS.—The larynx (Adam's apple,) is a kind of cartilagenous tube, which taken as a whole, has the general form of a hollow reversed cone, with its base upward toward the tongue in the shape of an expanded triangle; it is composed of several pieces of cartilage that not only connect with each other, but with the tongue, lower jaw, and trachea. These are stretched across the cavity formed by these cartilages, four folds of membrane, two on each side, called vocal cords. The space between the cords on each side is called the glottis; the cavity between the upper and lower vocal cords is called the ventricle of the larynx. Behind the base of the

tongue, is a piece of cartilage, resembling a leaf of parsley, called the epiglotts. The duty of this sentinel is to keep the food and drink from passing into the air-passage or trachea.

PHYSIOLOGY OF THE VOCAL ORGANS. In the formation of the voice, each part already described performs an important office; the cartilages give form and stability to the larynx, and by the action of the muscles attached to them, the width of the glottis is varied. When air is forcibly driven from the lungs through the glottis, it causes a vibration of the vocal cords, this produces sound, and it is varied by the tongue, teeth and the lips. The size of the larynx, the capacity and health of the lungs, the condition of the throat and nasal passages, the elevation and depression of the chin and tongue, and the state of the mind, influence the modulations of the sound.

THE SKIN. The skin is a membranous covering, enveloping the bones and other parts of the system. In youth, and in females particularly, it is smooth, soft and elastic. In middle age, and in males it is firm and rough to the touch. In old age, in persons who are emaciated, and about the flexions of the joints, it is thrown into folds.

ANATOMY OF THE SKIN. The skin of the human body is composed of two layers of membrane, namely : the cuticle, and the cutisvera or true skin.

The cuticle, or that part of the skin which is seen by the eye, is at first a fluid thrown out by the blood vessels over the internal layer of this membrane. While layers of this fluid are continually forming on the upper surface of the true skin, the external layers of the fluid become dry, and resemble small scales.

Illustration. The cuticle is that part of the skin which is raised by a blister. Sometimes from disease, erysipelas, or fever it comes off from the surface of the body in pieces of considerable size.

The arrangement of the cuticle, in different parts of the human body, is worthy of notice ; where feeling is most acute, the cuticle is delicate and thin ; where it is in motion, as over the joints, it is lax and moveable ; where it is in constant use, it becomes harder and thicker.

Illustration. The soles of the feet and palms of the hands afford good examples of the cuticle thickened by use.

This part of the skin has no blood vessels or nerves, consequently a needle may be passed under it to some extent, and cause no pain, nor

will any blood ooze out. The cuticle, when clean, looks like a thin shaving of soft, clear horn; but when filled with dust and other foul matter, it becomes dark colored.

Observation. The hair, nails, also the hoofs of animals, are appendages of the skin; they are so connected with the cuticle, that by scalding, they come off with this tissue.

In the inner and newly formed layers of the cuticle, there is a peculiar kind of paint; this colored layer, in the Negro, is black; in the Indian, copper colored; in the European, it is very light, differing however, in different persons.

The cutis vera or true skin, is so called, because it is the most essential of the two layers of the skin. It contains several sets of vessels viz:—arteries, veins, and lymphatics; besides these vessels, there are found both oil and perspiratory glands and nerves.

The arteries and veins form a net work upon the surface of the true skin; hence, cut any part of this layer of skin, and it will bleed. By the arteries, the skin is nourished.

Observation. When this layer of the skin is destroyed by cuts or burns, it is never formed again, and produces scars which never disappear.

The nerves, like the blood vessels are very numerous, for no part of the skin can be pricked

without giving pain. The minute extremities of these nerves, together with the capillary vessels, form small, conical prominences called papilla.

Observation. These prominences can be seen in the palm of the hand and sole of the foot.—On the ends of the fingers they are curiously arranged ; some in concentric ovals, others pursue a serpentine course.

The lymphatics are those small vessels which open upon the inner layers of the cuticle. These vessels are called into action when ointments are rubbed on the skin, and also in vaccination, to prevent small pox.

The perspiratory apparatus consists of minute tubes, which pass inward through the cuticle, and terminate in the deeper meshes of the skin. In their course, each little tube forms a beautiful spiral coil ; and on arriving at its destination, coils upon itself in such a way as to form an oval shaped ball, called the perspiratory gland.

The oil glands are small bodies embedded in the true skin ; they connect with the surface of the skin, by small tubes, which traverse the cuticle. In some parts these glands are wanting ; in others, where their office is most needful, they are abundant, as on the nose, ears and head.

Observation. When there is an unnatural accumulation of oil in the tubes they cause the grub or worm.

PHYSIOLOGY OF THE SKIN. The skin invests the whole of the external surface of the body, following all its prominences and curves, and gives protection to all the organs it encloses, while each of its several parts has a distinct use.

The cuticle is insensible, and serves as a sheath of protection to the highly sensitive skin, situated beneath it; the latter feels, but the former blunts the impression, which occasions feeling.

The cuticle, also prevents disease, by impeding the evaporation of the fluids of the true skin, and the absorption of the poisonous vapor, which necessarily attend various employments. It however, affords protection to the system only when unbroken, and then to the greatest degree, when covered with a proper amount of oily secretion from the oil-glands.

The nerves of the skin are the organs of the sense of touch and feeling. Through them we receive many impressions that increase our pleasures; as the grateful sensations imparted by the cooling breeze in a warm day. In consequence of their sensitiveness, we are individually protected, by being warned of the nearness of

destructive agents. A large proportion of the waste of the body passes through the outlets of the skin; some portions in the form of oil, others in the form of watery vapor and carbonic acid.

The perspiratory glands separate from the blood, the perspiration or sweat. There are more than 2000 of these glands in every square inch of the skin. In health, these glands are in constant action, and the skin is moist. When this moisture cannot be seen, it is called insensible perspiration; when it can be seen in drops, it is called sensible perspiration. The functions of these glands is very necessary to health as before remarked, during twenty-four hours, about twenty five ounces of waste matter pass out of the body through the pores of the skin. If perspiration is suppressed from disorder of the skin or cold, the whole of this injurious matter is circulated through the system by the blood, disturbing the action of the lungs, stomach and other organs. Many cases of chronic coughs, headache, dyspepsia and diarrhoea, originate in this way. If any one organ of the system has been weakened, this organ is more susceptible of disease than others. In persons whose lungs are weak or diseased, a chill will immediately cause an irritation, and often inflammation of these

organs. If an individual is predisposed to stiffness of the joints and rheumatic pains, a chill will affect these diseased parts.

SENSE OF TOUCH. Sensation is an impression made upon the mind, through the medium of the senses. There are five sense, viz :—Touch, Taste, Smell, Hearing and Vision.

Touch is the sense that enables us to tell whether a body is rough or smooth, cold or hot, sharp or blunt; this sense and feeling reside in the nerves of the skin. The nerves that contribute to the sense of touch, proceed from the anterior half of the spinal cord. Where sensation is most acute, we find the greatest number of nervous filaments, and those of the largest size, as at the end of the fingers and lips.

Observation. The sense of touch varies in different persons, and also in individuals of different ages; this is modified by the condition of the brain and nerves; and by cultivation. Blind persons, by whom the beauties of the external world cannot be seen, cultivate this sense to such a degree that they can distinguish objects with great accuracy; and the rapidity with which they read books prepared for them, is a convincing proof of the niceness and extent to which the cultivation of this sense can be carried.

SENSE OF TASTE. Taste is the sense by which we perceive the flavour of a thing. The tongue is the principal organ of taste, though the sides of the cheeks and upper part of the throat share in this function. The surface of the tongue is thickly studded with points; these give this organ a velvety appearance; to these points the nerve of taste is situated.

Observation.—By applying strong acids to the tongue, with a hair pencil, these points will become curiously lengthened.

This sense has been made to vary. In different persons in civilized life, taste varies, but the Indian's like or dislike to particular kinds of food is the same with every person of the same tribe. This sense is modified by habit, and frequently those articles that at first seemed nauseous and disgusting, by persevering in the use of them become quite agreeable, as chewing tobacco, &c. Taste as well as touch, may be improved in acuteness. Many persons impair their taste by indulging in bad habits, such as smoking and chewing tobacco, &c.; these indulgences lessen the sensibility of the nerve and destroy the natural relish for food.

SENSE OF SMELL. Smell is the sense that enables us to discern the odor or scent of a thing; this sense is located in the air passages of the nose.

The air passages or nostrils, are lined by mucous membrane, which is continuous with the skin externally, and with the lining membrane of other cavities which communicate with them. To this membrane, the olfactory nerve is distributed. To protect the delicate filaments of the nerve of smell, thus freely exposed to the air, and to the painful stimulus of sharp, pungent odors, the membrane is kept continually moist by a fluid, secreted by the glands with which it is provided. When substances are presented to the nose, the air that is passing through the nostrils brings the odoriferous particles of matter in contact with the filaments of the nerve of smell, that are spread upon the membrane that lines the air passages, and the impression is then carried to the brain. This sense is closely connected with that of taste, and aids man, as well as the inferior animals, in selecting proper food ; it also gives us pleasure by the inhalation of agreeable odors. The sense of smell, like taste and touch, may be improved by cultivation ; thus the North American Indians can easily distinguish different tribes, and different persons of the same tribe, by the odor of their bodies.

Observation. Acuteness of smell requires that the brain and nerve of smell be healthy, and that the membrane that lines the nose be

thin and moist. Snuff-taking diminishes the sensibility of the nerve and thickens the lining membrane; this thickening of the membrane obstructs the passage of air through the nostrils, and thus obliges "snuff-takers" to open their mouths when they breathe.

SENSE OF VISION. This sense contributes more to the enjoyment and happiness of man than any of the other senses; by it we perceive the form, colour, size and position of objects that surround us. The beautiful organs of vision, or sight, is the Eye.

ANATOMY OF THE ORGANS OF VISION. The eye is shaped like a globe, and is placed in a cavity in front of the skull. The sides of the globes are composed of three coats or membranes. The interior of the globes is filled with certain substances called humors. The coats are three in number: 1st. The Sclerotic and Cornea. 2d. The Choroid, Iris, and Ciliary processes. 3d. The Retina.

The humors are also three in number: 1st. The Aqueous or watery. 2d. The Crystalline. 3d. The Vitreous or glassy.

The sclerotic coat is firm, and its color white; hence, it is frequently called the "white of the eye." From its toughness it forms the principal support to this organ. This membrane with the cornea in front of the eyes.

The cornea is the transparent part of the eye in front, which projects more than the rest of the globe. It is shaped like the crystal of a watch, and, in health, gives the eye its sparkling brilliancy. The choroid coat is of a dark colour upon its inner surface. It contains a great number of blood vessels, which give nourishment to different parts of the eye.

The iris is situated behind the cornea; it is the most delicate of all the muscles of the body. This part gives the blue, gray or black color of the eye. In the centre of the iris is an opening called the pupil. This word is derived from the Latin, *pupa*, or babe, because it reflects the diminished image of the person who looks upon it. The pupil enlarges or contracts according to the quantity that falls upon it. On viewing the part of the eye near the pupil, small lines of a lighter color will be seen passing to the outer part of the iris; these are called ciliary processes. They are about sixty in number.

The retina is the innermost coat of the eye. It is formed, in part, by an expansion of the optic nerve over the bottom of the eye, where the sense of vision is first received.

The aqueous humor occupies the space between the cornea and crystalline, both before and behind the iris humor.

The crystalline humor (lens) lies behind the aqueous humor and pupil. Its form is different on the two sides. When boiled, it may be separated into layers, like an onion.

The optic nerve or nerve of vision extends from the brain to the back part of the eye, where it expands on the choroid coat. On this expansion the image of the objects are first formed.

The eyebrows and eyelids protect the eye from too strong impressions of light, and also prevent particles of dust and perspiration from falling into it.

The eyelashes are attached to the eyelids, and when the eye is closed they are interlaced, and thus prevent particles of matter from injuring this delicate organ. They add greatly to the expression of the eye.

The eyelids not only protect the eye, by closing it in front, from too brilliant rays of light and from dust, but distribute equally over the globe of the eye a watery fluid secreted by glands, with which they are provided. Besides this, there is another fluid (tears) secreted by the lachrymal or tear-gland, above the eye.—The tears flow to the eye by several minute ducts. As this fluid passes over the eye, the small atoms of dust are swept away by the pro-

cess of "winking," and with the tears pass into two ducts at the inner corner of both eyelids.

The orbit, or bony cavity, in which the globe of the eye is placed, is lined with a thick cushion of fat, in order that the eye may move in all directions with perfect freedom and without friction. The eye is moved by six muscles at one end, attached to the bones of the orbit; the other extremity to the globe of the eye.

Observation. If the external muscle is too short the eye is turned out, producing the "wall eye." If the internal muscle is contracted, the eye is turned inward toward the nose. It is then called a "cross eye."

PHYSIOLOGY OF THE ORGANS OF VISION.
As the eye is strictly an optical instrument, it is necessary to know the laws that regulate the transmission of light, before the use of the different parts of this organ can be understood. It is a law of optics that the rays of light, while passing through the same medium, proceed in straight lines, but they are turned out of their course when they pass from one medium to another of a different density. They are then said to be refracted. We would also add that the rays of light from an object, in passing through the eye, cross each other. Hence, the image of the object is inverted on the retina.

Observation. Light may be decomposed by means of a prism into seven primary colours. The succession of these colours, beginning with the uppermost, is violet, indigo, blue, green, yellow, orange and red. The decomposition of light only requires that a ray should be admitted through a small aperture into a room, and made to pass through a triangular prism.

We will now pass to the use of the different parts of the eye. The eyebrows, eyelids and eyelashes are protecting organs to this delicate instrument, while the coats give protection to the more delicate parts within. The transparent cornea and humors are mediums of different density, so that the direction of the rays of light that leave the object at which we look are refracted, and forms upon the retina a small but clear image of that object. The impression of the rays of light upon the retina is then carried to the brain by the optic nerve. When the cornea and crystalline become flattened, as in old age, the image is formed beyond the retina. This defect is remedied by wearing convex glasses. When the cornea and crystalline lens are too convex an image of the object will be formed before the retina. This defect of the eye is called near-sightedness. To give such persons longer vision it is necessary to wear concave glasses.

SENSE OF HEARING. The sense of bearing is next in importance to that of vision. Through this sense we are enabled to perceive sounds that not only subserve to our comfort and pleasure, but are instrumental to our intellectual enjoyment. The organ of hearing, or Ear, is one of the most complicated in the human body.

ANATOMY OF THE ORGANS OF HEARING.

The Ear is composed of three parts. 1st. The external ear. 2nd. The tympanum, or middle ear. 3rd. The labyrinth, or internal ear.

The external ear presents many furrows, arising from the folds of the cartilage that form it. A funnel-shaped tube extends from the external to the middle ear. At the internal extremity of the tube is a thin, semi-transparent membrane, that separates the external from the middle ear. It is called the *membrana tympani* or drum of the ear. This and the bitter wax in the tube prevent insects from entering the head.

The middle ear is connected with the internal and most important cavity by four small bones, which are the most delicate shaped bones in the body. These are so arranged as to form a chain from the drum of the ear to the labyrinth.

From the middle ear a tube opens into the back part of the throat, called the eustachian, which admits air into this part of the ear. If this tube is closed by disease of the throat hearing is impaired.

The internal ear is very intricate, and the uses of its various parts are not well known. It is called the labyrinth from its windings. This part of the ear is composed of a three-cornered cavity resembling a snail-shell. The internal ear is the only part that is absolutely essential in hearing.

The auditory nerve, or nerve of hearing, proceeds from the brain, and expands upon the membrane that lines the internal ear, similar to the expansion of the optic nerve.

PHYSIOLOGY OF THE ORGANS OF HEARING.
Hearing is that function by which we obtain a knowledge of the motions of bodies, which constitute sounds. The precise functions of all the different parts of the ear are not known.

The function of the external ear is to collect sounds and reflect them into the tube that connects the external with the middle ear. The membrana tympani serves to moderate the intensity of sound.

The supposed office of the middle ear is to carry the vibrations made on the membrana

tympani to the internal ear. This is effected by the air which it contains and, by the chain of small bones that are enclosed in this cavity.

But little is known of the functions of the internal ear. Its parts are filled with a watery fluid, in which the filaments of the auditory nerve terminate.

The auditory nerve, like the optic, has but one function, that of special sensibility, or transmitting sound to the brain. The transmission of sound through the different parts of the ear will now be noticed more collectively. The vibrations of the air are collected by the external ear, and conducted through the tube to the membrana tympani; from thence the vibrations, passing down along the chain of bones, communicate with the ear; from thence the impression is carried to the brain by the auditory nerve.

THE NERVOUS SYSTEM. In the preceding pages the structure and use of the bones and muscles have been explained, the process by which food is converted into chyle and mixed with the blood, together with the manner by which this fluid is conveyed to every part of the body, as has been described. It has also been shown that lymphatic absorption commences as soon as nutrition is completed and carries the useless worn-out particles of the different parts

back into the circulating fluid ; while the respiratory organs and secretory glands perform the work of preparing the waste atoms to be conveyed from the body. These functions must succeed each other in proper order, and such is the mutual dependence of these processes that a medium of communication is necessary from one organ to another. This is effected by means of the nervous system.

ANATOMY OF THE NERVOUS SYSTEM. The nervous system is composed of the brain, cranial nerves, spinal cords, spinal nerves, and the sympathetic nerve.

The brain is a pulpy organ within the skull-bones. The upper part and front is called the cerebrum. The lower portion, situated at the back of the skull, is called the cerebellum. The cerebrum, or larger portion of the brain, is composed of a whitish substance, with an irregular border of gray matter around its edges. The cerebellum is also composed of gray and white matter, but the latter is by far the largest portion. The white matter is so arranged that when cut vertically it presents the appearance of the trunk and branches of a tree. The brain is surrounded by three membranes. The external membrane is thick and firm ; the middle membrane is thin, and somewhat resembles a

spider's web; the membrane consists of a net work of blood vessels. On removing the upper part of the skull bones and membranes the brain presents a folded appearance. These ridges are called convolutions.

The spinal cord is composed of a whitish substance, similar to that of the brain; it is covered with a sheath or membrane, and extends from the brain through the whole length of the spinal column; the upper portion, within the skull bones, is called the medulla oblongata.

The nerves are small white cords, that pass from the brain and spinal cord; they are distributed to every part of the human system.

The cranial nerves that connect with the spinal cord, are arranged in twelve pairs; they are distributed to the parts about the face.

The spinal nerves that connect with the spinal cord are arranged in thirty-one pairs, each arising by two roots; a moter and sensitive root.

Every nerve, however small, contains two distinct cords of nervous matter. One gives feeling, while the other is used in the motion of the part to which they are distributed. The sympathetic nerve consists of a series of knots, extending each side of the spinal column, forming a chain. It communicates with the cranial and

spinal nerves and also distributes branches to all the internal organs.

PHYSIOLOGY OF THE NERVOUS SYSTEM. The brain is the organ of the mind, or physical Instrument of thought and feeling.

The blood is the great medium, for the resupply of vital energy, it being the most abundant wherever the greatest resupply of this energy is required. Now the exercise of the mind, besides being the chief end of man's existence in this world, and a source of much more intense pleasure and pain than the exercise of his muscles, causes a far greater expenditure of the vital energies, than the exercise of the latter. If therefore the brain were the instrument of the mind, it would use up much more blood in proportion to its size, than any other portion of the body. Accordingly we find that from ten to twenty times more blood is sent to the brain in proportion to its size, than is sent to any other equally large portion of the system. As light pressure upon the brain suspends the mental operations rendering the patient unconscious of everything, and by the removal of this pressure the mental powers are instantly restored, whilst this effect cannot be produced by pressing upon any other portion of the system. Injuries and morbid states of the brain palpably affect the operations of the

mind, whilst this effect cannot be produced by wounding any other portion of the body.—The brain by means of its nerves is connected with every part of the system, and also everything appertaining to it, point it out as the “dome of thought,” the palace of the soul. The brain is the seat of sensation. It perceives the impressions made on all parts of the body, through the medium of the sensitive nerves. That the impressions of external objects, made on these nerves be communicated to the brain, where sensation is perceived, it is necessary that they be not diseased or injured. There is a plain distinction between sensations and impressions; the latter are the changes produced in the extremities of the nerve; the former, the changes produced in the brain and communicated to the mind. Some portions of the brain are of greater importance than others. Pieces of both the white and gray matter, have been removed without impairing the intellect or destroying life.—This organ, although it takes cognizance of every sensation, is of itself, but slightly sensible. It may be cut without pain, and the individual, at the same time, retain his consciousness.

The medulla oblongata, unlike the brain, is highly sensitive; if slightly punctured, convulsions follow; if much injured, breathing immediately ceases.

The brain is the seat of will. The contraction or movement of the muscles, is caused by an influence sent from the brain, by the act of the mind or will. The medium of communication from this organ to the muscles is the motor nerves. If the brain is in a state of repose, the muscles are at rest; if, by an act of the will, the brain sends a portion of nervous influence to a muscle, it immediately contracts, and those parts to which the muscle is attached, move.

The sympathetic nerve confers neither sensibility nor power of movement, yet it gives vitality or life, by accompanying the blood vessels to every part of the system.

Illustration. When the brain is jarred by a blow nausea and vomiting follow. Again, when food is taken into the stomach that irritates the nerves, it produces headache from the sympathy of the brain with the stomach, through this system of nerves.

Observation. We have omitted to explain the hygene of the different organs of the system, from the consideration that this art belongs more immediately to the science of medicine, and is therefore the study of the medical practitioner rather than the anatomist. Besides, it is not so much my object to display man in the condition in which he ought to be, as in the state in

which he really is. Although a knowledge of hygiene of the different organs of the body is highly necessary for the promotion of health and happiness, it would require more time to explain it here, than I am able to devote to that purpose.

We have now traced man throughout, from the principal essences of which all material things are created, to that perfect form and structure with which we see him moving around and enjoying an intercourse with his fellow-man and all surrounding objects. This subject frequently engaged the attention of the pious Psalmist. With an eye of intelligence and devotion, he surveyed the curious organization of the human frame; and, struck with the wisdom displayed in its formation, he raised his thoughts to God in grateful adoration, and exclaims: "I will praise thee, for I am fearfully and wonderfully made! Marvellous are thy works! How precious are thy wonderful contrivances in relation to me, O God! How great is the sum of them! If I should count them, they are more in number than the sand!" This body, however, wonderful as its structure is, is subject to decay, and must soon be dissolved in the grave. But we are assured that a day is approaching when "all that are in the graves shall hear the voice of the Son of God and shall

come forth ;" when this mortal frame " shall put on immortality ;" and when that which was sown in corruption " shall be raised in glory." If the human body, even in its present state of degradation, excited the pious admiration of the Psalmist, much more will it appear worthy of our admiration when it emerges from darkness and corruption to participate in the glories of an immortal life.

But we have as yet only surveyed the animal structure of the human frame, without even referring to the intellectual powers and faculties of the mind. Were the animal frame all we had to admire in the formation of man, we might contemplate its beauty and symmetry for a short time, and then cease to wonder and adore ; but when we take into consideration the wonderful powers of the mind—their eternal duration, their unlimited power of expansion, the infinite variety of knowledge retained by the memory, together with the mysterious union of mind with matter, all of which conspire to excite our admiration of the matchless wisdom of Jehovah, as displayed in the formation of the human frame.

It was the opinion of the ancient philosophers that the heart which is the seat of animal life, was also the source from which flowed all the desires of the mind, and the seat of the will ;

but the science of Anatomy and Physiology has proved that the brain is the organ where this mysterious union is consummated.

I am aware that there are those who hold so tenaciously to scripture phraseology that they cannot in conscience admit anything for truth that cannot be found in the Bible ; but when we consider the age of the world in which it was written, the purpose for which it was written, and the people to whom it was addressed, we cannot reasonably expect the Bible to contain a description and analysis of scientific subjects, as is now brought to light by the aid of Chemistry and Philosophy ; neither do we consider it doing any injustice to the sacred scriptures, or showing a disrespect for the opinion of the sacred pensman, by saying that the brain, instead of the heart, is the fountain of thought. They wrote upon different subjects according to the knowledge they had received, and gave, undoubtedly, a true account of the opinions of the day ; we, acting upon the same principle, form our opinions upon the various topics of the day, according to the amount of knowledge we have received, with this advantage, however, over the ancient philosophers : we call in to our aid, in forming our opinion, the light which modern science has thrown upon the different subjects we may choose to investigate.

Our own observation, assisted by a knowledge of the laws of nature, are convincing proofs that many of the notions held by the sacred writers were erroneous, especially those which related to the motion of the earth upon its axis, and the other planets in the solar system; and as the Bible was given to man as a chart to conduct him to a holier sphere of existence in another world, it was necessary that it should be given to him by revelation, since the operations of the Spirit cannot be produced by any natural cause. But the works of nature being under the government of certain laws, can be investigated by a knowledge of these laws: hence there was no necessity of a revelation concerning them; consequently the sacred writers wrote upon natural subjects according as the light of science shone upon their understanding. And as they had found the heart to be the great centre of animal life, it was natural enough for them to suppose that it was the fountain of thought.

As we have before shown that the brain is the organ of the mind, and as the mind is composed of different faculties, it is evident that a portion of the brain is given to each faculty. The brain being matter heavier than the skull, would naturally tend to make that portion of the skull, which is thus pressed upon by the brain, to pro-

trude above the surrounding skull. The brain being distributed in different portions underneath the skull, causes these bumps or organs which we observe on the outside of it, and by the size and shape of these organs we judge of the character of an individual, a knowledge of which forms an important science known by the name of Phrenology.

PART III.

PHRENOLOGY.

PHRENOLOGY is a term derived from two Greek words : *phren*, which signifies mind, and *logas*, discourse ; the two together signifying the science of the mind, and its phenomena as manifested through the brain. It points out those connexions which exist between the conditions and developments of the brain, and the manifestations of the mind, discovering each from an observation of the other. Its one distinctive characteristic feature is, that each class of mental functions is manifested by the size of the organ. Thus the benevolent feeling is indicated by means of brain in the front part of the top of the head ; in proportion to the development of the brain here will be one's spontaneous flow of kind, obliging feeling, and so of every other quality of the mind. That these phrenological relations do or do not exist, or that it is fundamentally true, or else untrue, is a self-evident proposition, which, by applying the following philosophical axioms, can be speedily ascertained.

Phrenology, like every other new science, has had, and still has, its opposers ; but it is grati-

ying to every advocate of the science to know that those old fogies and enemies of mental improvement are rapidly disappearing : the objections raised against phrenology having been so repeatedly and satisfactorily answered, upon natural principles, that in spite of their determined opposition, truth has been too powerful, and has so far prevailed, and will eventually obtain a complete victory. The anatomy and physiology of the nervous system, and the practical facts everywhere illustrated by every phrenologist, furnish demonstrable proofs of the correctness of the science.

The objection urged against phrenology upon the grounds of scripture we think we have sufficiently answered. The objection raised against it upon the principle of guessing needs only to be mentioned to be ridiculed by every one ; from the fact that as phrenologists have described the character and mental faculties of persons with whom they were personally unacquainted, and had no other means of ascertaining the disposition of the individual, only by the development of the brain displayed through the organs of the outside of the skull, as shown by phrenology.

But again, objections are urged against phrenology of a different character, and at first appear quite plausible. The objection is that if

phrenology be true, and God the author of nature, it is evident that man cannot be a free moral agent; for, says the objector, it is incompatible with our views and ideas of Jehovah's attributes to suppose that he would bring any of his intelligent creatures into existence, and place them under the control of certain pre-existing and unchangeable laws, and compel them to act under their influence, and then, for those very deeds which were committed, consign an immortal soul—which might have been otherwise happy in glory, had it not been for the existence of those laws—to that region of despair, from whence the smoke of its torment shall ascend up forever and ever. Is this the character of that being whose name and nature is love? Can it be justice or equity in the creator to create a soul and allow it to exist here in a world of sin and woe for a few short years, and then banish it forever from his presence, and from the glory of his power? Certainly not. Such an act is more befitting the character of the blackest fiend in the darkest region of pandemonium, than that God who loveth to do his needy creatures good. Taking this view of the subject it would appear that Phrenology is absolutely untrue, and at variance with the doctrine of man's free agency, and as a matter of course

the doctrine of the universal salvation of all men is the doctrine of the Bible ; or else, that both it and Phrenology are alike untrue.

But before we decide let us investigate the subject a little further. 1st. If phrenology is fundamentally true, it forms an important part of this great system of things called the universe, developing those laws and unfolding those principles, physical, intellectual and moral, in accordance with which "God created man," and also the whole range of animated beings ; consequently, as every portion of the universe originated in the same divine mind, and as each part of it is adapted to every other part, phrenology, if true, is adapted to, and must therefore perfectly harmonize with, every other fact and principle in nature with which it is capable of being composed. But if it be erroneous, then, since God is the author of nature, and man of phrenology, the two will clash with each other, because man could never devise a system of facts and principles capable of dovetailing with laws and operations of nature. Truth will always harmonize with truth, but error cannot tally with truth nor with error. If we can substantiate the science of phrenology upon natural principles, as God is the author, its origin is divine ; and, like every other portion of the

creator's works, its own inherent beauty, simplicity, perfection and *naivette*, will stamp it with the divine impress.

In the first place, then, let us see whether the organs on the skull are under any fixed law. We find by examining the heads of different individuals that the location of each organ is in the same region of the skull in each individual, which proves that the location of these organs are controlled by fixed laws; if they were merely thrown together, or placed there at random by the creator, the location of the various organs would be different in the heads of different individuals; but this we see is not the case: hence, thus far we have proved that phrenology is based upon natural principles, and as a matter of course, harmonizes with nature's laws. But, says the objector, you say that the Almighty has placed these organs upon the head, and deposited the portions of the brain beneath those organs, and the greater the amount of brain, the larger the organ; and consequently the greater the amount of influence over the corresponding faculties. These, sir, says the objector, are objections I would like to see answered. But if the organs increase or decrease in proportion to the amount of exercise they endure, it is certain that they are under

the control of some law over which man has authority, which, if this is the case, will establish man's free moral agency.

The brain is certainly a corporeal organ, that is, it belongs to the body, and is as much composed of animal and earthly matter as any other organ in the system; consequently, must be under the same general law with the rest of the system. It is one of the laws of the system, that each organ will increase or decrease in proportion to the amount of exercise it endures. For example, let a blacksmith who is constantly using the sledge, or hammer, tie up his arm, or hand in a sling for several days, and when he commences to use them again, he will find that the strength of the muscles is greatly decreased. On the contrary, let one who has been accustomed to sit at his books and desk, whose muscles are relaxed and weak, commence using the sledge and hammer, and he will find that in a short time the muscles of his arm will become firm and hard; consequently, as both the brain and arm are corporeal organs they are under the same law, or else there is manifestly a disunion between them. As a proof of this, it has been observed by hatters that literary men require larger hats than laboring men, even though their bodies are less; the reason of this is obvious,

educated persons exercise the brain more, and their bodies less than laboring men. In the heads of sailors who have long followed the seas, the organs of size, weight and locality are large, from the continual exercise they receive; order is commonly found also to be large when compared with those of men of different occupation. Again, the organ of amateness is very small in children, but increases in youth and manhood in proportion to the increased strength of the corresponding passions. It is also observed to be larger in married than in single persons. Is it irrational to suppose that it is exercise that makes this difference?

From the preceding facts we arrive at the conclusion that any set of organs may be increased or decreased by exercise. It is not so much the size of the organ that makes the disposition of a person, as does the conduct; for instance, a man may possess large combativeness, acquisitiveness, destructiveness, &c., and yet not be a thief, murderer, &c.; but it shows from the size of the organs, and the corresponding faculties, how much the possessor has been guilty of yielding to the influence of those animal propensities; though a man may possess the above organs, and yet his moral sentiments overbalance them. As the Creator

has given man the power of action, and placed those organs under the control of action, man is made accountable for his conduct. Hence, it is evident that all men came from the hand of their Maker holy and perfect, with all the organs of the brain rightly developed; and of all the miseries arising from an abuse of the organs and faculties, man is himself the author. To deny this, would be to charge God with folly for having made man an imperfect being; to deny this, would be to sentence the souls of some infants to endless ruin, for the scripture informs us that nothing unholy shall enter into the kingdom of heaven; and if any are created unholy and die in infancy, according to this logic they must inevitably be lost, from the fact that repentance and faith in Christ is the only way of securing eternal life, and the infant cannot repent as it has done nothing to repent of; it cannot exercise faith in Christ because it is ignorant of the plan of salvation. To depraved human nature the doctrine of constitutional depravity seems to be immensely gratifying; since it answers as a sort of "scape goat," upon the head of which to pile up all our sins. But I do not see any thing in nature which teaches that in our day man is born with a less moral or less physical nature than that given to

Adam when he came from the hand of his Maker.

FREE AGENCY AND FATALISM.

As man's free agency is the great gun of the opposition to phrenology—the terrific scare-crow which has frightened many religious people so that they dare not even look at the arguments and facts in the case—and inasmuch as it appears a very plausible objection, I shall endeavor to notice it at considerable length. Please to notice the following arguments.

First. That certain vicious propensities do exist, is an absolute fact which everywhere stares us full in the face. One man is cruel and ferocious, and another mild and tender-hearted. For the first characters, we need only point to our prisons and criminal courts, and to the many cold blooded murders which almost nightly occur in many of our large cities. Need I cite your attention to the revengeful duels and daring robberies, which blacken the columns of almost every newspaper? Need I enumerate the ever-varying crimes of mankind, to illustrate this position? To illustrate the second class of persons we need only refer the reader to John Howard, the philanthropist, who fell a sacrifice to the violence of the prison fever, in Tartary ;

besides a host of other worthies, in all ages of the world, who have shone like stars in the midst of surrounding darkness; or like some kind ministering angels sent from the better land to alleviate the distresses and apply the oil and wine to the wounds of Adam's afflicted sons and daughters. Hence, then, if there are vicious propensities in the brain, there are also virtuous ones; consequently, if we would destroy the one, we must annihilate the other; and as God is the author of nature, and also the creator of all animate beings, He certainly is the creator of those organs, and the disposer of them on the skull; and by objections we are rather impeaching the Almighty with folly, than casting a stigma upon phrenology, from the fact that phrenology does not create the organs, but only points them out; and if God is the author of phrenology its origin is divine, and must be correct, for he is a being "too wise to err;" and as he is also "too good to be unkind," those faculties were doubtless given for a good and wise purpose. We draw this inference from scripture itself, for it is said that God purposed to make man in his own image and in his own likeness; again it is said, after his creation, that God beheld all his works and pronounced them very good, which implies that there was no

imperfection in anything which he had made, and certainly there could not have been any imperfection in the organs or faculties of the brain: hence it is not the use of these organs that produces so much misery in the world, but it is the abuse of them. Suppose that a man possesses large combativeness, firmness, self-esteem and continuity: this does not make him a murderer, from the fact that he generally has other organs of a moral character to overbalance them. Again; suppose that man possessed no moral faculties he would be no more than any other animal; it is his intellectual faculties that give him the ascendancy over the brute creation, and was he destitute of these he would not be accountable for whatever act he might commit, seeing it was done through ignorance, for where there is no law there can be no transgression. Hence, upon no kind of reasoning whatever can we impeach the Almighty with being the author of sin, or man's degradation and moral depravity. Those very organs—the abuse of which causes so much misery and bloodshed throughout the earth, and has so often rent the air with the cries of widows and orphans; that has sent death and destruction abroad like a mighty whirlwind, spreading desolation wherever it appeared; that razed the most beautiful and

populous cities to the ground, overturned mighty empires, dethroned kings, and demolished their kingdoms ; which has destroyed the most beautiful works of art, and at times almost wholly depopulated countries, and covered the earth with the slain of her sons : even these organs, if rightly used, are the choicest earthly blessings which the Creator could bestow upon fallen man, in the present state of society. Without combativeness, firmness, destructiveness and self-esteem, we could not give protection to any creature, no matter how much they needed our assistance, if animal suffering was involved in the affair ; nay, we cannot even sustain our own existence without in some degree exercising those organs. The saint as well as the sinner, in the present state of things, finds an abundant exercise for all of those faculties, although, it is true, in a different sphere of action, and for different purposes. Without firmness and combativeness how could the servant of God face the many vices and errors which are abroad in the world ? In fact it would be morally impossible to be a christian without the exercise of those propensities. The whole life of the christian is styled a warfare. " I have," says the apostle, " fought the good fight of faith"—2 Tim. iv. 7 ; again, we are commanded to " fight the

good fight of faith"—1 Tim. ii. 12 ; again, "ye endured a great fight of affliction"—Heb. x. 32 ; again, "waxed valiant in fight"—Heb. xi. 34 ; again, "so fight I, not as one that beateth the air"—1 Cor. ix. 27 ; again, "if my kingdom was of this world, then would my servants fight"—John xviii. 36 ; again, "who teacheth my fingers to fight"—Psalms cxliv. 1. I am aware that the fighting mentioned here does not imply the destruction of animal life, but it implies the destruction of evil propensities, which requires a large amount of moral courage to resist, and a vast deal of perseverance to overcome, as every christian can testify. Again, says the apostle, "I have kept the faith ;" again, we are commanded to be faithful unto death, and we shall receive a crown of life as a reward for our perseverance or continuity. If, then, we are willing to admit that God is the author and disposer of the organs of benevolence, veneration and conscientiousness, &c., we must certainly admit that he also created and disposed of the other organs. But still farther : Are we positive that war is really that great scourge which it appears to be ? Scripture furnishes us with evidence that God commanded the children of Israel to go to war with the different heathen nations, and gave them the victory :

the Israelites slaying their enemies by thousands, of which Gideon and his army are a well known example ; and Pharaoh and his host at the Red Sea might be referred to as another example. We would not be understood to delight in war, or consider it as an individual blessing, or a blessing to an individual country. No. But we do consider it sometimes a blessing to the world. We might notice various wars which have resulted in benefitting the human race, but we pass to notice the bloodiest scene that ever has, or probably ever will stain the page of the world's history—we refer to the siege of Jerusalem. Josephus informs us that in consequence of the bloody factions that arose in the city, occasioned by the jealousies that arose between the leading parties prior to Titus' marching to the city, that the dead laid piled in the streets—the Jew and Gentile together—so that the blood of the slain stood like lakes in the holy courts themselves. The bodies of Greeks and barbarians, countrymen and strangers, priests and people, laid piled together in one undistinguished heap. The same historian further informs us that during the seven years of the siege there were 1,337,490 persons slain, and 97,000 taken captive ; mothers even killed and roasted their own children, so great

was the famine in the city ; whole companies of the Jews voluntarily put themselves to death by lot, rather than surrender prisoners to the Romans ; so great was the number of deserters to the Roman army outside of the walls, and by them taken and crucified, until there was no timber could be found to make crosses of, or place to put them after they were made. (Whiston's Josephus.) Notwithstanding this awful calamity which befel that rebellious people, the recital of which almost fills the stoutest heart with terror, even through the whole of it, God is by his providence manifestly seen hastening his once chosen people on to certain destruction. And why ? Our Saviour's exclamation, as he saw the city and wept over it, answers the question. Again, we are told in Matt. 24th chapter, that for the elect's sake the days of the Jewish political existence should be shortened, and except they were shortened there should no flesh be saved. Thus we see that although there was a vast amount of suffering endured by that unhappy people, God meant it for the spread and glory of the Christian Church. As a further proof of our position we would instance the war of China in 1841. Although it might seem unjust for the English to commence a bloody warfare for so trifling an insult, yet what

a vast amount of good has not mankind derived from that very war, not only in a commercial, but a religious point of view? The missionary, availing himself of the privilege secured to foreigners by the treaty, carrying the Bible to millions of benighted heathens and spreading the light of revelation among those who had long groped their way surrounded by pagan darkness. Again, considering the politically distracted state of Europe in the latter part of the eighteenth century, and especially that of France at that period, how could it be possible that a more fitting person could be raised up to settle the universal tumult that then agitated Europe than that wonder of the human race, Napoleon Buonaparte? His great mind contemplated those vast projects of conquest which so often put to shame all former achievements; his dauntless courage enabled him to face danger and death in all their varied forms; his stern and inflexible disposition caused him to complete every enterprise in spite of all opposition, and enabled him to perform deeds of valor and feats of daring, which to a common mind would be an absolute impossibility. And would a mind anything less than his have answered the purpose? We might refer you to a Washington, the father of American liberty,

who was "first in war, first in peace, and first in the hearts of his countrymen," as another who seemed destined by Providence to be the pioneer of a new empire; besides a host of others who have stood foremost in danger, and foremost in the rank of fame in all ages of the world. They filled their stations of life and have passed away, and who can say that the Almighty did not point out their course? And who can divine the result or blessings that may be enjoyed by the Christian world in after ages, arising from the late war between England and Russia, although it has cost both nations millions of pounds to carry it on and the lives of thousands of their most valiant sons. That good will arise from it there is no doubt, but when and what amount time itself must determine.

Let us take the historic page of the wars that have swept over the earth from its earliest date down to the present day, and we will see that the Providence of God has determined them for some general good to mankind. Very possibly, this may seem to some persons a strange doctrine, but, strange as it may appear, we are obliged to admit it if we acknowledge the Almighty's rule over the universe, and this we must do if we believe the scriptures. Since, that God is the author of nature and the ruler

of the universe, and the exercise of those propensities, the propelling power of action among mankind, and Phrenology points out the existence and locality of those faculties, do we not discover a harmony existing throughout the whole system. As these propensities do exist, as virtue and vice are abroad in the world, and as vicious and virtuous characters are everywhere to be seen, Phrenology proves itself to be true by pointing them out.

Perhaps the reader will accuse me of having greatly digressed from my subject, namely, Free Agency and Fatalism. My object has been, first, to prove Phrenology to be of divine origin, and if Free Agency is according to the divine will, they will harmonize together as truth will harmonize with truth but, not with error. The first thing, then, to be considered with regard to free agency is, do the organs of the brain increase by exercise? if they do not, man's free agency is destroyed, and as a matter of course, he must ever remain morally passive in the hands of his Creator, content to be, to suffer, or to remain in whatever situation Providence has been pleased to place him.

MATERIALISM. Another objection to phrenology is, that it establishes the doctrine of materialism. It is urged that by making mind

so much dependent upon, and under the influence of, organized matter, and by showing that from one end of the animal kingdom to the other the mental and corporeal manifestations are reciprocal, phrenology proves a connection between mind and matter, so direct and intimate that it can only be explained by admitting that mind is nothing more or less than a condition or property, or emanation of matter, peculiarly organized, and endowed with vitality; and, consequently, that when vitality ceases in such matter, the mind that inhabited it also ceases to exist, and, therefore, cannot be immortal. That the sympathy and connexion between mind and matter are very intimate, and that organised matter has a controlling influence upon the manifestations of intellect and feelings, no one who has investigated the subject will pretend to deny. It is a matter of fact that we know nothing either of the character or operations of the mind in this world, only as they are manifested by means of corporeal organs. The mantled cheek, the lowering brow, the curled lip, the speaking tongue, the sparkling eye, the look of joy, of love, of sorrow, of suffering, of benignity, of intelligence and of indignation, as expressed by the countenance—all indicate the inward workings of the mind, whose mandate they obey; and if we

derange the corporeal organization through which the mind manifests itself, we disturb the mind also. Let the body be vigorous and the mind will be equally so ; whereas, if weakness, or lassitude, or nervous affection prostrate the corporeal powers, the mental powers will proportionably sink. In short if the corporeal organs are deranged in any way the mental functions are equally disturbed ; excepting always the degeneration which different proportions of our species have undergone by the perversion of the laws of our physical nature.

I have already shown that man becomes guilty by perverting his originally good faculties—that he often prostitutes his reason, his moral feeling, and all the noblest powers of his nature, to the base and groveling gratifications of his sensual desires and appetites ; whereas, were he to act in harmony with the constitution which God originally gave to him, he would be virtuous and happy. According to this view of the subject, phrenology establishes the doctrine of free agency, and charges home upon the sinner himself the whole weight of his own guilt with a power and force that can scarcely be derived from any other source. Phrenology, instead of leading to infidelity, materialism, and other anti-scriptural doctrines, furnishes the christian with

a demonstrable proof of the truths of revelation. Suppose a christian is endeavoring to convince an infidel of the realities of a future state of existence, the infidel resists the appeal by rejecting the Bible as an absurd fable, and let the christian turn which way he will, he cannot by the aid of the Scriptures entirely wrest this weapon out of his hand. But here phrenology steps in to his assistance and completely shields christianity from the blows of infidelity, by admitting that God gives to one man—say Dick Turpin, “the noted highway man,”—very large destructiveness, acquisitiveness, &c. ; but so far as the Deity is concerned, these faculties were created pure and sinless, and had they been properly cultivated and directed, their manifestations would have been virtuous and productive of good to mankind. But Turpin had no right to pervert those originally good faculties, and for so doing he alone was guilty, and, of course, punishable. Having, then, proved man to be the author of his own guilt, and consequently punishable, we will here dismiss this part of our subject.

From the preceding arguments it follows that phrenology no more leads to materialism than does anatomy, physiology, medicine, every system of physics, metaphysics, natural and moral

philosophy ; for they are all chargeable of supporting the same doctrine of the intimate connexion between the physical organization and the manifestations of thought and feeling. Nay, even the Bible itself is chargeable with this heresy of materialism, if materialism consists in believing in the connection of mind with matter. In reference to this doctrine of materialism I have only to add, that phrenology furnishes evidence sufficient to satisfy my mind that it is utterly false. This evidence is furnished by the faculties of veneration and hope. I believe that the leading function of the first is to teach us to worship God, and this proves the existence of a Deity, and, consequently of a being whose mind acts independently of organized matter ; and I believe the office of the last is to point out to us a hereafter, by leading us to hope for it and expect it, and thereby it proves the existence of a future state of being. Another subject nearly allied to materialism, and about which we hear a great deal said, is

REGENERATION, OR CHANGE OF HEART.—

The first thing that presents itself to the mind in considering this subject is, in what does this change of heart consist? Simply and solely in a change of the direction of these faculties, or upon the objects by which they are exercised,

and not in a change of their nature or character, or their relative power. For example; if the person converted has a great talent for music, the effect of this conversion is to change the direction of this faculty; thus before conversion it was chiefly exercised in singing songs, lively airs, &c.. whereas it is now chiefly exercised upon pieces of sacred music. If, before his conversion, his reasoning powers are great, but exercised chiefly upon philosophical, scientific or political subjects, they are afterwards equally powerful, but mainly directed to religious and theological subjects. Benevolence, which was before manifested in relieving the physical suffering and promoting the earthly happiness of his fellow men, is now directed to a different and far more elevated object, namely, the salvation and eternal happiness of fallen man; and so of every other feeling, faculty and talent of the individual.

From even a superficial view of the subject, it is evident that it does not consist either in a substitution of one primary mental faculty for another of an opposite faculty, or in a change of their original nature and character, or their proportionate strength; for, if the person who experienced this change possessed a strong original intellect before his conversion; he possessed

as strong an original intellect afterwards ; but, if he is weak-minded before his conversion, he will remain so afterwards. Even his leading peculiarities of mind, thought or feeling remain unaltered ; if, before his conversion, he possessed a remarkably retentive memory of incidents, of faces, dates, principles and places, it is equally so afterwards ; if he is remarkable for his mechanical, musical, or any other talent, before his conversion, he possesses the same talent in the same degree afterwards. Then, as before remarked, this change consists in the direction of the faculties, and not in the faculties themselves. As the power of the faculties remain unchanged though differently directed, there is no call for an alteration in the proportionate size of the organ ; but if this change of heart did necessarily involve a change of the nature and constitution of the mental powers, the inevitable conclusion would be that these faculties were not originally well made, and therefore require remodeling, or rather re-creating, which would necessarily imply imperfection on the part of the Creator ; and not only so, this change in the nature of the faculties themselves would destroy the identity of the person converted, thus making him, not a new being, but another being. The amount of it is, that divine

grace simply gives to the faculties, as they originally were, a new direction. Let us illustrate this by a boat going down a river, and when it has arrived at its place of destination, by the means of a rudder, its direction is altered, and it goes up the stream. Divine grace acts upon the faculties like the rudder of a boat. As the faculties and organs were created originally good, it certainly required a length of time before the evil propensities would overbalance his moral sentiments, for it is impossible, in the nature of things, for any part of the corporeal system to increase or decrease instantaneously, as the exercise of a faculty increases its strength; to give the evil propensities the predominance they must have a far greater amount of exercise than the moral sentiments; then so far as the change is concerned it cannot be a sudden one, except the change of desire; the gift of grace may be instantaneous, but that does not change all the natural propensities one whit: that change can only be produced by watching and prayer, by long continued and laborious effort, and severe self-denial. If the individual had contracted the habit of swearing before his conversion, did he not watch he would be guilty of it afterwards; and the same would be the case with every other besetting sin. Paul speaks of

carrying on a warfare against the lusts of the flesh ; christian experience in the Bible is compared to a light, that groweth brighter and brighter unto the perfect day, to a grain of mustard seed, which, from the smallest of seeds, becomes, a great tree ; plainly implying that as far as the relative strength of the faculties is changed, the change is gradual. I would ask any true christian if he is not obliged to hold with a strong rein those propensities that predominated before his conversion ; and if a long time is not necessary effectually to subdue "those sins which most easily beset him," so that their instinctive promptings are not plainly felt ? This view of the subject of regeneration will explain the cause of so much backsliding among the members of the orthodox churches, especially those churches which enjoy extensive revivals ; in the time of these revivals the minister will, in the first place, thunder out the terrors of the law, with all the energy and force of oratorical powers that he is capable of, and point out to them the awful consequences attending a life of sin and wickedness ; he will tell the unconverted part of his congregation they are about to sink beneath the sulphurous flame, and that angry fiends stand ready to drag them into the awful vortex of eternal ruin ; my imagination would fail me

were I to attempt to conceive the awful frown resting on the countenance of Jehovah, as he looks down upon the hardness of heart of the unregenerate; and my pen would fail to perform its office were I to attempt a description of the appearance of the Almighty's visage, with vengeance depicted in every feature. And whither, oh! whither shall the sinner fly from the wrath of God? If he take the wings of the morning and fly to the uttermost part of the earth, God's anger will rest upon him there; if he descend into hell, there God's vengeance will follow him; though he descend millions of feet below the surface of the earth, yet he cannot escape the dreadful wrath of God—ruin, endless and eternal, attend his every step, and ere another morning he may sleep the sleep that knows no waking—his final doom may be sealed forever, and his soul in the dark regions of the damned, suffering the vengeance of eternal fire; and, says the minister, so sure as the Bible is true, this will be the sinner's doom, unless he repent; and repent now—to-morrow may be too late. The effect of this preaching, with the gestures of the speaker, instead of producing the desired effect—of arousing the mental faculties and causing persons to reflect upon their past conduct, and the attributes of God: the demand

he has upon their lives, as well as all they have and are; the design of their creation, and also the debt they owe to their fellows, as children belonging to one great family—it merely arouses to action the organs of physical fear, and in reality they only consider the demand of their worship which the Almighty has upon the human family to be a prerogative of power, rather than a debt they owe him as their Creator, benefactor, and friend. Instead, I say, of causing these reflections, the all-absorbing thought of the unconverted is how they may escape this sudden and eternal destruction, which they suppose is immediately to overtake them; as if they had always been unknown to Jehovah until the present moment, and now, for the first time during their existence, the Almighty had risen in his might and clothed himself with vengeance as with a garment, and was now determined to punish them for all their guilt by eternally banishing them from his face and favor. After their fears are raised to their highest pitch the scene changes: the minister tells them that notwithstanding the enormity of their crimes Jesus has appeared as mediator, died upon the cross to satisfy the demands of divine justice, ascended up to heaven, took the mediatorial seat, and pleads their guilty cause

before the throne of his father, saying, "Father, behold my hands and side, I suffered this for them. Will not my blood atone for their guilt?" The father hears his prayer, his countenance changes, the frown is turned to a look of pity, he hears the cry of the penitent for mercy, and on the wings of love sends pardon to the guilty soul. The minister, in the meantime, telling the penitent to believe his sins forgiven, and give glory to God for the gift of his grace—the penitent believes, and the grace descends, and he is now relieved from all his fears. And now let me ask how many of the faculties of the individual in question have been exercised to produce this wonderful change? Why, only two: fear and hope. Now, is it reasonable to suppose that it only requires the exercise of these two organs to produce this change, instead of eight, as shown by phrenology to belong to the religious sentiments? When we consider that all the faculties were given for a wise and good purpose, and that they are all capable of being exercised alike, it is reasonable to suppose that when the cause has disappeared that brought any organ into action, the organ itself will soon cease to act, and, consequently, the influence that it had exercised over the organs will be lost. So it is with this change: there

being only two organs brought into action, so soon as the excitement ceased which caused the action of these organs, their influence ceased, and the whole machinery of the brain went on as before, and the individual relapsed again into his former habits and practices. Need we wonder that people backslide under such circumstances? Indeed it would be a wonder if they did not. But I would not have the reader suppose that I object to revival meetings. I do not. But I object to the manner in which they are conducted. I object to this frightening process which ministers so often resort to, merely for the sake of raising a religious excitement. Man is an intellectual being, and should be treated as such ; and if any one or two organs or faculties get excited over the rest, enough to influence them, all that action produces is the abuse and not the use of the faculty ; and the abuse of one faculty is as bad as the abuse of another ; and without the exercise of his mental faculties man is as incapable of reasoning as any other animal. Hence, the man has only had his animal feelings aroused by this excitement, and his religion has been a mental delusion ; as a matter of course when the excitement has subsided, his religion has subsided, and the individual is set down as a backslider, when, in

reality, the person has remained morally and mentally unchanged, except so far as the excitement was concerned. Thus, if I am not greatly mistaken, I have shown the reason of so much backsliding among the members of many of the orthodox churches. Having thus examined the preceding subjects phrenologically, we will now endeavor to illustrate the science of Practical Phrenology.

PHRENOLOGY. As the illustration and application of the principles of phrenology necessarily combine with them much evidence of the truth of the science, it is impossible to treat the several branches of the subject in a manner wholly distinct and separate. At every succeeding step, therefore, there will be presented additional proofs of the correctness and importance of the science. The first thing that will be considered in relation to phrenology is the division of the

Temperaments. The word temperament is here used to denote certain states or conditions of the body, or the relative activity of particular classes of the corporeal organs. The temperaments are divided into four kinds: 1st. Lymphatic; 2nd. Sanguine; 3rd. Billious; 4th. Nervous.

The Lymphatic, in which are the secretory

glands, are the most active portion of the system, indicated by soft and abundant flesh, and languor of the pulse, and of all of the corporeal and mental functions; by a dull, indolent disposition, and an aversion to corporeal labor. Great excitement is necessary to arouse one with this temperament to action, but when aroused, the action may be a powerful one. The negroes generally possess this temperament.

- The Sanguine, in which the arterial system and the organs which circulate the various fluids, particularly the blood, are most active: indicated by a strong and rapid pulse, strong animal passions, and more ardor, enthusiasm, activity, and zeal, than strength and power of mind or body.

The Billious, in which the muscular portion of the system predominates in activity: characterized by a more athletic form, by a strong and steady pulse, hardness, strength and power of body, accompanied by a considerable force and energy of mind and character.

The Nervous, in which the brain and the nervous system are much more active than the other portions of the body, which gives rise to, and is accompanied by, the highest degree of excitability and activity of the physical and

mental powers, clearness and rapidity of thought, perception and conception, sprightliness of mind and body, with more activity vivacity, and intensity, than power and endurance of mind and body.

The influence of education is exerted chiefly in directing and modifying, the operations and manifestations of the various faculties, rather than the growth or decrease of their strength, power, or the size of their respective organs.

Shape of the Organs. Each mental faculty is indicated by means of two sets of organs, occupying a corresponding portion of each hemisphere of the brain. The same principle of double organ obtains here as is exemplified in the case of the eye, the ear, &c.; and doubtless for the same reason, that when one organ is injured the other may perform its functions. In shape the organs are conical, their apex being at the medulla oblongata, and their base at the skull. A straight line drawn from the opening of one ear to that of the other, would pass nearly through it. The power of each faculty, and its tendency to action is proportionate to the size of its respective organ. In order to determine the size of an organ it is necessary to obtain its length and breadth. The length of the organs may be determined by observing the

distance from the external opening of the ear to that part of the skull in which they terminate ; and the breadth by the surface of the skull they occupy. It is supposed that the portion of the organ which is nearest to the skull is chiefly used in the exercise of the mental functions. In some heads the shape of the organs are sharper and more elongated than in others, thus presenting a greater prominence ; in others they are shorter and broader. The shape of the former denotes great activity and less power ; the latter denotes great intensity and strength.

CLASSIFICATION OF THE FACULTIES.—The faculties are divided into two classes or orders, and these are subdivided into several genera, and these again into various species.

ORDER 1ST. *Affective Faculties, or Feelings.* From these faculties originate the propensities, desires, emotions, sentiments, and the whole range of those mental operations denominated feelings. They constitute by far the largest class of the mental operations, and whenever their stimuli are presented, rush into involuntary activity, and frequently without awaiting the command of reason. Although we cannot altogether avoid this internal excitement, yet we are not obliged to express all that we feel. The organs of these faculties occupy that por-

tion of the brain commonly covered by the hair.

Genus Propensities. These embrace those mental functions which pertain to man as an animal, or to his physical relations. They stimulate the other faculties; impart efficiency, impetus, and physical force to the whole character; originate the various animal impulses, passions, and desires to act, and are located in the posterior, or back and lower portion of the head, and when large, or very large, causing great breadth of brain behind and over the ears; but when small, this portion of the head is thin and narrow. Nearly all the brain of animals is developed in this region, and their characters are made up of the functions pertaining to the corresponding faculties.

The Domestic Propensities are amativeness, philoprogenitiveness, adhesiveness, and inhabitiveness. These constitute man a gregarious animal, lay the foundation for his civil institutions, make him a social and domestic being, create family attachments, have a reference to the marriage state, and originate most of its duties, relations, and pleasures. When large, or very large, they cause an elongation and fullness in the middle and lower portion of the back part of the head; but when they are

small, present a depressed and flattened appearance.

Selfish Propensities. These are vitativeness, combativeness, destructiveness, alimentiveness, acquisitiveness, and secretiveness. These provide for the various animal wants, and have a reference to the desires of the person possessing them, and terminate upon his interest, wants, and happiness. They are located upon the sides of the head, around the ears, and when large, or very large, give it a thick and round appearance, but when small, the head is thin and flat in this region.

Human, Moral, and Religious Sentiments. These are feelings of a higher order than the propensities; are more elevating in their character, and more humanizing in their influence. They are located together in the coronal, or upper portion of the head, and when large, or very large, elongate, widen, and elevate this part of the head; but when moderate, or small, the head is lower, shorter, and narrower.

Selfish Sentiments. These are cautiousness, approbation, self-esteem, and firmness. These, like the selfish propensities, also terminate upon their possessor, and dispose him to seek his own interest, and thereby become selfish; yet their character and manifestations

are superior to those of the selfish propensities, especially when the religious and reasoning faculties are strong. They are located together in the back part of the upper portion of the head. When these organs are large, or very large, this portion of the head is extended upwards and backwards, and when the remaining sentiments are deficient it is rendered conical.

Religious Sentiments. They are conscientiousness, hope, marvellousness, veneration, and benevolence. These faculties create those moral, religious, and devotional feelings which enter so largely into the human character; humanize, adorn, elevate, and soften the nature of man; and which constitute him a moral and religious, and, consequently, an accountable being, and connect him with the moral government of God; create those moral duties and relations which exist between man and his Maker, and also between man and man. They are situated in the frontal portion of the upper portion of the head, and when very large throw a proportionably large amount of brain into this region, elevating and elongating it.

*Semi-Intellectual Faculties, (Sentiments).—*They are constructiveness, ideality, imitation, and mirthfulness. These faculties are of a

mixed nature, participating the properties both of the human sentiments and of the intellectual faculties. They tend to the adornment of the mind by creating in it a taste and a talent for the fine arts, and polite literature ; for constructing, manufacturing, copying, and the like. They are located partly between the forehead and the portion which is covered by the hair, and partly within the latter ; giving, when large, or very large, a fulness and breadth to this portion of the head ; but when small, the head where the hair begins to appear is narrow and flattened.

ORDER 2ND. INTELLECTUAL FACULTIES.

These faculties have to do exclusively with objects and things, their physical qualities, and abstract relations. They create a thirst for information, and furnish the ability to acquire knowledge in general ; take cognizance of facts and conditions, and remember them, and constitute what is commonly called the judgment or understanding.

Perceptive Faculties. These perceive natural objects, and their physical qualities, together with some of their relations. They constitute the direct medium of communication between the other faculties and the material world, and

convey to the mind all the physical information it is capable of acquiring.

External Senses. They are feeling, sight, hearing, taste, and smell. These perform the first portion of the process of observing the physical qualities of material objects.

Observing and Knowing Faculties. They are Individuality, Form, Size, Weight, Color, Order, Calculation and Locality. These store the mind with individual facts; furnish a general knowledge of things, their conditions and qualities; collect statistical information; create a desire and talent proportionate to their size for observing and knowing; and thus render very great assistance in doing every kind of business. They are located directly above the eyes—their principal medium with the external world—and when very large, cause the lower portions of the forehead above the eyes to protrude proportionally, but when small, this portion is depressed.

Semi-Perceptive Faculties. They are eventuality, time, tune and language. These constitute a class of faculties intermediate between those which perceive objects and their physical qualities, and those which comprehend the abstract relations of things, and have to do with a class of facts which are not necessarily of a physical character.

Reflective or Reasoning Faculties. They are casuality and comparison. These form ideas, reason ; superintend the operations of the other faculties ; perceive abstract and metaphysical relations, the connexion between cause and effect, proposition, inference, &c. ; form judgment ; discover truth and absurdity. They are located in the superior and frontal portion of the forehead. When they are large, the upper portion of the forehead is very high, broad and deep, as well as prominent, but, when they are small, this portion is low, narrow and depressed.

COMBINATIONS OF THE CLASSES OF FACULTIES. The back part of the head called occipital, is exclusively occupied by the organs of the propensities and selfish sentiments, the remaining portion is called frontal, and is devoted to the organs of the sentiments and the intellect.—One in whom the occipital region is larger than the frontal, will have proportionally more of feeling than reason ; of passion than intellect ; of propelling than direction of power ; of efficiency than depth and strength of intellect ; of zeal, and energy, and action, than judgment ; but, when the occipital is smaller than the frontal portion, the character will be directly the opposite. One in whom the basilar region predominates over the coronal, will possess great force

and efficiency of character ; a ready talent for business, and study, and strong passions applied to selfish purposes, but accompanied with less morality and human sentiments, and yet, with full causality and comparison, may be capable of effecting and conducting important operations. This portion of the brain is generally large in men who distinguish themselves in the world. One who possesses a greater development of the moral and intellectual faculties than of the propensities, will have goodness with less greatness or force of character, morality and virtue, joined with want of energy; will be amiable and sentimental if not eminently pious, yet effect but little. This organization is but poorly adapted to the exigencies of the nineteenth century. One having large organs of the propensities, and the religious sentiments and reasoning faculties, moderate or full, may struggle hard against the current of his propensities, yet will be liable to be often overcome by it, may endeavor to live a virtuous, Christian life, yet will be sometimes guilty of gross inconsistencies and apt to take contracted views of religious subjects, and indulge alternately both classes of organs; but with the moral and reasoning faculties equally large will be obliged to struggle hard, yet will struggle successfully against " his easily beset.

ting sins," and, in general, be consistent in his religious belief and practice. One having the propensities well developed, with very large moral and intellectual organs, will combine great strength of mind with great energy of character, directed by the humane sentiments, and applied to the advancement of moral and benevolent objects, and be a talented and useful member of society, yet have many faults. One with the propensities and the intellectual organs large, and the moral deficient, will combine great power and energy of mind with great depravity of character, and never lack means by which to gratify his selfish passions. One having some of each class of organs large or very large, will present seemingly contradictory phases of character, will often do what he afterwards regrets, and be subject to a constant "warfare between the flesh and the spirit." One having the perceptive faculties generally large or very large, and the reasoning organs only full, will have a mind well stored with facts, and a desire to see and know—a thirst for general information and a facility in acquiring it—an ability to attend to details, and a popular, practical business talent, but will lack depth, judgment, originality and penetration of mind, but cannot superintend complicated operations; may be a good scholar

and pass for a man of talents, yet will not think profoundly, nor readily comprehend first principles, nor bear sounding. One with the reflecting organs large, and the perceptive only moderate or small, or with the upper portion of the forehead larger than the lower, will think more than he observes or communicates ; will have much more to do with ideas than with facts ; with fundamental principles, and the general bearing of things than with the details and minutia ; he will be unable to employ his powers to a good advantage, or show what he is except in a certain sphere, yet will bear well ; have a fund of important ideas and excellent judgment, and shine in proportion as he is tried. One having the perceptive and reasoning organs both large or very large, and a large and active brain, will have a universal talent and a mind well furnished with facts and principles, and a respectable development of the propensities, possess a decidedly superior intellect, and be capable of rising to eminence ; will not only possess talents of a very high order, but be able to use them to the best advantage, and succeed in whatever he undertakes, even when most around him fail. One with an even head in which all the parts are respectably balanced or developed will have few prominent traits of character, and few excesses or deficiencies ; will do a fair

business, take his character from surrounding objects and circumstances, and pass quietly through life ; but if the brain is large and very active, and external circumstances are favorable, he will be a universal genius—great in everything, without any weak points of character, and capable of swaying a commanding influence. One with an uneven head will be notorious for his peculiarities of talents and disposition ; will cut a bold and commanding figure wherever he moves ; and often affect something important, but will often present strong and weak points or traits of character.

The combined action of the several organs, has also a very important influence upon the character and the mental manifestations, particularly in directing them. For example, self-esteem, large or very large, combined with still larger moral and reasoning organs, and with small propensities, imparts a dignity, manliness, and nobleness, and high-mindedness, which scorn everything mean or degrading, and forms the most commendable trait of character ; while the same degree of self-esteem joined with weaker moral and reasoning faculties, and stronger selfish propensities, makes its possessor proud, conceited, impertinent, and most disagreeable.

The larger organs control and direct the

weaker ones and also give the stamp to the whole character, while the smaller ones, in proportion to their strength, modify the action of the larger. Thus, one having large combative-ness and destructiveness, with large self-esteem, will employ the former to avenge personal injuries, to promote selfish interests, and domineer over others ; but with self-esteem only moderate, and conscientiousness and benevolence large, will seldom resent personal injuries, yet will maintain the cause of truth and justice.

NAMES AND NUMBER OF THE PHRENOLOGICAL ORGANS.

NO.	NAMES.	ABBREVIATIONS
	<i>Domestic Propensities.</i>	<i>Domes. Propen.</i>
1	Amativeness.....	Amt.
2	Philoprogenitiveness.....	Philo.
3	Adhesiveness.....	Adhes.
4	Inhabitiveness.....	Inhab.
5	Concentrativeness.....	Concent.
	<i>Selfish Propensities.</i>	<i>Self. Propen.</i>
6	Vitiveness.....	Viat.
7	Combativeness.....	Combat.
8	Destructiveness.....	Destruct.
9	Alimentiveness.....	Aliment.
10	Acquisitiveness.....	Acquis.
11	Secretiveness.....	Secret.
	<i>Selfish Sentiments.</i>	<i>Self. Sents.</i>
12	Cautiousness.....	Caut.
13	Approbativeness.....	Appro.
14	Self Esteem.....	Self Es.
15	Firmness.....	Firm.
	<i>Moral Sentiments.</i>	<i>Mor. Sents.</i>
16	Conscientiousness.....	Consci.

NAMES AND NUMBER OF THE ORGANS.—(*Continued.*)

NO.	NAMES.	ABBREVIATIONS
16	Hope.....	Hope.
17	Marvellousness.....	Marvel.
18	Veneration.....	Ven.
19	Benevolence.....	Benevo.
	<i>Semi-Intellectual Sentiments.</i>	<i>Semi-Intel. Sent.</i>
20	Constructiveness.....	Const.
21	Ideality.....	Ide.
22	Sublimity.....	Sub.
23	Imitation.....	Imi.
24	Mirthfulness.....	Mirthfl.
	Intellectual Faculties.....	Intl. Fac.
	Perceptive Faculties.....	Perct. Fac.
25	Individuality.....	Ind.
26	Form.....	Form.
27	Size.....	Size.
28	Weight.....	Wt.
29	Color.....	Col.
30	Order.....	Order.
31	Calculation.....	Cal.
32	Locality.....	Loc.
33	Eventuality.....	Even.
34	Time.....	Time.
35	Tune.....	Tune.
36	Language.....	Lang.
	<i>Reasoning Organs.</i>	<i>Reas'g Organs.</i>
37	Causality.....	Caus.
38	Comparison.....	Comp.
39	Suavitiveness.....	Suat.
40	Human Nature.....	Hum. Natr.

In the preceding table we have omitted to give the size of the organs, for the reason that this work is not designed to enter into the minutia or detail of any subject, but merely to give a general display of man in all of the characters of which we know him to be possessed.

ANALYSIS AND CLASSIFICATION OF THE FACULTIES. *Amativeness*: Reciprocal Attachment and love of the sexes as such, with adhesiveness, connubial love and the married relation. Adaptation. To prevent the extinction of our race, some provision for its continuance became necessary. Propagation and death, are arrangements necessarily connected with man's earthly existence, the former has its counterpart in this organ, it creates all those relations and reciprocal feelings existing between the sexes as such ; and results in marriage and offspring. So far from being gross or exceptionable, the proper use of this organ is pure, chaste and even desirable. The son who always loves and obeys his mother, will also be tender and faithful to his wife, and the endearing recollections of loved ones, will always be a strong incentive to virtue, as well as a restraint upon his vicious propensities. The mother dotes upon her sons, and the father upon his daughters. All this class of feelings and phenomena originates in this faculty ; this organ is larger in the brain of persons residing in a city, than those in the country, owing to its continual exercise by caresses even bestowed upon children by the opposite sex, but being already too strong, it should be excited as little as possible. Average : One having this

organ average, will treat the other sex tenderly, and enjoy society, yet not be enchanted with it, nor allow it to divert him from graver pursuits, yet its amount will be determined by his temperaments and combinations. If adhesiveness, conscientiousness and ideality are large, and activity great, his love will be tender and intense, yet pure and chaste ; partake more of elevated friendship than animal feeling, and be refined and virtuous ; he will have more friends than lovers among the opposite sex ; be disgusted with vulgarity in them ; in case his love is well placed, will enjoy the marriage relations much, and with the intellectual organs large will love the intellectual only. But, if ideality is moderate or small he will disregard mere personal beauty and choose a useful companion. With cautiousness very large, he will mature his love slowly, hesitate much, and perhaps make no choice at all. With cautiousness and secretiveness both large, he will express more love than he feels, and that by piece-meal, and then not till his loved one is fully committed. With conscientiousness and approbateness large, he can love only one whose morals are pure with small self-esteem ; will be bashful in the company of the opposite sex. With adhesiveness and benevolence large, with ideality

and approbateness small, will be really kind and affectionate towards the other sex, yet not polite or refined, but merely attentive. Full : One having amateness full, will experience the same feelings in kind, (only in a greater degree) with one having amateness average. Large : One who has amateness large, will be alive to the charms of the other sex ; a great admirer of their beauty of form, elegance of manners, on account of the reciprocal influence of this faculty can easily ingratiate himself into their good will, become acquainted with, and exert an influence over them, and kindle in them a passion of love, or, at best, create a favourable impression, even if in some respects disagreeable; his warmest friends will be those of the opposite sex, and when this feeling is strongly excited, finds it hard to govern. Very large : One having this organ very large, experiences its power to almost an ungovernable extent; is passionately fond of the other sex ; should by all means be married ; will place the highest estimate upon them, and experience the feelings described under amateness large, except in a greater degree of power, so that making due allowance for the increase of this feeling, his character will be read in this respect under amateness large, selecting those combinations

which are found in his head. Small : Feels little connubial love or desire to marry ; is cold, distant and reserved to the opposite sex.

Philoprogenitiveness. Parental love ; attachment to ones offspring ; love of children generally ; of pets, animals, &c. Adaptation : For aught we know, man, like the fabled Minerva from the brain of Jubiter, might have been brought forth in the full possession of all his faculties both physical and mental, capable, from the first moment of his existence, of taking care of himself, and of supplying his every want. But the fact is otherwise. He enters the world in a helpless condition, and, but for the greatest parental care, every infant must inevitably perish, and our race become extinct. To this arrangement or state of things, philoprogenitiveness is adapted, nor can any other element of man's nature accomplish this end attained by this faculty. The infant cannot be regarded as a friend, and therefore adhesiveness cannot be exercised upon it. Causality might devise the means requisite for its relief, but would not lift his finger towards executing them. Benevolence might do something, yet it would be far too little for their physical salvation or their mental and moral culture. How often do we find persons very

benevolent to adults, but cruel to children. These vexatious and expensive little creatures are far more likely to array combativeness, destructiveness and acquisitiveness against them than benevolence or any other faculty in their favour ; so that if parents had no faculty adapted exclusively to the nursing and training of their offspring, their burdens would be too intolerable to be submitted to, whereas this faculty renders them the dearest of all objects to parents, their richest treasure, their greatest delight, and an object for which they live, labor and suffer more than for any other, casting into the shade all toil and trouble which they cause, and lacerating the parent's heart with the bitterest pangs, when death or space tears the parent and child asunder. The numberless attentions demanded by the helpless condition of children, require a much more vigorous action of the other faculties in their favor, than is demanded by adults. Philoprogenitiveness excites combat, and combativeness and cautiousness in their defence.—Causality to plan, and Benevolence to execute means for their relief ; it stimulates acquisitiveness to accumulate means to educate them—in fact, it sets all the other faculties to work in their behalf. However, the duties and relations of the mother to her offspring require a much

greater endowment of this faculty in her, than in the father, and accordingly, we find much larger philoprogenitiveness in the female than in the male head. This adaptation of the organ in woman, to the far greater power of the passion, and of both, to the far greater demand made upon her by her offspring, is an important evidence of the truth of phrenology. Average : One having philoprogenitiveness average, will take considerable interest in children, especially when they begin to walk and prattle, and, if a parent, exert himself strenuously to provide for them ; place a high but reasonable value upon them ; be sufficiently tender of them, yet not foolishly indulgent ; be pleased with good children, yet not bear much from those that are troublesome ; and whilst he will value his own children highly, and bear considerably from them, he will not care much about those of others, or bear much from them. One having philoprogenitiveness average, with destructiveness large, will not manifest a great fondness for infants, yet when his own children are capable of being made companions and friends, will prize them highly. With combativeness and destructiveness larger than philoprogenitiveness, though tolerably fond of good children, will not bear with their mischief, or their noise,

and hence often scold if he does not punish them ; with well developed intellectual organs, will labor for their intellectual improvement and give them advantages for education. With the moral organs large, will seek the moral and religious improvement, and give them good advantages for obtaining it, and watch over their moral conduct. With adhesiveness, benevolence, firmness, conscientiousness and the reasoning organs large, combativeness and self-esteem full, will like children well, yet be far from spoiling them by over indulgence, and generally secure their obedience, yet not treat them with severity. With very large conscientiousness, will not make sufficient allowance for their childishness, but censure their thoughtless mischief as though it were a premeditated wrong. Full : One having this organ full with the corresponding faculties, his character will be read under this organ, average, making an allowance for increase of size. Large : One having philoprogenitiveness large, if a parent, takes a deep and lively interest in his children ; enjoys their company and childish sports, and perhaps often mingles with them ; easily gains their good will by paying them some little attention, and is therefore the better qualified to govern and educate them ; values his children

above all price ; cheerfully submits to parental care and toil ; spares no pains for them ; watches tenderly around their sick-bed ; regrets their absence, and greatly laments their loss, and if concentrativeness is large, will mourn over that loss for years, but with concentrativeness small, though he will feel their loss keenly whenever he thinks of it will, however, be occasionally relieved by a change of scenes, places, &c. With combativeness, destructiveness and self-esteem full, and adhesiveness, benevolence, conscientiousness, firmness and the reasoning organs large, corrects his children for their own good, and not for his caprice, and governs them mainly by moral suasion, and only employs physical force as a last resort ; is kind, yet strict ; fond, yet not over indulgent ; gratifies his children whenever he can do so without injuring them, but no further ; and is well qualified to become and discharge the duties of a guardian and parent. If a professor of religion will interest himself in moral and religious institutions, such as sabbath schools, &c., and with large cautiousness added, will have much anxiety about the matter ; with the intellectual organs large, will do his utmost to cultivate their intellect ; with an active temperament, a moderate sized brain, and large com-

bativeness and destructiveness, and moderate causality, secretiveness, and conscientiousness, will be by turns too indulgent, and then too severe—pet them one minute, and punish or scold them the next, not overlooking their childish foibles ; with but moderate self-esteem added, will fail to secure their respect or obedience, and will allow them to trample upon him ; with large approbateness and ideality added to this combination, will be likely to educate them for show rather than for usefulness, thus making them self-conceited fops, and gaudy belles, rather than useful members of society ; but with a large brain, well developed morally and intellectually, and only moderate ideality and approbateness, will seek their usefulness, rather than their distinction, and give them a practical and substantial education. With a full or large sized brain, and well developed moral and intellectual organs, particularly large firmness, self-esteem, conscientiousness, individuality, eventuality, locality, form, language, order, calculation and comparison, will be eminently qualified for teaching school, and capable of both governing and instructing them. This organ also fastens upon other objects of care, such as the domestic animals, particularly horses, dogs, cattle, birds, &c ; this organ being com-

bined with ideality, aids in matching and judging of horses, and with large acquisitiveness, leads to trading in them. Very large : One having philoprogenitiveness very large, will experience the feelings described under this organ large, but in the highest degree of intensity and power ; will idolize his children ; grieves immoderately at their loss, and absolutely lives for them. With large benevolence cannot correct them, and with average causality is in danger of spoiling them by over indulgence.— With large approbateness or self-esteem, indulges parental vanity, and prides himself upon his children, and takes every opportunity of exhibiting their attainments. With large cautiousness, indulges in a multitude of groundless apprehensions concerning their safety. With large intellectual organs, will love them as intellectual beings, rather than as merely his own children, and employ his utmost powers in cultivating the higher and nobler qualities of man's nature, contemplating them with a fondness amounting to rapture. Moderate : One having this organ moderate, will not be fond enough of children to bear much from them ; may love his own children, but care very little for those of others, and cannot please or take care of them, particularly infants, nor endure their cry or

noise. With an active temperament and large combativeness, is yet with destructiveness and combativeness only full, with philoprogenitiveness large, may do everything for their good, and never see them suffer. This description will apply to this organ average, due allowance being made for the decrease of feeling. Small : feels little interest even in his own children, and is liable to treat them, as well as others, unkindly. Location : This organ is located in the centre of the back part of the head, just above the sharp point of the occipital bone and back of the top of the ears. When the lobes of adhesiveness are large, and philoprogenitiveness is small, a depression will be found between the lower portion of the two lobes of adhesiveness, but when philoprogenitiveness is also large, this portion of the head will be elongated. When philoprogenitiveness and adhesiveness are both large, and inhabitiveness small, it assumes a sharpened appearance, running horizontally between the two lobes of adhesiveness.

Amativeness is located in the cerebellum, or between the mastoid processes behind the ear, and when large, causes this portion of the head to appear broad, and thick ; when small, the neck is thin and narrow.

Adhesiveness : Friendship, social feeling, love of society. Average, is quite friendly, yet

not willing to sacrifice anything for his friends. Full, is highly social, yet not remarkably warm hearted. Large, is eminently social, an ardent, sincere friend ; enjoys friendly society extremely, forms strong, if not hasty attachments. Very large loves friends with indescribable tenderness and feeling ; will sacrifice almost everything upon the altar of friendship. With large amativeness, is susceptible of the most devoted connubial love ; falls in love easily. Moderate, loves friends some, yet self more ; is often changing his friends. Small, or very small, is unsocial, cold-hearted, likes and is liked by few or none, and in reality is a stranger to all friendly feelings. Location : The location of this organ is outward and upward from philo-progenitiveness, and above amativeness, and its shape nearly oval.

Inhabitiveness. Love of home, as such ; attachment to the place where one has lived ; unwillingness to change it. Average : forms some local attachments though not very strong. Full : loves home well, yet does not grieve much on leaving it. Large : soon becomes strongly attached to home, loves it dearly, thinks the place in which he lives about the best in the country, leaves it reluctantly, is unhappy without a home of his own. Very large : regards home as the sweetest, dearest spot on earth ;

feels homesick when away, dislikes changing residences, is pre-eminently patriotic, thinks of his native place with intense interest. One with inhabitiveness small forms few or no local attachments, cares little where he is, makes any place his home, leaves and changes residences without regret. Location: The location of inhabitiveness is directly above philoprogenitiveness, and partly between the two lobes of adhesiveness. Where it is large, and concentrativeness moderate, an angle is formed near the union of the lamboidal sutures, between which and occipital bone there will be a considerable distance, but when it is small no such organ will be found.

Concentrativeness. Unity and continuity of thought and feeling, power of entire and concentrated application to one thing. Average: does not possess this power to any great extent, yet may carry on some small amount of business. Full: is disposed to attend to but one thing at a time, yet can turn rapidly from one thing to another; is neither disconnected nor prolix. Large: is able and inclined to apply his mind to one and but one subject for the time being, changes his mental operations with difficulty; this, combined with large mental faculties, with language added, is fond of hearing and telling

long stories ; with this organ full, and large mental faculties, will make a good scholar and a man of business. One having concentrativeness very large, places his mind slowly upon subjects ; will not leave them, nor attend to but one thing at once ; is very tedious, has great application, but lacks intensity and point. Small : craves novelty and variety, has little application, thinks and feels intensely, yet not long, on anything ; jumps rapidly from premise to conclusion, fails to connect and carry out ideas. Location : This organ is located above inhabitiveness and adhesiveness, and below self-esteem. When it is large, or very large, a general fullness of this region will be observable, but no protuberance will be apparent ; but when it is small, a proportionate semi-circular depression will be very perceptible, in part encircling adhesiveness and inhabitiveness, and following the lamboidal sutures. When inhabitiveness is also small, the depression is widened at the union of these sutures.

SELFISH PROPENSITIES. These provide for the various animal wants ; have reference to the necessities, desires, and gratifications of their possessor, and terminate upon his sensual interests and wants. Large or very large : has strong animal desires ; is strongly tempted to

gratify them ; and unless the moral sentiments are still stronger, will be selfish, and live only to gratify his own inclinations, without any regard to the happiness of others. Small : is not selfish enough ; easily trod upon ; needs to have some one to take care of him ; cannot give himself up to sensual pleasures. With large conscientiousness will be easily duped and be made to believe that whatever is told him for truth, must be so.

Vitativeness. Love of existence ; as such, dread of annihilation. Average : is attached to life, and fears death, yet not a great deal. Full : desires life, but not eagerly, from love of it, and of pleasure. Large : loves and clings to life tenaciously ; loves existence for its own sake ; craves immortality ; prefers a miserable existence to annihilation. Very large : however wretched, shrinks and shudders at the thought of being dead ; feels that he cannot give up existence.

Combativeness. Feeling of resistance ; defence, opposition, boldness, willingness to encounter, courage, &c. Average : is pacific, but when driven to it, defends his right boldly ; avoids collision, strife, &c., yet, once excited, is quite forcible. Full : seldom either seeks or dreads opposition ; when roused is energetic ; may be

quick tempered ; yet is not contentious. Large : is resolute and courageous, spirited and efficient as an opponent ; quick and intrepid in resistance ; loves debate ; boldly meets opposition, if he does not court it. Very large : is powerful in opposition ; prone to dispute ; ready to attack, &c ; given to be contrary ; has a violent temper, and governs it with difficulty. Small, or very small, is inefficient ; lacks force and temper ; is chicken-hearted ; is almost afraid of his own shadow. Location : In a common sized head, combativeness is located about an inch and a half behind the top of the ear, and extends itself in a perpendicular direction. When it is very large, and the surrounding organs also large, it will cause a thickness of this part of the head, which may be the 'more easily observed by placing the thumb upon the organ on one side, and the fingers upon the opposite side, but when it is moderate or small, there will be but little protruberance in this region.

Destructiveness. Executiveness, indignation, force, severity, sternness, a destroying, pain-causing disposition. Average : is by no means deficient, yet, has none too much. Full : can cause, or witness severity and even death ; has sufficient severity, but it requires considerable to call it out. Large : when excited, feels

deep toned indignation ; is forcible, and is disposed to destroy or subdue the cause of his displeasure. Very large : when provoked, is vindictive, cruel, disposed to hurt, take revenge, &c ; as an enemy is bitter and implacable. Location : this organ is located beneath the temporal bone, and, when large, extends from three to six-eighths of an inch above the top of the ear. When it is large it thickens the middle of the base of the head, and makes the ears stand out from the head. When it is large, or very large, and secretiveness small, it produces a horizontal ridge which extends about half an inch above the top of the ear.

Alimentiveness. Appetite for sustenance ; cause of hunger. Average : enjoys food well, but is not particular. Full : has a good appetite, yet can govern it well ; hence is not greedy. Large : has an excellent appetite ; a hearty relish for food, drink, &c., enjoys them much ; is a good provider ; not dainty. Very large : sets too much by the indulgence of his palate ; eats with the keenest appetite ; makes an idol of his stomach. Small, or very small : has no relish for food ; is very particular in his choice of food ; cares but very little when he eats, or whether he eats at all. Location : Alimentiveness is located just before, and a little

below destructiveness, in front of the top part of the ears, beneath the anterior portion of the temporal bone. It may be distinguished from destructiveness, by its being situated farther forward and a little below it. It is generally large in children.

Acquisitiveness. Love of acquiring property, and possessing it as such ; desire to save ; an innate principle to possess and dispose of things. Average : loves money, but does not make it his god ; can make it, but spends it freely. With large benevolence, gives liberally to the needy and destitute. With large moral and religious sentiments, gives freely to the support of the gospel and moral institutions ; if the intellectual organs are very large, delights in supporting educational institutions, common schools, &c. Full : sets by property, both for itself and what it procures, yet is not penurious ; is industrious and saving, yet supplies his wants ; may be close in making a bargain, yet not dishonest. One having large acquisitiveness, has a strong desire to acquire property ; is frugal ; saving of money ; devoted to money-making : generally gets the worth of it, and is quite fond of trading. Very large : makes money his idol, and unless conscientiousness is also very large, will be inclined to use dishonest

means to obtain it ; will be obliged to contend much with his desires to remain strictly honest. Small, or very small : spends all the money he can get, injudiciously, regardless of the price of things, in fact, hardly knows the worth of money. Location : this organ is located just before secretiveness and above alimentiveness, or, upon the sides of the head, and a little further forward than the fore part of the ears ; or in the middle of a line, connecting the organs of cautiousness and calculation. It seldom causes a protuberance, but, when it is large, the thickness of the head is perceivable, even to the naked eye, just in front of, and a little above the tops of the ears.

Secretiveness. Desire and ability to secrete, conceal, &c. Average : is not very frank, but generally open ; can conceal, if he chooses. Full : can keep to himself what he chooses, yet not cunning. Large : seldom discloses his plans, opinions &c ; is hard to be found out ; is non-committal. Very large : seldom appears what he really is, or says what he means, often equivocates and deceives ; is mysterious, dark, cunning, artful, given to double dealing ; is an eye servant. Moderate : is quite candid, open-hearted, and loves truth ; hates underhanded measures, and seldom employs them. Small :

speaks out just what he thinks ; acts as he feels ; does not wish to know, or tell the secrets of others, yet freely tells his own ; is too plain spoken and candid. Very small : keeps nothing back, has a transparent heart. Location : Secretiveness is located just above the organ of destructiveness, and runs nearly parallel with it the centre of it being about an inch above the top of the ear, and when large will cause the side of the head above the ear, to be round, thick and full.

SELFISH SENTIMENTS. In their character and objects, these faculties partake more of the human, and less of the animal, than do the selfish propensities, and although they terminate upon self, yet they have no inconsiderable influence upon the moral character. Average or full : has a respectable, not great regard for his character, and desires to do something worthy of himself. Large, or very large : thinks much above and about himself ; has a great amount of character of some kind. Moderate, small, or very small : has too little pride and weight of character and ambition, to give manliness and efficiency.

Cautiousness. Carefulness ; provision against danger. Average : has some caution, yet not hardly enough for success. Full : has prudence

and forethought, yet not too much. Large : is always watchful ; on the look out ; anxious ; provident against real and imaginary danger. Very large : hesitates too much ; suffers greatly from groundless fears ; is timid and easily frightened, &c. Moderate : is rather imprudent, hence, unlucky ; liable to misfortune from carelessness ; plans too imperfectly for action ; Small : acts impromptu ; disregards consequences ; fears nothing ; is imprudent ; luckless, and often in trouble. Location : this organ is located just above, and partly behind secretiveness. Or when the head is erect, it will be found upon the sides of the head, just back of a perpendicular line passing through the opening of the ears.

Circumspection. Propriety ; discreetness of expression and conduct. Average, or full : has some, though not too much discretion, and sometimes speaks inconsiderately. Large, or very large : weighs well what he says and does ; has a nice sense of propriety and thinks before he speaks.

Approbativeness. Sense of honor ; regard for character ; ambition ; love of popularity, fame, distinction, &c. Average : enjoys approbation, yet will not sacrifice much to obtain it. Full : desires and seeks popularity, and feels censure, yet will not trouble himself much to secure the

one, or avoid the other. Large : sets everything by character, honor, &c ; is keenly alive to the frowns and smiles of public opinion, praise, &c ; tries to show off to a good advantage ; is affable, ambitious, apt to praise himself. Very large : regards his honor and character as the apple of his eye ; is even morbidly sensitive to praise and censure ; over fond of praise, and often feels ashamed, &c ; extremely polite, ceremonious, &c. Moderate : feels reproach some, yet is little affected by popularity or unpopularity ; may gather the flowers that are strewed in his path, yet will not deviate from it to collect them. Small : cares little for popular frowns or favors ; feels little shame ; disregards and despises fashion, etiquette, &c ; is not polite. Very small : cares nothing for popular favor or censure. Location : Approbateness is located between cautiousness and self-esteem.

Self-esteem. Self-respect ; high-toned manly feeling ; innate love of personal liberty, independent pride of character. Average : respects himself, yet is not haughty. Full : has much self-respect ; pride of character ; independence. Large : is high-minded ; self-confident ; dignified ; his own master ; aspires to be, and to do something worthy of himself ; assumes responsibilities ; does few little things. Very large :

has unbounded self-confidence ; endures no restraint ; takes no advice ; is rather haughty and imperious. Moderate : has some self-respect, and manly feeling, yet too little to give ease, dignity, weight of character, and is too trifling. One having small self-esteem, feels too unworthy ; says and does trifling things ; puts himself on a par with the meanest class ; undervalues himself ; is not looked up to as a great man. Very small : is servile, low-minded, destitute of self-respect. Location : self-esteem is located on the mesial line of the head, about half an inch above the union of the lamboidal sutures, and directly back of firmness ; or, in the middle of the superior-inferior portion of the head, at an angle of about forty-five degrees with the plane of the base of the skull. Approbativeness is located on the two external sides of it, and cautiousness, beyond approbativeness, in the same range. The existence of this faculty demonstrates the position, that the feelings or principle of liberty, and of equal rights, is inalienable, and inherent in the very nature and constitution of man, that therefore, it can no more be destroyed than hunger or love ; that a purely republican and democratic form of government is the only one adapted to the nature of man, and the only one calculated to secure

universal satisfaction and happiness ; and that the subjugation of man by his fellow-man, is an open violation of the principles of human nature. If our rulers only understood this principle of our human nature, and if all the landmarks, and all the regulations of government only proceeded upon its subjection and servitude, all those ten thousand forms which they assume in society, would be at once abolished. By creating every man free, to choose or refuse the evil or the good, God allows every man to govern himself, and, surely then, man ought to allow one another to govern themselves, subject, however, in the latter case, as they are in the former, to those regulations which are necessary for the general good, and, also to be rewarded according to their deeds. There is no danger of this feeling ever being extinguished ; but, in case the subjugation and servitude of man in any form, should be carried to any great length, there is danger, aye, a moral certainty of a revolution, and a revolution too, attended with a violence proportionate to the pressure laid upon it. In this country, there is no likelihood, nor scarcely a possibility of a despotic form of government, but there is danger of a moneyed despotism, of aristocratic monopolies, and of the powerful tyrannizing over the weak, because they are

poor or friendless. This same principle of ruling ourselves reaches still farther, and desires to govern others. Slowly, but surely, is this serpentine aristocracy, subduing by piece-meal, particularly the virtuous and talented poor of our country ; and, should things progress for sixty years to come, as they have done for the past sixty, this province will be ruled by an aristocracy of monopoly, if not of government, far more tyrannical than any European despot.

Firmness. Decision, stability, fixedness of character, &c. Average : has some decision and stability, yet not enough for general success. Full : has perseverance enough for common or ordinary occasions, yet too little for great enterprises ; is neither fickle nor stubborn. Large, may be fully relied on ; is set in his own way ; hard to be convinced or changed at all ; holds on long and hard. Very large : is wilful, and so tenacious of opinion, purpose, &c, that he seldom gives up anything. With large combativeness and language full, will often take up on the wrong side of a subject, merely for the sake of debate, and with the above organs large, and small intellectual faculties, will be very apt to make a disagreeable companion. Small : lacks perseverance ; is too changeable and vacillating to effect much, or to be relied on. Location :

Firmness is located in the back part of the top of the head. When the head is erect, a perpendicular line, drawn from the external opening of the ear to the top of the head; will pass through the anterior of the organ. It is usually the highest portion of the American and English.

Species 2nd. MORAL AND RELIGIOUS SENTIMENTS. These render man a moral and accountable being; humanize, adorn and elevate his nature; and are the origin of goodness, virtue, moral principle and purity, and connects him with the moral government of God. Average or full: has moral feeling and principle, yet too little to withstand large or very large propensities. Large or very large: is morally inclined; sentimental; thinks and feels much on moral and religious subjects, &c. Moderate, small, or very small: has not strong moral and religious feelings; lets his larger faculties rule him.

Conscientiousness. Innate feeling of duty, accountability, justice, right, &c; moral principles; love of truth. Average: has right intentions, but their influence is limited. Full: strives to do right, yet sometimes yields to temptation; resists besetting sins, but may be overcome, and then feels remorse. Large: is

honest, faithful ; upright at heart ; moral in feeling ; grateful ; penitent ; means well ; consults duty before expediency ; loves and means to speak the truth ; cannot tolerate wrong. Very large is scrupulously exact in matters of right ; perfectly honest in motive, always condemning self and repenting ; very forgiving ; conscientious, &c ; makes duty everything, and expediency nothing. Moderate : has considerable regard for duty in feeling, but less in practice ; justifies himself ; is not very penitent, grateful or forgiving ; often temporizes with principles ; sometimes lets interest rule duty. Small : has few conscientious scruples ; little penitence ; gratitude ; regard for moral character ; justice ; duty. Very small : neither regards nor feels the claims of duty or justice. Location : conscientiousness is located upon the two sides of the posterior portion of firmness. Its protruberance are at right angles with those of firmness, and parallel to those of hope. Its development can generally be determined without difficulty, yet, as hope is located by its side, it is sometimes difficult to determine with certainty to which a given protruberance belongs.

Hope. Anticipation, expectation of future happiness, success, &c. Average, has some, but generally reasonable, hopes ; is seldom elated.

Full : is quite sanguine, yet realizes about what he expects. Large : expects, attempts and promises a great deal ; is generally sanguine, cheerful, &c., and rises above present troubles ; though disappointed, hopes on still ; views the bright side of every prospect. Very large : has unbounded hopes ; builds a world of castles in the air ; lives in the future ; has too many irons in the fire. Moderate : expects and attempts too little ; succeeds beyond his hopes ; is prone to despondency ; looks on the darker side. Small : is low spirited ; easily discouraged ; fears the worst ; sees many lions in the way ; magnifies evils ; lacks enterprize. Location : hope is located upon the two sides of the anterior portion of firmness, in front of conscientiousness, and behind marvellousness, being elongated in the direction of the ear.

Marvellousness. Belief in the supernatural ; credulity, &c. Average : believes some, but not much in wonders, forewarnings, &c. Full : is open to conviction ; rather credulous ; believes in spirits, and Divine Providences and forewarnings, the spiritual, &c. Large : delights in the supernatural, dreams, and the like ; thinks many natural things, supernatural. Very large : is very superstitious ; regards most things with wonder. Moderate : believes but little that can-

not be accounted for, yet is open to conviction ; is incredulous, but listens to evidence. Small : is convinced only by the hardest ; believes nothing till he sees facts, or why and wherefore, not even revelation, farther than a reason is rendered ; is prone to reject new things without examination. Very small : believes very little else than his senses. Location : Marvellousness is located on the two sides of veneration, between imitation and hope. It runs lengthwise in the direction of the coronal sutures, and lies under them. Very large imitation throws it as far back as the middle of the head.

Veneration. The feeling of worship for a Supreme Being. Average : may feel religious ; have a desire for worship, yet little respect for men ; Full : is capable of much religious fervor and devotion, yet is not habitually serious ; generally treats his fellow men civilly. Large : loves to adore and worship God, especially through his works ; treats equals with respect, and superiors with deference. Very large : is eminent if not pre-eminent for piety, heart-felt devotion, religious fervor ; seriousness ; love of divine things, &c. One having veneration moderate, disregards religious creeds, forms of worship, &c ; places religion in other things ; is not serious or respectful. Small : feels little,

religious worship, reverence or respect. Very small : seldom, if ever, adores God ; is almost incapable of it. Location : Veneration is located anterior to firmness, in the middle of the top of the head, and nearly beneath the union of the coronal sutures.

Benevolence. Desire to see, and make sentient beings happy ; willingness to sacrifice for this end ; kindness ; sympathy for distress. Average : has kind fellow-feeling, without much active benevolence. Full : has a fair share of sympathetic feeling ; and some, though no great willingness to sacrifice for others. Large : is kind, obliging, glad to serve others, even to his injury ; feels lively sympathy for distress ; does good to all. Very large : does all the good in his power ; gladly sacrifices self upon the altar of pure benevolence ; scatters happiness wherever he goes ; is one of the kindest hearted of persons. Moderate : has some benevolent feeling, yet too little to prompt to much self-denial ; does good only when he can without cost. Small : feels little sympathy or kindness ; is almost deaf to the cry of distress ; hard-hearted, selfish, &c. Very small : is destitute of all humanity and sympathy. Location : benevolence is located in the anterior superior portion of the head, just forward of veneration, and of

the union of the coronal sutures, and beneath the posterior superior portion of the frontal bone.

SEMI-INTELLECTUAL SENTIMENTS. By creating a taste for the arts, improvements, polite literature, refinements of life, &c., these faculties greatly augment human happiness, and adorn and elevate human nature.

Constructiveness. Mechanical dexterity and ingenuity ; desire and ability to use tools, build, invent, employ machinery, &c. Average : has some, yet has no great relish for, and tact in using tools. Full : has fair mechanical ingenuity, yet no great natural talent or skill to make things ; with practice, will do well ; without it, but little. Large : shows great natural dexterity in using tools, executing mechanical specifications, working machinery, &c ; loves them. Very large : is a mechanic of the first order ; a true genius ; loves it too well to leave it ; shows extraordinary skill in it. Moderate : with much practice, may use tools quite well, yet dislike mechanical operations. Small : hates, and is awkward and bungling in using tools. Very small : has no mechanical skill or desire. Location : constructiveness is located just above the middle of a line connecting the top of the ear and the external corner of the eye, or just below ideality, and a little forward of it.

Ideality. Imagination ; taste ; fancy ; love of poetry, polite literature, oratory, the beautiful in nature and art, &c. *Average :* has some taste, though not enough to influence him much. *Full :* has refinement of feeling, expression, &c., without sickly delicacy ; some love of poetry, yet not a vivid imagination. *Large :* has a lively imagination ; great love of poetry, eloquence, fiction, good style ; the beauties of nature and art. *Very large :* often gives reins to his erratic imagination ; experiences revelings of fancy, ecstasy, rapture of feeling, enthusiasm, &c. *Moderate :* has some, but not much imagination ; is rather plain in his expression, manner, feeling, &c., dislikes poetry, finery, &c. *Small :* lacks taste, niceness, refinement, delicacy of feeling, &c. *Very small :* is destitute of the qualities ascribed to this faculty. *Location :* Ideality is located upon the sides of the head, about the spot in which the hair begins to grow—upward, and backward of constructiveness, beneath the temporal ridge, and near its union with the parietal bone, and nearly in a line with comparativeness, causality and mirthfulness. When large or very large, the sides of the head, where the hair makes its appearance, are widened and heightened, but when it is small, they are narrow and depressed.

Sublimity. Conception of grandeur ; sublime emotions excited by contemplating the vast, magnificent or splendid in nature or art. Average : sometimes, but not to a great degree, experiences this feeling. Full : enjoys magnificent scenes well, yet not remarkably so. Large : enjoys mountain scenery, thunder, lightning, tempest, a vast prospect. &c., exceedingly ; hence, enjoys travelling. Very large : is a passionate lover of the wild and romantic ; feels the sublimest emotions whilst contemplating the grand or awful in nature ; dashing, foaming, roaring cataracts ; towering mountains ; peals of thunder ; flashes of lightning, commotion of the elements. Moderate : has some, though not much emotion of this kind. Small, or very small : discovers little in nature to awaken this feeling. Location : sublimity is located upon the side of the head, between cautiousness and ideality, partly under hope and marvellousness, and above acquisitiveness.

Imitation. Disposition and ability to take pattern ; imitate. Average : copies some, yet too little to deserve notice. Full : with effort, copies some, but not well ; cannot mimic. Large : has a great propensity and ability to copy ; take pattern from others ; do what he sees done, &c., to the very life ; has a

taste and talent ; seldom speaks without gesturing. Moderate : cannot mimic at all ; can copy, draw, and take pattern, only with difficulty ; describes or relates anecdotes, &c., poorly. Small : dislikes and fails to copy, or draw after one. Very small : has little ability to imitate or copy. Location : Imitation is located upon the two sides of benevolence, and when large, it extends nearly as far back as the organ of benevolence, and the coronal sutures, and causes a protuberance, especially when marvellousness is small, which runs downwards from benevolence, and towards ideality and constructiveness.

Mirthfulness. Intuitive perception of the absurd and ridiculous ; a joking disposition ; desire and ability to ridicule. Average : perceives jokes and relishes fun, but cannot make much. Full : has much mirthful feeling ; makes and relish jokes well. Large : has a quick, keen perception of the ludicrous ; makes a great amount of fun, too much for his own good ; is quick at repartee ; smiles often ; laughs heartily at jokes. Very large : is quick and apt at turning everything into ridicule ; throws off constant sallies of wit ; is jocose, facetious, &c. Moderate : has some witty ideas, yet lacks quickness in conceiving, and tact in expressing them ; is

generally quite sober. Small : makes little fun ; is slow to perceive, and still slower to turn jokes ; seldom laughs ; thinks it wrong to do so. Location : mirthfulness is located beneath the temporal ridge, externally from causality, but a little lower, and nearly in the range of combativeness, causality and ideality.

INTELLECTUAL FACULTIES. These have to do with the physical and metaphysical world ; with things in general, and their qualities, relations, &c., with the world and its contents. Average or Full : has sufficient intellect to get along in the world, yet not enough to render him eminent for talents. Large : is possessed of sufficient natural talent, and power of intellect, to enable him to take a high intellectual stand among men, yet their direction depends upon other causes. Very large : is by nature, truly a great man ; possesses the highest order of natural talents ; is capable of rising to pre-eminence. Moderate or small : shows little natural talent ; lacks sense.

The Senses : sensation, sight, hearing, taste, smell, observing, and knowing faculties ; these bring man into direct intercourse with the physical world, observe facts of all kinds, that is, the conditions, qualities, phenomena, and physical relations of material things ; collect

and treasure up information, create a desire to see and know things, &c. Average, or full: possesses fair perceptive powers. Large, with advantages, knows a great deal about matters and things in general; is very quick of observation and perception; has a practical, matter-of-fact, common sense tact and talent; can show off to excellent advantage, appears to know all that he really does, and perhaps more; is capable of becoming an excellent scholar, or of acquiring and retaining knowledge with great facility, and of attending to the details of business, and has a decidedly practical intellect. Very large: is pre-eminent for the qualities just described; seizes, as if by tuition, upon the properties, conditions, fitness or unfitness, value, &c., of things; has wonderful powers of observation, and ability to acquire knowledge; has a natural taste and talent for examining and collecting statistics, studying natural sciences, &c. Moderate or small: is rather slow of observation and perception, cannot show to be what he is; acquires knowledge with difficulty, is slow in learning and doing things off-hand, &c.

Individuality. Observing and individualizing power and desire, curiosity to see and know, disposition to specify, personify. Average: has some yet no great curiosity and desire to see

things. Full : has fair observing power, and desire to see things. Large : has a great desire to know, investigate, examine, experience, &c. ; is a great observer of men and things, quick of perception, sees what is transpiring, what should be done, &c. Very large : has an insatiable desire to see and know everything, extraordinary observing powers, is eager to witness every passing event. Location : Individuality is located at the root of the nose, and when large, it separates the eyebrows from each other, and causes them, as they approach the nose, to arch ; but when small, the eyebrows nearly meet, and are nearly horizontal.

Form. Cognizance and recollection of shape, or configuration. Average : recollects forms, faces, &c., quite well, but not very well. Full : recognizes persons, countenances, &c., well. Large : notices, and for a long time remembers the faces, countenances, forms, looks, &c., of persons, beasts, things, &c., once seen ; knows by sight many whom he may be unable to name. Very large : never forgets the countenance, form, &c., of persons and things seen ; easily learns to read and spell correctly ; reads and sees things at a great distance ; has excellent eyesight. Moderate : must see persons several times before he can recollect them ;

sometimes doubts whether he has seen certain persons. Small, or very small : has a miserable memory of persons, looks, &c. ; fails to recognize even those he sees very often. Location : Form is located upon the two sides of the crista galli, and when large, or very large, causes great breadth between the eyes, and sometimes turns them outwards ; but when small, they more nearly approach each other.

Size. Cognizance and knowledge of relative magnitude, bulk, &c. Average : measures bulk with tolerable, but not great accuracy. Full : can measure ordinary and familiar distances well, yet shows no remarkable natural talent in it. Large : has an excellent eye for measuring proportion, size, height, angles, perpendiculars, &c. ; quickly detects disproportions in them. Very large : detects disproportion, and judges of size with wonderful accuracy, by intuition, and as well without as with instruments ; cannot endure inaccuracy. Moderate : is rather deficient in measuring by the eye ; with practice may do tolerably well in short, but fails in long, distances. Small : judges of relative size, &c., very inaccurately. Very small : can hardly distinguish mountains from mole-hills. Location : Size is located at the internal termination of the eyebrows. and developes itself

on the two sides of the root of the nose. When it is large it causes the internal portion of the eyebrows to project, or shelf over the internal portion of the eye nearly an inch; but when moderate or small, it is nearly perpendicular from the inner corner of the eye to that of the eyebrows. By inserting the thumb in the angle formed by the arch of the eye and the nose, when the organ is large, or very large, and weight only moderate, a protuberance will be observed, in shape somewhat resembling a bean.

Weight. Intuitive perception, and application of the principles of specific gravity, projectile forces, momentum, balancing, resistance. *Average:* balances himself tolerably well in ordinary cases, yet has no great talent in this respect. *Full:* keeps his centre of gravity well, but ventures little. *Large:* can walk on a high or narrow place, hold a steady hand, throw a stone or ball, and shoot strait, ride a fractious horse, &c., very well. *Very large:* has this power to a wonderful extent. *Moderate:* maintains his centre of gravity, &c., very poorly. *Small, or very small:* is unlike one with weight large. *Location:* Weight is located adjoining to size, and a little internally from the middle of the arch of the eye. It is

generally moderate or small in the American head.

Color. Perception and recollection of color, hues, tints, &c., notices them. Full : with practice, compares and judges of colors well ; without it does not excel. Large : has a natural taste and talent for comparing, arranging, mingling, applying, and recollecting color ; is delighted with paintings. Very large : resembles one with color large, but excels him. Moderate, aided by practice, can discern and compare colors, yet owes less to nature than art ; seldom notices colors, unless obliged to, and then soon forgets them. Small : seldom observes the color of one's hair, eyes, dress, &c. ; cannot describe them by what they wear, or compare colors apart ; hardly distinguishes the primary colors by candlelight, much less shades. Very small : can tell black from white, but do little more. Location : color is located under the arch of the eyebrows, a little externally from the middle, and between the organs of weight and order. In ascertaining it there is occasionally some difficulty, in consequence of the thickness of the bone that covers it.

Order. System, physical arrangement, a place for things. Average : appreciates order, yet not enough to keep it. Full : likes order.

takes much pains to keep things arranged, **Large** : has a place for things, and things in their places ; can find, even in the dark, what he alone uses ; is systematic, annoyed by disorder. **Very large** : is very precise and particular to have every little thing in its place ; literally tormented by disorder ; is fastidious. **Moderate** : likes, but does not keep order ; allows confusion. **Small, or very small** : is nearly destitute of order and system. **Location** : order is located under the arch of the eyebrow, at the external corner of the eye, and beneath the origin of the superciliary ridge. When it is large, or very large, the external angle of the lower portion of the forehead appears projecting and full ; the eyebrows at the union of the temporal ridge arched and elongated, and sometimes sharp ; but when it is moderate, or small, the external portion of the eyebrow will appear straight and shortened. The thickness of the bone in this portion, increased by the temporal ridge, causes an occasional mistake in deciding upon the size of this organ.

Calculation. Intuition, perception of the relation of numbers, ability to reckon figures in the head, numerical computation. **Average** : by practice and rules may reckon figures quite well. **Full** : aided by rules and practice, may

excel in reckoning figures, and do well in his head, but not without them. Large : can add, subtract, divide, &c., in his head, with facility and correctness ; become a rapid, correct accountant ; delights and excels in arithmetic. Very large : has an intuitive faculty, to a wonderful extent, of reckoning even complicated sums of figures in his head ; delights in it. Moderate : does sums in his head rather slowly and inaccurately. Small : is dull and incorrect in adding, dividing, &c. ; dislikes it. Very small : can hardly count, much less go farther. Location : Calculation is located externally from order, and a little lower, and at the external termination of the arch of the eye.

Locality. Cognizance and recollection of relative position ; looks and geography of places, &c ; desire to travel, see the world, &c. Average : has a fair, though not excellent recollection of places. Full : remembers places well, yet is liable to lose himself in a city or forest ; ordinarily shows no deficiency : seldom loses himself. Large : recollects distinctly the looks of places where he saw things, &c ; seldom loses himself, even in the dark ; has a strong desire to travel, see places, &c. Very Large : never forgets the looks, location or geography of any place, or hardly anything he has ever

seen ; is even passionately fond of travelling, scenery, geography, &c. Moderate ; recollects places rather poorly ; sometimes gets lost. Small, or very small : has little geographical or local knowledge or recollection ; seldom observes where he goes, or finds his way back. Location : locality is located directly over size and weight, and nearly above the internal orbit of the eye. It extends diagonally in the direction of mirthfulness. The frontal sinus sometimes increases the apparent size of this organ, but this subject will be more fully presented in another portion of the work.

SEMI-PERCEPTIVE FACULTIES. These have to do with action or phenomena, and their conditions, and deal them out to the reasoning faculties.

Eventuality. Recollection of actions ; historical and circumstantial facts, occurrences, &c. Average : has neither a good nor a bad memory of occurrences. Full : recollects leading events, and interesting particulars, and has a good memory of occurrences, yet forgets less important details. Large : has a clear and retentive memory of historical facts, general news, what he has seen, heard, read, &c., even in detail. Very large : never forgets any occurrence, even though it is trifling ; has a craving thirst for

information and experiment ; literally devours books, newspapers, &c ; commands an astonishing amount of information. Small, or very small : has a treacherous confused memory of facts and events, and scarcely remembers any occurrence correctly. Location : eventuality is located about the middle of the forehead. When the surrounding organs are large, and eventuality only full, there will be an apparent depression just above individuality, and between the two lobes of locality, which will result rather from the size of the surrounding organs, than from an absolute deficiency of eventuality.

Time. Cognizance and recollection of succession, the lapse of time ; dates ; how long ago things occurred, &c. Average : notices and remembers, dates, times &c ; but not well. Full : recollects about, but not precisely when things occurred. Large : tells times, dates, appointments, time of day, &c., well. Very large : will remember with wonderful accuracy, the time of occurrences ; is always punctual ; tells the time of day, &c., by intuition. Moderate : has rather a poor idea of dates, when, time, &c. Small : can seldom tell when things took place ; is seldom punctual. Very small : is liable to forget everything.

Tune. Tone ; sense of melody ; musical

harmony ; ability to learn tunes and detect chord and discord by ear ; propensity to sing. Average : likes music ; with practice may perform tolerably well. Full : can learn tunes by ear, well, yet needs help from notes. Large : easily catches tunes, and learns to sing and play on instruments by note : delights greatly in singing ; has a correct musical ear. Very large : learns tunes by hearing them sung once or twice ; is literally enchanted with good music ; shows intuitive skill, and spends much time in making it. Moderate : aided by notes and practice may sing, yet it will be mechanically, and it will lack that feeling which reaches the heart. Small : can scarcely learn to sing either by note or rote ; is no musician. Location : tune is located above the organ of calculation, and within the arch of the superciliary ridge.

Language. Power of expressing ideas, feelings, &c., by means of words, attaching meaning to signs ; verbal memory ; desire and ability to talk. Average : can communicate his ideas tolerably well, yet finds some difficulty ; uses common words ; can write better than speak. Full : commands a fair share of words, yet uses familiar expressions ; is neither fluent nor the reverse ; when excited, expresses himself freely, yet not copiously. Large : is a free,

easy, ready, fluent talker and speaker ; uses good language ; commits easily ; seldom hesitates for words. Very large : has by nature an astonishing command of words, copiousness and eloquence of expression, and verbal memory ; quotes with ease ; is an incessant talker ; has too many words. Moderate : often hesitates for words ; employs too few ; may write well and be a critical linguist, but cannot be an easy, fluent speaker. Small : employs few words, and those common-place ; in speaking, hesitates much ; is barren in expression ; commits slowly. Very small : can hardly remember or use words at all, or read. Location : Language is located upon the superorbiter plates. When large or very large : it pushes the eye outward and downward, giving a fullness to it, and a swollen appearance to the under eye-lid. When the organ is small, the eyes will appear small and sunken, and the under eye-lid small.

REFLECTIVE, OR REASONING INTELLECT. This looks beyond mere physical facts and natural phenomena, and investigates their causes, abstract relations, principles, &c ; originates ideas ; ascertains and applies natural laws ; invents ; contrives, &c. Large, or very large : with perceptive intellect less, gives great depth

without brilliancy of talent ; shows to be less than he really is ; holds out well.

Causality. Cognizance of the relations of cause and effect ; ability to apply them ; power of reasoning ; discovering first principles, &c. **Average :** has some, but no great ability to plan and reason. **Full :** adapts means to ends well ; has an active desire to ascertain causes, yet not a deep, original, cause-discovering mind. **Large :** plans well ; can think clearly ; inquires into the why and wherefore of things ; always gives and requires a reason ; has an excellent judgment and a strong mind. **Very large :** is endowed with a deep, strong, original comprehensive mind, powerful reasoning faculties, and a gigantic intellect. **Moderate :** is rather slow of comprehension ; has not good ideas or judgment ; is unable to adapt means to ends. **Small :** has a weak mind ; cannot contrive or think. **Very small :** has few ideas, and in fact, is a natural fool. **Location :** causality is located in the upper and lateral portion of the forehead, externally from comparison and gives height and breadth to the forehead, proportionate to the size of the organ.

Comparison. One having this organ average, illustrates tolerably well. **Full :** illustrates tolerably well, but not remarkably. **Large :**

has a happy talent for criticising between what is, and what is not analogous. Very large : is endowed with an extraordinary amount of critical acumen. Small, or very small : is destitute of this power. Location : It is located in the middle and upper portion of the forehead, between the two lobes of causality with eventuality below, and benevolence above it. Its shape resembles an inverted cone.

It has been already remarked, that the class of functions performed by the reflective faculties, is of a far higher order than any other, and also, that when fairly developed and furnished with correct data, if allowed to operate in an unperverted and unbiassed manner, they will always form correct conclusions, and furnish us with the truth. But the great misfortune is, that these faculties are seldom allowed to assert their own prerogative, and sway that influence over human actions for which they are originally designed. Hence it is, that we see men more frequently guided by feeling, passion, or prejudice, than by reason. This great and deplorable evil generally arises, either from a neglect to cultivate the reasoning faculties, or from a perversion of them. At present, however, we shall consider only the neglect and perversion of the reflective faculties.

As society is now constituted, even in what is called christian communities, men are often taught to fight, cheat, lie, scandalize, &c., but how rarely are they taught to think ! In proof of this, we have only to look abroad upon the face of society. How often do we see our beautiful system of religion debased and degraded, and made subservient to the vilest and most selfish purposes—her sacred vestments torn by sectarian strife and party discord—her holy altars polluted by base hypocrisy and sordid iniquity—her sublime doctrines perverted, and her righteous laws trampled under foot. How often do we see the unprincipled pretender gaining his selfish objects by practising upon the ignorance of his fellow-men—the ambitious, rising to high places of power and profit by making use of the basest duplicity and the most heartless intrigues ? Now it is evident, that if men were taught to think, if their reasoning faculties were properly cultivated, to perform their legitimate functions with energy, these things would not, nor could not take place, because in the first case, they would restrain the sinful passions, and the unhallowed ambition of the designing, by the aid of the moral organs ; and, secondly, so enlighten the minds of the common people as to prevent their being thus deceived and imposed upon.

But the vices and follies of mankind, grow out of the perversions of the reasoning faculties, perhaps more frequently than out of their neglect ; and when this is the case, their tendency is to make man even worse than the brute, for they are then under the dominion of the selfish passions, and are rendered almost wholly subservient to the gratification of their wants ; they are then actively employed in searching for new objects upon which the indulgence of the passions may be expended, and new excuses for such indulgences ; they are energetic in seeking out, and presenting artificial, improper and unnecessary stimuli to the selfish propensities of which the brute can never form any conception, and of course, upon which it can never exert or debase its mental functions. Again, mankind are not only taught to think, but they are frequently mistaught to think ; that is, they are frequently taught to think in a particular way—to believe certain doctrines, and to disbelieve others—taught to believe whether reason approves or disapproves of that belief ; and all this is brought about by a kind of legerdemain, or by causing the eye of reason to look through dim spectacles of prejudice. This point may be illustrated by a reference to the natural intellect of children. Before their reasoning faculties become perverted, they fre-

quently reason more clearly and accurately upon some subjects than their tutors or their parents, for in the simplicity of their honest hearts, they deduce from the premises presented to their minds, the conclusions which naturally flow from them. Hence, many would do well to take the hint, lay aside their bigotry and their prejudice; bow their stubborn pride, and, in reasoning, adopt the simplicity of the child. From the preceding arguments and phrenological facts, we arrive at the conclusion that the brain, and not the heart, is the

“Dome of thought, the palace of the soul.”

INTRODUCTION TO PART IV.

THERE is no person in any country where the march of science has made any progress, that has arrived to the years of understanding, and who possesses but a common share of the intellectual and reflective faculties, but what is anxious to gain all the information they can, concerning the immortality of the soul, and the eternal destination of man.

This is an inquiry far more interesting and important to every individual, than any other which comes within the range of the human mind. Next to the being of a God, the doctrine of the immortality of man lies at the foundation of all religion, and of all the animating prospects which can cheer us in this land of our pilgrimage. Remove from the mind the belief of a future existence, and the hope of immortality, and religion becomes a shadow, life a dream, and the approach of death, a scene of darkness and despair. Upon this short question,—“Is man immortal, or is he not?” depends all that is valuable in science, in morals, and in theology, and all that is most interesting to man as a social being, and as a rational and accountable intelligence. If he is destined to an eternal

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existence, an immense importance must attach itself to all his present affections, actions and pursuits ; and it must be a matter of infinite moment, that they be directed in such a channel as will tend to carry him forward in safety, to the felicities of a future world, But, if his whole existence be circumscribed within the circle of a few fleeting years, man appears an enigma, an inexplicable phenomenon in the universe, human life a mystery, the world a scene of confusion, virtue a mere phantom, the Creator a capricious being and his plans and arrangements an inextricable maze.

There is too much reason to believe, that the indifference to religion, which so much prevails, especially among those who are raised a little above the vulgar throng, and the unhallowed propensities and vicious practices to which it gives rise, are owing, in a considerable degree, to the want of a full conviction of the reality of a future existence, or to some doubts which hover about the mind, in relation to this important point. There is no person, however insensible to the obligations of religion, that can fully satisfy his own mind or the minds of others, that the idea of a future world is a mere chimera. On the contrary, the possibility and probability of the truth of man's eternal destiny,

will, at certain times, force themselves upon the minds of the most careless and profane. Yet, it is amazing, to consider with what ease and indifference, multitudes of this description can glide down the stream of time, under the awful uncertainty whether it will land them in the shades of annihilation, the realms of bliss, or the regions of endless wo. Between us and these three states, no barrier is interposed but life, the most brittle thing in nature ; and the happiness of heaven being certainly not designed for those who doubt whether they have an immortal part to enjoy in it, such persons have nothing left, but the miserable chance of annihilation or of hell. To treat a subject so interesting and momentous with levity or indifference—to exert all the energies of the soul in the pursuits of objects, which a few years at most, will snatch forever from their embrace—and never to spend one serious hour in reflecting on what may probably succeed the present scene of existence, or in endeavoring to find some light to clear up the doubts that may hang over this important inquiry, is not only foolish and preposterous, but the height of infatuation and madness. It is contrary to every principle on which reasonable men act in relation to the affairs of the present world. How strange it is that men, formed in the

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image of God, endowed with powers and faculties capable of discriminating between right and wrong, who are formed by their Creator, and designed to be the Lord over all the brute creation, and for whose benefit and use, the beasts of the fields and forest, with the fowls of the air, and the finny tribes that inhabit the mighty waters were created, who possess such strength and intellect as to be enabled, through the almost magical powers of the telescope, to see and gain a knowledge of worlds, and even systems of worlds far distant, from the planet we inhabit; and, who by the aid of mathematical science, can determine with precision, the distance in miles from our earth to any other planet in the whole system; the diameter, circumference and solid contents of each; the exact time it will take them to revolve around the sun; the velocity of motion upon their axis, and a thousand other things are investigated and brought to light, which are equally strange to a person unacquainted with the mysteries of science; and yet, be so indifferent about their final destination. But let us carry the subject a little farther. We see the philosopher and astronomer employing all his time, talent and energies, in investigating the laws of nature, and determining the motion of heavenly bodies;

employing hours in study, that nature requires to be devoted to rest ; and all we fear, often merely for the gratification of their ambition, and to be called by their fellow-men learned and wise ; but, notwithstanding all their wisdom, pay but little regard to the concerns of religion. Others again, are equally assiduous in amassing wealth, and for the sake of being styled wealthy, will deprive themselves of the necessities, as well as the luxuries of life, and centre all their affections upon, and exercise and employ all the faculties of their minds in getting possessions, that in a few years at most, they must leave, perhaps, to those who will ridicule them for their folly, and, in an unexpected moment, without having made any preparation to secure an eternal inheritance and a crown of glory, are called to stand before their God.

What will all this world's goods profit us, in the hour of death, if the immortal soul, just hovering on the verge of eternity, is about to drop into the awful vortex of eternal woe ? Yet, this is not all. Those who are still regardless of their future destiny, and pay no attention to the demand which religion has upon them, are chargeable with ingratitude, the blackest of all crimes. What has not the Creator done to secure the final happiness and holiness of all mankind ?

When man had fallen from his holy estate, the grand scheme of his restoration and happiness was conceived in the Divine Mind, Christ the Son, and second person in the Trinity, left his holy habitation, came to this earth to proclaim the glad tidings, and wondering angels rejoiced at his birth in contemplation of the consummation of the plan of redemption, and that a fallen race was to be reinstated into the favor of God. What folly ! nay, what infatuation ! what ingratitude ! what inconsistency is chargeable upon those who neglect the great concern of their soul's salvation, and yet are anxious to secure to themselves, the perishable things of earth.

Having the light of nature, as well as of revelation to guide us aright, what excuse can we offer in the day of eternity, for the misimprovement of the time allotted us here ? But the man whose heart pants after substantial knowledge and felicity, will seize with delight upon every argument, by which a full conviction of his immortal destiny may be rivetted upon his mind, and he will cheer his soul with the consideration, that " when this earthly house of his tabernacle is dissolved, he has a building of God, a house not made with hands, eternal in the heavens."

PART IV.

THE REALITY OF A FUTURE STATE.

The evidence of a future state, which the light of nature or reason affords, though not so clear and decisive as those which are derived from Divine Revelation, are worthy of the serious consideration of every one, in whose mind the least doubt remains on this important subject. The conviction they are calculated to produce, when attentively weighed, is sufficient to leave every one without excuse who trifles with the concerns of his future destiny, and overlooks his relation to the eternal world. Though the Deity is invisible to mortal eyes, yet his existence and perfections are clearly visible by his works, and he has not left himself without a witness to his beneficence, in every age, in sending rain from heaven, fruitful seasons, and filling our hearts with food and gladness. In like manner, though the realities of a future world are not presented directly to the eye of sense, yet the faculties with which man is endowed, when properly exercised on all the physical and moral scenes which the universe displays, are sufficient to evince the high degree of probability, if not absolute certainty, that his

sphere of action is not confined to the narrow limits of the present world, but have a relation to a future and immortal existence. In illustrating this topic, I shall confine myself chiefly to those popular considerations, which are level to every capacity, and perhaps, more convincing than the subtle and refined disquisitions of metaphysical minds.

On the universal belief of the immortality of the soul. That the thinking principle in man is of an immortal nature, was believed in by the ancient Egyptians, Persians, Phoenicians, Scythians, Celts, Druids and Assyrians,—by the wisest and most celebrated characters among the Greeks and Romans, and by almost every other ancient nation and tribe whose records have reached our times. The notions, indeed, which many of them entertained of the scenes of futurity were very imperfect, but they all embraced the idea, that death is not the destruction of the soul or thinking principle in man, but only its introduction to a new and unknown state of existence. The ancient Scythian believed that death was only a change of habitation, and the Magian sect which prevailed in Babylonia, Media, Assyria and Persia, admitted the doctrine of Eternal rewards and punishment. The doctrine taught by the second Zoroaster

who lived in the time of Darius, was, "that there is one Supreme Being, independent and self-existent from all eternity ; that under him, there are two angels, one the angel of light who is the author of all good ; and the other the angel of darkness, who is the author of all evil ; that they are in a perpetual struggle with each other ; that where the angel of light prevails there good reigns, and where the angel of darkness prevails, there evil takes place ; that this struggle shall continue to the end of the world ; that then there shall be a general resurrection and day of judgment, wherein all shall receive a just retribution according to their works. After which, the angel of darkness and his disciples shall go into a world of their own, where they shall suffer the punishment of their wicked deeds in everlasting darkness ; and the angel of light and his disciples shall also go into a world of light of their own, where they shall receive the rewards due to their good deeds ; that after this they shall be separated forever, and light and darkness shall be no more mixed forever. (Rollin's Ancient History, Vol. 2.) The remains of this sect, which are scattered over India, and Persia still hold this doctrine, without any variations, to the present day. It is well known that Socrates and Plato as well as other

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Greek philosophers, held the doctrine of the soul's immortality. In Plato's admirable dialogue entitled *the Phaedon*, he represents Socrates, a little before his death, encompassed with a circle of philosophers, and discoursing with them concerning the immortal destiny of man. After illustrating the truth of the doctrines of the soul's immortality, and of future rewards and punishment, he concludes by saying, "If the soul be immortal it requires to be cultivated with attention, not only for what we call the time of life, but for eternity; and the least neglect in this point may be attended with endless consequences. If death were the final dissolution of being, the wicked would be great gainers by it, by being at once delivered from their bodies, their souls, and their vices: but as the soul is immortal, it has no other means of being freed from its evils, nor any safety for it, but in becoming very good and very wise, for it carries nothing with it but its good and bad deeds, its virtues and vices, which are commonly the effects of education which it has received, and the cause of its eternal happiness or misery." The description and allusions contained in the writings of the ancient poets are a convincing proof that the belief of the soul's immortality was a universal opinion in the times in which

they wrote, and among the nations to whom their writings were addressed ; Homer's account of the descent of Ulysses into hell, and his description of Minos in the shades below, distributing justice to the dead assembled around his tribunal, and pronouncing judgment that would decide their everlasting fate ; the poems of Ovid and Virgil contain a variety of descriptions which demonstrate that they entertained the belief that virtue was rewarded and vice punished in another state of existence. Their notions of future punishment are set forth in the description of Tantalus, who, for the loathsome banquet he made for the gods, was set in water up to his chin, with apples hanging to his very lips, yet had not power to stoop to the one to quench his thirst, or to reach to the other to satisfy his craving appetite. Of the fifty daughters of Danous, who, for the murder of their husbands in one night, were condemned in hell to fill a barrel full of holes, with water, which ran out again as fast as it was put in. Their notions of future happiness are embodied in the description they have given of the Hesperian gardens, and the Elysian fields, where the souls of the virtuous rest secure from every danger, and enjoy perpetual and uninterrupted bliss. And as the matrons of antiquity recog-

nized the doctrine of a future state of existence, so there is scarcely a nation or tribe of mankind existing at the present time, however barbarous or untutored, which does not express in one way or another, the same opinion. The natives of the Society Isles believe, that after death there is not only a state of conscious existence, but degrees of felicity, according as men have been more or less pleasing to the Deity. The chiefs of the Friendly Isles, believe that after death the soul is immediately conveyed in a fast sailing canoe, to a country called Dooludha, which they describe as a beautiful Paradise; that those who are conveyed thither are no more subject to death, but feast on all the favorite productions of their native soil, with which this blissful abode is plentifully furnished. The New Zealanders believe, that the third day after the interment of a man, the heart separates itself from the corpse, and that an inferior divinity which has constantly hovered over the grave, carries it to the clouds. They believe that the soul of a man, whose flesh has been eaten by the enemy, is doomed to a perpetual fire, while the soul of a man who has been rescued from those that killed him, is happy. The inhabitants of the Pelew Islands, the Kalmuc Tartars, the Samoiedians of Northern Tartary, and the

Burmans all acknowledge the immortality of the soul, and their belief in the doctrine of future rewards and punishments.

The various tribes which inhabit the continent of Africa, in so far as we are acquainted with their religious opinions, appear to recognize the doctrines of a future state. We are informed by the accounts which travellers have given of the religious opinions entertained by the people of Western Africa, that they believe their souls are of such a nature as to require variety, and are not capable of always being delighted with the same objects. The Supreme Being, therefore, in compliance with this taste for happiness which he has implanted in the soul of man, will raise up from time to time, every gratification which it is in the human nature to be pleased with. If we wish, say they, to be in groves or bowers, among running streams or water falls, we shall immediately find ourselves in the midst of such a scene as we desire. If we would be entertained with music or the harmony of sounds, the concert arises upon our wish, and immediately the whole region about us is filled with the most melodious music. In short, every desire will be followed by fruition, and whatever a man's inclination directs him to, will be present with him. The negroes and other inhabitants of the interior of Africa, according to the

account of Mungo Park, believe in one Supreme Ruler, and expect hereafter to enter into a state of misery or felicity. The Gollas of Abyssinia, though they reject the doctrine of future punishment, admit the reality of a future state. The Mandingoes, Ialoffs, Feloops, Foubahs, Moors and all other tribes who have embraced the Mahometan faith, recognize the doctrine of the immortality of the soul, and future rewards in a celestial Paradise. The natives of Dahomy entertain the same belief, hence it is a common practice with the Sovereign of that country, to send an account to his forefathers of any remarkable event, by delivering a message to any one who may happen to be near him at the time, and then ordering his head to be chopped off immediately, that he may serve as a courier to convey the intelligence to the world of spirits. (McLeod's voyage to Africa. Page 64.)

The Japanese believe that the souls of men and beasts are alike immortal ; that after death, a just retribution takes place of both rewards and punishments ; that there are different degrees of happiness as well as misery, and that after death the souls of the wicked transmigrate into the bodies of animals, and at last, in case of amendment, are translated back again into the human body. (Thumberge's Travels.)

From a conviction of the reality of a future

world, the Wahabee Arabs regard it as impious to mourn for the dead, who they say, are enjoying felicity with Mahomet in Paradise, and the Japanese make several feasts on the decease of their relations and friends, who they say, have entered into a world of bliss. The North American Indians believe that beyond the most distant mountains of their country, there is a wide river ; beyond that a great country ; on the other side of that country, a world of waters ; in that water, a thousand islands, full of trees and streams of water, and that a thousand buffaloes and ten thousand deer graze on the hills, or ruminate in the valleys. When they die, they are persuaded that the Great Spirit will conduct them to this land of souls. Thus, it appears, that not only the ancient philosophers and the most civilized nations at present existing on the globe, have recognized the immortality of the soul, but that even the most barbarous and untutored tribes fortify their minds in the prospect of death, with the hope of happiness commensurate to their desires, in the regions beyond the grave. The ideas the American Indians entertain of the joys of the immortal state, and the locality of Heaven, are set forth in those beautiful lines of Pope :

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"Lo! the poor Indian, whose untutored mind
Sees God in clouds, or hears him in the wind;
Whose soul, proud science never taught to stray
Far as the solar walk, or milky way—
Yet simple nature, to his hope has given
Behind the cloud-topt hill, an humbler heaven;
Some safer world, in depth of wood embraced,
Some happier island in the watery waste,
Where slaves once more their native land behold,
No fiends torment, no christian thirst for gold,
And thinks, admitted to that equal sky,
His faithful dog shall bear him company.

Among the numerous and diversified tribes that are scattered over the different regions of the earth, that agree in scarcely any other sentiment or article of religious belief, we here find the most perfect harmony in the recognition of Supreme Intelligence, and that the soul survives the dissolution of this mortal frame. And, as Cicero long since observed, "In everything the consent of all nations is to be accounted the law of nature, and to resist it, is to resist the voice of God." For we can scarcely suppose, in consistency with the Divine perfections, that an error of such vast importance to mankind, should obtain the universal belief of all ages and all nations, and that God himself would suffer a world of rational beings throughout every generation to be carried away by a delusion, and to be tantalized by a hope which has no

foundation in nature, and which is contrary to the plan of his moral government. It is true indeed, that several of the opinions to which I have adverted, and many others which prevail among the uncivilized tribes of mankind, in regard to the condition of the disembodied spirits, and the nature of future happiness, are very erroneous and imperfect ; but they all recognize this grand and important truth, that death is not the destruction of the rational soul, and that man is destined to an immortal existence. Their erroneous conceptions concerning future rewards and punishments, may be easily accounted for, from a consideration of the imperfect conceptions they have formed of the Divine Being, and of the principles of his moral government ; from their ignorance of those leading principles and moral laws, by which the Almighty regulates the intelligent universe ; from the false ideas they have been led to entertain respecting the nature of substantial happiness ; from the cruel and absurd practices connected with the system of Pagan superstition ; from the intellectual darkness which has brooded over the human race since the fall of man ; and from the universal prevalence of those depraved dispositions and affections which characterize the untutored tribes on whom the light of Revelation has never shone.

From the above considerations it is evident that the human mind is so constituted, that, when left to its native unbiassed energies, it necessarily infers the existence of a Supreme Intelligence from the existence of matter, and the economy of the material world; and from the nature of the human faculties and the moral attributes of God, it is almost as infallibly led to conclude that a future existence is necessary, in order to gratify the boundless desires of the human soul, and to vindicate the wisdom and rectitude of the moral Governor of the world. As the consent of all nations has been generally considered a powerful argument in favor of the existence of the Deity, so the universal belief of mankind in the doctrine of a future state ought to be viewed as a strong presumption, that it is founded upon truth. It is certainly strange, after such demonstrative proofs of various kinds have been given of the existence of a Deity both by nature and revelation, as well as natural instinct, that any intelligent being would argue with, or suppose that his intellectual faculties were not intended by the Creator to enjoy an immortal existence. Though strange and unnatural as it may appear; it must, indeed, be admitted that such individuals have appeared in all ages of the world. Hierocles assigns the reason of it: "A wicked man," says he, "is

afraid of his judge, and therefore wishes his soul and body may perish together, rather than it should stand before the tribunal of God." As this seems to be a plausible reason why those persons argue for the mortality of the soul, it is a principle that must come to nought, as the march of science and revelation progress onward. As has been before stated, that the existence of an all-creating power is a principle, that with the belief of the immortality of the soul, is instinctively implanted in the breast of man, the question has often arisen, as to where the locality of this paradise is situated, hence, its locality will be a subject for a brief investigation.

Locality of Heaven. It is admitted by every believer in revelation that at the close of the present arrangement respecting our world, "all that are in their graves shall be raised to life;" and that however different the constitution of these new-modelled bodies may be from their state of organization, they will still be material vehicles, furnished with organs of sensation as the medium of perception to the immaterial spirit. In what manner the disembodied spirit views material objects and relations, and applies the knowledge of them which it acquired while united to an organical structure, we can have no conception whatever, until we are actually

ushered into the separate state ; therefore, the observations already made, and those which remain to be made, are not intended to apply to the intermediate state of the spirits of good men—that state, whatever may be the mode of perception and enjoyment in it, is a state of imperfection, and, in some respects, an unnatural state, if we suppose that the spirit is unconnected with any material vehicle. Now, if it be admitted that the spirits of the just, at the general resurrection, are to be reunited to material organical structures, it must also be admitted that those structures must have some material world, or habitation, in which they may reside. This last position is also as evident from the declaration of the scripture, as the first ; for while we are informed that the elementary parts of our globe shall be dissolved, we are at the same time informed that a “ new heaven and a new earth ” shall be prepared, “ wherein dwelleth righteousness,” for an abode for the spirits of the just. In reference to the locality, and the circumstances of our future destination, there appear to be five suppositions that can be formed : 1st, either the world we now inhabit will be new modelled, after the conflagration, and furnished as a proper place of residence for its renovated inhabitants ; or, 2nd, some of the

globes now existing in other regions of space, to which the holy inhabitants of our world will be transported, may be allotted as the more permanent habitation of the just ; 3rd, or some new world may be immediately created, adapted to the circumstances of the redeemed, and adorned with scenery fitted to call into exercise their renovated powers ; or, 4th, the redeemed inhabitants of heaven may be permitted to transport themselves from one region, or world, to another, and be furnished with faculties or vehicles for this purpose ; or, 5th, after remaining for a certain lapse of ages in that particular world to which they shall be introduced immediately after the resurrection, they may be transported to another region of the universe, to contemplate a new scene of creating power and intelligence, and afterwards pass, at distant intervals, through a successive series of transportations, in order to obtain more ample prospects of the riches and glory of God's universal kingdom. In all these cases, whatever supposition we may adopt as most probable, the general laws which now govern the universe, and the general relations of the great bodies in the universe to each other, will remain unchanged ; unless we adopt the language and belief that is sometimes proclaimed from the pulpit, that the whole frame of

Jehovah's empire will be overturned for the sake of our world, which, when compared with the whole system of nature, is but an indistinguishable atom amidst the immensity of God's works. With equal reason we might suppose that the conduct of the inhabitants of a planet which revolves around the star Sirius, or the catastrophe which may have befallen the planets Ceres, Pallas, Juno, and Vesta, must necessarily involve the destruction of the earth.

Throne of God. In connection with the preceding subject there is another which has been frequently mentioned, both by the sacred writers and ministers of the gospel, concerning the throne of God. The scriptures frequently refer to a particular place, circumstance, or manifestation, termed the throne of God, as in the following passages: "Heaven is my throne, and the earth is my footstool;" "the Lord hath prepared his throne in the heavens;" "a glorious high throne, from the beginning, is the place of thy sanctuary;" "therefore are they now before the throne of God, and serve him day and night in his temple;" "blessing, and honor, and glory, and power, be unto him that sits upon the throne;" these, and similar expressions and representations, must be considered either as merely metaphorical, or as referring to some

particular region of the universe, where the divine glory is manifested more particularly as the fountain from which all his glory emanates, and where the manifestations of the Divine character are most illustriously displayed. If there be a reference to the splendor and magnificence of a particular portion of the universe, there is an astronomical idea, which may help us to form some conception of this "glorious high throne," which is the peculiar residence of the Eternal. It is now admitted by astronomers as highly probable, if not certain, from observations, from the nature of gravitation, and other circumstances, that all the systems of the universe revolve around one common centre, and that this centre may bear as great a proportion, in point of magnitude, to the universal assemblage of systems, as the sun does to his surrounding planets; and since our sun is five hundred times larger than this earth, and all their other planets and satellites taken together; on the same scale, such a central body would be five hundred times larger than all the systems and worlds in the universe. If this is in reality the case, it may, with the most emphatic propriety, be termed *the throne of God*. for, upon this estimate it would form a vast universe itself—an example of material creation,

exceeding all the rest in magnitude and splendor, and in which are blended all the glories of every other system. This is the most sublime and magnificent idea that can possibly enter into the mind of man, although it may overpower our feeble conceptions, we ought not revolt at the idea of so glorious an extension of the works of God ; since nothing less magnificent seems suitable to a being of infinite perfection, this grand central body may be considered as the capital of the universe. From this glorious centre, embassies may be occasionally despatched to all surrounding worlds, in every region of space. Here, too, deputations from all the different provinces of creation, may occasionally assemble, and the inhabitants of different worlds mingle together. Here, may be exhibited to the view of unnumbered millions, objects of sublimity and glory, which are nowhere else to be found within the wide extent of creation. Here, intelligencies of the highest order, who have attained the most sublime height of knowledge and virtue, may form the principal part of the population of this magnificent region. Here, the glorified body of the Redeemer may have taken its principal station, as "the head of all principalities and powers," and here likewise, Enoch and Elijah may reside

in the meantime, in order to learn the history of the magnificent plans and operations of the Deity, that they may be enabled to communicate intelligence respecting them, to their brethren of the race of Adam, when they shall again mingle with them in the world allotted for their abode, after the general resurrection. Here, the grandeur of the Deity, the glory of his physical and moral perfections, and the immensity of his empire may strike the mind with more bright effulgence, and exert more elevated emotions of admiration and rapture, than in any other province of universal nature; in fine, this vast and splendid central universe may constitute that august mansion mentioned in the Scripture, under the designation of the Third heavens, the Throne of the Eternal, &c. Perhaps, some may consider the grand idea which has now been suggested, as too improbable and extravagant to claim our serious attention. In reply to such an insinuation, let it be remembered, that nothing has been stated but what corresponds to the whole analogy of nature, and to several sublime intimations contained in the system of Divine Revelation. It is a fact, which, in the present day, cannot be denied by any one acquainted with the subject, that the material universe, as far as our glasses

can extend our vision, consists of a countless multitude of vast bodies, which completely baffle our powers in attempting to form any adequate conception of them. This amazing fact, placed within the evidence of our senses, shows us, that it is impossible for the human mind to form too extravagant ideas of the universe, or to conceive its structure to be more glorious and magnificent than it really is.

Grandeur of the Deity. In connection with the above arguments, if we admit that the Divine Being is infinite, pervading the immensity of space with his presence, why should we be reluctant to admit the idea, that his Almighty energy is exerted throughout the boundless regions of space? for it is just such conclusions, as the belief in the power of infinite intelligence should naturally lead us to deduce. Whether does it appear to correspond more with our ideas of an infinite Being, to believe that his creative power has been confined to this small globe, and a few sparkling studs fixed in the canopy of the sky; or to admit on the ground of observation and analogy that he has launched into existence millions of worlds; that all the millions of systems within the reach of our vision, are but as a particle of vapor to the ocean, when compared with the myriads which exist in the immense unexplored

regions of space ; that the whole of this vast assemblage of suns and worlds, revolves around the grand centre of the universe ; and that this centre, where the throne of God is placed, is superior to all the other provinces of creation in magnitude, beauty, and magnificence ? Who would dare to prove that such conceptions are erroneous or impossible, or unworthy of that Being who sits on the throne of the universe ? To attempt such a proof, would be nothing less than to set bounds to Omnipotence ; to prescribe limits to the operations of him “ whose ways are past finding out.”

“ Can man conceive beyond what God can do ?
 Nothing, but quite impossible, is hard ;
 He summons into being, with like ease,
 A whole creation and a single grain.
 Speaks he the word ? a thousand worlds are born ;
 A thousand worlds—there’s room for millions more,
 And in what space can his great fiat fail ?
 Condemn me not, cold critic, but indulge
 The warm imaginations ; why condemn—
 Why not indulge such thoughts as swell our hearts
 With fuller admiration of that power [swell ?
 Which gives our hearts with such high thoughts to
 Why not indulge in his augmented praise ?
 Darts not his glory a still brighter ray ?
 The less is left of chaos, and the realms
 Of hideous night.”

These views and reasonings are fully corroborated by the sublime descriptions of Deity

contained in the Holy Scriptures. "Canst thou by searching find out God? Canst thou find out the Almighty to perfection?" "He is the high and Lofty One who inhabiteth eternity." "He is glorious in power." "He dwells in light unapproachable, and full of glory." "Great is our Lord, and of great power, his greatness is unsearchable; his understanding is infinite." "Can any thing be too hard for Jehovah?" "The everlasting God, the Lord, the Creator of the ends of the earth, fainteth not, neither is weary, there is no searching of his understanding; He doeth great things, past finding out, and wonders without number." "He meteth out the Heavens with a span, and comprehendeth the dust of the earth in a measure." "He spake and it was done; He commanded and it stood fast." "He stretched forth the heavens alone, and bringeth forth their hosts by number." "Lo, these are parts of his ways, but how little a portion is heard of him; and the thunder of his power who can understand? Behold, the heaven and the heaven of heavens cannot contain him!" "The heavens declare the glory of God, and the firmament sheweth forth his handiwork." "Thine, O Lord! is the greatness, and the glory, and the majesty of all in heaven and earth is there, and thou art exalted above all." "Behold,

the heaven, and the heaven of heavens is the Lords." "Jehovah hath prepared his throne in the heavens, and his kingdom ruleth over all." "Thou, even thou, art Lord alone; Thou hast made heaven, the heaven of heavens, with all their host, thou preserveth them all, and the host of heaven worshippeth thee." "Who can utter the mighty acts of the Lord?" "Who can show forth all his praise?" "Touching the Almighty, we cannot find him out." "He is excellent in power, and his glory is above the earth or heavens."

Such sublime descriptions of the Divine Being, which are interspersed throughout various parts of Revelation, lead us to form the most august conceptions of creative energy, and plainly indicate that it is impossible for the highest created intellect to form a more magnificent idea of his designs and operations than what in reality exists. In short, although some of the preceding arguments may not precisely correspond to the facts which shall ultimately be found to exist in the universe—they ought, nevertheless, to be entertained, since they open to the mind, a sublime and interesting subject for contemplation, and go not beyond the magnificence of Jehovah's kingdom, nor be very different from what actually exists in the universe.

It may be laid down as a principle in Theology, that our conceptions of the grandeur of God, are commensurate with our conceptions of the grandeur and magnificence and extent of his operations throughout the universe. We all admit that the Deity is infinite, both in respect to space and duration. But, an infinity of empty space and infinity of duration, abstractly considered, convey to the mind no tangible ideas to guide it in forming distinct conceptions of the Deity, or any other beings.

From the preceding arguments, we perceive a close analogy between the ground we have taken, and the truths of Revelation concerning the grandeur of the Deity, and the magnificence of his operations, and his unlimited power.

Employment of the Redeemed in the future world. Another question which has often been the subject of much reflection in the minds of the christian is, what will be the employment of the immortal mind of the just, in the spirit world? On this subject there has been many wild conjectures among christians, as well as heathens, in all ages of the world ; this is owing to the style in which the sacred writers portray the joys of the righteous, who are represented as standing before the Throne of God, and giving glory to his name and to the Lamb for-

ever,—and casting their crowns at his feet, and saying “worthy is the Lamb that was slain to receive honor, glory, power, and dominion for ever and ever.” But, when we reflect upon the constitution and powers of the moral faculties of the mind, such a conjecture as this seems altogether incompatible with their present inclinations. We all admit that it is perfectly right to study the sciences of Arithmetic, Geography, Astronomy, Philosophy, History, &c., in order to become acquainted with the operations of nature and the magnitude of the heavenly bodies and other surrounding objects. Now, if the study and knowledge of these sciences in this world, are necessary to promote our happiness; they must evidently proceed from the Almighty, as he is the great fountain of all good, and if so, then these sciences will be cultivated also in another world, for we cannot reasonably suppose that we shall be denied the privilege of investigating any subject which will tend to augment our happiness in the spirit world, or that will enable us to become more perfectly acquainted, and to comprehend more clearly the wonders of creative power; for it is evidently certain, that when we leave this world we shall leave none of the powers of the mind or its faculties behind, except those which per-

tain to our animal nature, and consequently when we are rid of those animal propensities, the moral sentiments and perceptive faculties which are now often blunted by these propensities, will then be much more active than they are at present, then undoubtedly those sciences which are in their nature interesting and beneficial, will be pursued with untiring zeal and vigor ; though, in what manner this knowledge will be imparted to us, and what course of instruction will be adopted, is certainly a matter of conjecture. But that the knowledge of figures is retained in the spirit world, and even cultivated too, may be inferred from several passages of Holy Writ. When Daniel beheld the vision of the "Ancient of Days," sitting on his throne, a numerous retinue of glorious beings appeared in his train, to augment the grandeur of the scene. "Thousand thousands ministered unto him, and ten thousand times ten thousand, stood before him." We are told in the sixty-eighth Psalm, "that the chariots of God are twenty thousand, even many thousands of angels," and in the epistle to the Hebrews, we read of "an innumerable company of angels." The apostle John, when narrating his vision of the celestial world, tells us, that he "beheld and heard the voices of many angels round about the throne,

and the number of them was ten thousand times ten thousand and thousands of thousands ;” and again, “ After this I beheld, and lo, a great multitude which no man could number, of all nations and kindreds and tongues, and people—and all the angels stood round about the throne, and fell upon their faces and worshipped God.” These expressions are the strongest which the inspired writers make use of, in order to express a countless multitude of objects, and they lead us to conclude that, in the heavenly world, vast assemblages of intelligent beings, will be occasionally presented to the view ; and consequently a countless variety of scenes, objects and circumstances connected with their persons, stations and employments. And, therefore, if celestial beings were not familiarized with numerical calculations and proportions, such scenes, instead of being contemplated with intelligence, and rational admiration would confound the intellect ; and produce an effect similar to that which is felt by a savage when he, for the first time, beholds some of the splendid scenes of civilized life.

From the foregoing passages of scripture, it is evident that the science of Arithmetic is understood by the inhabitants of the celestial world ; if then, this science is cultivated there,

it is more than reasonable to suppose that several of the other natural sciences are also cultivated. The Creator himself has laid the foundation of some of these sciences. His works consist of globes and spheroids of different dimensions and of immense concentric rings, revolving with a rapid motion. These globes are carried round different centres, some of them in circles, some of them in ellipses, and some of them in long eccentric curves. Being impelled in their courses by different degrees of velocity, their real motion cannot be traced, nor the beautiful simplicity and harmony of the different systems, made apparent without the application of mathematical investigations. We all admit there are different degrees of intelligence or glory, among the celestial inhabitants which will explain the reason from the consideration, that the more intelligence we possess in this world, the more able we shall be to comprehend the glory and magnificence of the heavenly world and the extent and wonders of creative power; the gigantic minds of Locke or Newton, will be able to understand the grandeur of creation better than the Hottentot who was converted to christianity only a few years before his removal from time to eternity. If these sciences tend to make us wiser in heaven, will not the study of them

be pursued there? Astronomy is another science which will occupy the attention of pure intelligences in a future world. The object of this science is, to determine the distances and magnitudes of the heavenly bodies, the form of the orbits they describe, the laws by which their motions are directed, and the nature and destination of the various luminous and opaque bodies of which the universe appears to be composed. It is the most noble and sublime of all the sciences, and presents to our view, the most astonishing and magnificent objects, whether we consider their immense magnitude, the splendor of their appearance, the vast spaces which surround them, the magnificent apparatus with which some of them are encompassed, the rapidity of their motions, or the display they afford of the omnipotent energy and intelligence of the Creator. In consequence of the cultivation of this science, our views of the extent of creation, and of the sublime scenery it unfolds, are expanded far beyond what former ages would have conceived. From the discoveries of Astronomy, it appears that by the aid of our finest glasses, the number of planetary globes in the visible system of the universe may be stated at the least computation, at 2,400,000,000 of worlds. Sir William Herschel informs us, that when

viewing a certain portion of the "Milky Way," in the course of seven minutes, more than fifty-thousand stars passed across the field of his telescope,—and it has been calculated, that within the range of such an instrument, applied to all the different portions of the firmament, more than 80,000,000 of stars would be rendered visible. It is supposed that the diameter of the solar system is 3,600,000,000 of miles, and yet it is very probable that there are thousands of systems beyond the reach of the finest telescope. Hence, it appears, that our earth is but as a point in the immensity of the universe ; that there are worlds a thousand times larger, enlightened by the same sun which "rules our day ;" that the sun is himself, an immense luminous globe, whose circumference would enclose more than 1,200,000 globes as large as ours ; that the earth is carried forward with its inhabitants through the regions of space, at the rate of a thousand miles every minute ; that motions exist in the great bodies, in the universe, the force and rapidity of which astonish and overpower the imagination. These objects present an immense field for the contemplation of every class of moral intelligences, and a bright mirror in which they behold the reflection of the Divine attributes. Of this vast universe, how

small a portion has yet been unveiled to our view ! With respect to the bodies which compose our planetary system, we know only a few general facts and relations. In regard to the fixed stars, we have acquired little more than a few rude conceptions of their immense distance and magnitudes. In relation to the comets, we only know that they move in long, eccentric orbits, that they are impelled in their course with immense velocity, and appear and disappear in uncertain periods of time. Of the numerous systems into which the stars are arranged ; of the motion peculiar to each system ; of the relations which these motions have to the whole universe as one great machine ; of the nature and arrangement of the numerous nebulae which are scattered throughout the distant regions of space ; of the worlds which are connected with the starry orbs ; of the various orders of beings which people them ; of the changes and revolutions which are taking place in different parts of the universe ; of the new creations which are starting into existence ; of the number of opaque globes which may exist in every region of space ; of the distance to which the material world extends, and of the various dispensations of the Almighty towards the diversified orders of intelligences which

people his vast empire—we remain in almost profound ignorance, and must continue so, as long as we remain in this obscure corner of creation. There will, therefore be ample scope in the future world, for farther researches into the subject, and, for enlarging our knowledge of those glorious scenes which are at present so far removed beyond the limits of natural vision, and the sphere of human investigation. The heaven constitutes the principal part of the divine empire—compared with which, our earth is but an atom, and “all nations are as nothing, and are accounted to Jehovah as less than nothing and vanity. Vast as this world may appear to the frail beings who inhabit it, it probably ranks among the smallest globes in the universe, but, was it twenty times more spacious than it is, it would be only as a grain of sand when compared with the immensity of Creation, and all the events that have passed over the inhabitants as only a few of those few ephemeral transactions which crowd the annals of eternity. It is throughout the boundless regions of the firmament that God is chiefly seen, and his glory contemplated by unnumbered intelligences. It is there that the moral grandeur of his dispensations, and the magnificence of his works, are displayed in all their variety and lustre, to

countless millions of his rational intelligences, over which he will continue to eternally preside. Hence, the frequent allusions to "the heavens," by the inspired writers, when the Majesty of God and the glory of his dominions are intended to be illustrated. "All the gods of the nations are idols, but Jehovah made the heavens." "The Lord hath prepared his throne in the heavens; and his kingdom ruleth over all." "By his spirit he hath garnished the heavens." "The heavens declare the glory of Jehovah." "When I consider the heavens the work of thy fingers, the moon and the stars which thou hast ordained—what is man, that thou art mindful of him? or the son of man that thou visitest him?" In order to form just conceptions of the beauty and grandeur of the heavens, and the intelligence of Him, who arranged their numerous hosts, some of the fundamental facts and principles of astronomy require to be understood. The order of the bodies which compose the solar systems, or rather systems which exist in the universe, the form of their orbits, their proportional distances and periods of revolution; their magnitudes, rotations, velocities, and their various phenomena which are observed on their surfaces; the arrangement and positions of the different clusters of stars; of the stellar and planetary

nebulæ ; of double, triple, and variable stars, and many other general facts, require to be known before the mind can receive farther information respecting the structure of the universe. It may be also necessary, even in a higher state of existence, to be acquainted with those artificial helps by which very distant objects may be brought near to view. It is highly probable, that, in the future world, a considerable portion of our knowledge respecting the distant provinces of the Divine Empire, will be communicated by superior beings who have visited the different systems dispersed through the universe and have acquired information respecting their history, and their physical and moral scenery. We learn from Scripture that there are intelligencies who can wing their way, in a short period of time, from one world to another. Such beings, in the course of a thousand centuries, must have made many extensive tours through the regions of creation and acquired a comprehensive knowledge of the most remarkable scenes which the universe displays. And, since they have occasionally mingled in the society of men, and communicated intelligence from heaven to earth, it is reasonable to suppose, that they will have more frequent intercourse with redeemed men in a future state, and com-

municate the discoveries they have made, respecting the economy of God's universal empire. To enter into the spirit of those sublime details which angels and archangels might communicate, respecting other systems and worlds, the mind must be already prepared by a knowledge of those principles which have already been ascertained, and of those discoveries which have already been made in relation to the system of the universe. Were they previously ignorant of the science of astronomy and the facts that are brought to light, by the aid of astronomical knowledge, they might stare and wonder at some of the facts detailed ; but their ideas would be vague and confused, and they would be unable to form clear and comprehensive conceptions of the various circumstances connected with the scenes described, in all their bearings, aspects and relations, and of the indications they afford of exquisite skill and intelligent design. As the objects which astronomy explores, are unlimited in their range, they will afford an inexhaustible subject of study and contemplation to superior beings, and to mankind when placed in a higher sphere of existence, unless we suppose that finite minds will be able, at some future period, to survey and comprehend all the plans and operations of the

infinite Creator. But this is evidently impossible, for, "who by searching can find out God? Who can find out the Almighty to perfection?" After millions of centuries have run their rounds, new scenes of grandeur will still be bursting on the astonished mind, new regions of creation, and new displays of divine power will yet remain to be explored; and consequently, the science of astronomy will never arrive at absolute perfection, but will be in a progressive course of improvement through all the revolutions of eternity. In the prosecutions of such an interesting study, and in the contemplation of such objects as this science presents, the grand aim of celestial intelligences will be to increase the knowledge and love of God; and, in proportion as their views of the glories of his empire are enlarged, in a similar proportion will their conceptions of his boundless attributes be expanded, and their praises and adorations ascend in sublimer strains to Him, who sits upon the throne of the universe, who alone is "worthy to receive glory, honor, and power," from every order of his creatures. Since, then, it appears that Astronomy is conversant about objects the most wonderful and sublime—since these objects tend to amplify our conceptions of the divine attributes—since a clear and distinct

knowledge of these objects cannot be attained without a clear and distinct knowledge of the fundamental principles of astronomical science; since the heavens constitute the principal part of God's universal empire; since our present views of the magnificence of this empire are so obscure and circumscribed; since even the information that may be communicated by other intelligences, could not be fully understood without some acquaintance with the principles of this science; and since the boundless scenes it unfolds, present an inexhaustible subject of contemplation, and afford motives to stimulate all holy beings to incessant adoration; it would be absurd to suppose that renovated men, in a higher state of existence, will remain in ignorance of this subject, or that the study of it will ever be discontinued while eternity endures.

Natural Philosophy is another subject which will doubtless engage the attention of regenerated men in a future state. The object of this science is to describe the phenomena of the material world, to explain their causes, to investigate the laws by which the Almighty directs the operations of nature, and to trace the exquisite skill and benevolent design which are displayed in the economy of the universe. It embraces investigations into the several powers

and properties, qualities and attributes, motions and appearances, causes and effects of all the bodies with which we are surrounded, and which are obvious to our senses, such as light, heat, colors, air, water, sounds, echoes ; the electrical and magnetical fluids ; hail, rain, snow, dew, thunder, lightning, the rainbow, parhelia, winds, luminous and fiery meteors, the Aurora Borealis, and similar objects in the system of nature. From the discoveries of experimental philosophers, we have been made acquainted with a variety of striking facts and agencies in the system of the universe, which display the amazing energies of the Creator, and which tend to excite our admiration of the depths of his wisdom and intelligence. We learn that the light emitted from the sun, moves with a velocity equal to 200,000 miles in a second of time ; that the atmosphere which surrounds us, presses our bodies with a weight equal to 30,000 pounds ; that it contains the principles of fire and flame ; that, in one combination, it would raise our animal spirits to the highest pitch of ecstasy, and in another, cause our immediate destruction ; that it is capable of being compressed into 40,000 times less space than it naturally occupies ; and that the production of sounds, the lives of animals, and the growth of vegetables

depend upon its unceasing agency. We learn that a certain fluid pervades all nature which is capable of giving the animal frame a shock, which may be communicated in an instant to a thousand individuals; that this fluid moves with inconceivable velocity; that it increases the evaporation of fluids, and occasionally displays its energies among the clouds in the form of fire-balls, lambent flames and forked lightnings. We learn that the bodies of birds, fishes, quadrupeds and insects, in relation to their eyes, feet, wings, fins and other members, are formed with admirable skill, so as to be exactly adapted to their various necessities and modes of existence, and that they consist of an infinite number of adaptations in order to accomplish the object intended. In short, the whole of nature presents a scene of wonder, which, when seriously contemplated, is calculated to expand the intellectual powers, to refine the affections, and to excite the admiration of the attributes of God, and the plan of his Providence. Natural Philosophy may therefore be considered as a branch both of the religion of nature, and the religion of Revelation. It removes, in part, the veil which is spread over the mysterious operations of nature, and discloses to our view the wonders which are concealed from the sottish

multitude, "who regard not the works of the Lord, nor consider the operations of his hands." It discovers those laws by which the Sovereign of the universe governs his vast dominions, and maintains them in undecaying beauty and splendor throughout all ages. It thus enables us to consecrate the universe into one grand temple, and from the contemplation of every object it presents, to elevate our minds, and to raise our voices in grateful praises to Him "who created all things, and for whose pleasure they are, and were created." In the future world there will be abundant scope for the prosecution of this subject to an indefinite extent. We are assured that after the resurrection, a material world will be prepared for the habitation of the just, in which their connection with the visible universe will, doubtless, be far more extensive than it is at present, and wherever a material system exists, it affords a scope and application for Natural Philosophy. This new world will be prepared and arranged by Divine wisdom, and, consequently, will exhibit scenes of beauty and grandeur, of exquisite contrivance and benevolent design. For, if the world we now inhabit, amidst all the deformities and physical derangements which sin has introduced, displays so many beautiful arrangements and marks of

intelligence and skill, much more may we conclude, that the world in which "righteousness shall dwell," will abound in everything that can charm the eye, the ear or the imagination, and illustrate the manifold wisdom of God; and, of course, will present a boundless field for the most sublime investigations of science. This world, in many of its arrangements, will doubtless present a variety of objects and scenes altogether different from those we now behold, even should the same physical laws which govern our terrestrial system still continue to exist and remain in operation. The inflection, refraction and reflection of light, will be directed by the same general laws, and will produce effects analogous to those we now perceive in the scene around us; but the medium through which it passes, and the various objects by which it is refracted and reflected, and many other modifications to which it may be subjected, may produce a variety of astonishing effects, surpassing everything we now behold, and exhibit scenes of beauty of which we can at present form no distinct conception. The science of optics, in unfolding to us the nature of light, has enabled us to exhibit a variety of beautiful and surprising effects, and to perceive traces of infinite intelligence in relation to this element, beyond what

former ages could have believed. And, therefore, we have reason to conclude, that, in the hand of Omnipotence, when arranging other worlds, the element of light is capable of being modified in a thousand forms of which we are now ignorant, so as to produce the most glorious and transporting effects. There will probably be no such phenomena as thunder, lightning, and fiery meteors in the world to which I allude, but the electrical fluid, which is the principle agent in producing these appearances, and which pervades every part of nature, may operate in that world in a different manner, instead of producing effects that are appalling, may be an agent for creating scenes which will inspire the soul with admiration and delight. What has now been said of Natural Philosophy, will equally apply to the science of Chemistry. This science has for its object to ascertain the first principles of all bodies, their various properties and combinations, their mode of operation and the effects they produce in the economy of nature. Its discoveries have not only unfolded many of the admirable processes which are going forward in the animal, vegetable and mineral kingdoms, but have opened to our view many striking displays of the wisdom and goodness of God, in producing by the most sim-

ple means, the most astonishing and benevolent effects. The principles of this science must, therefore, be applicable wherever matter exists, under whatever shape or modification it presents itself; and as all the worlds throughout the universe are composed of matter compounded into various forms, they must afford an ample range for the investigations and researches of chemical science. To suppose that the inhabitants of heaven make no use of any of the natural sciences, or have no knowledge of them, would be to suppose their intellects inferior to ours, and that their knowledge was less extensive, and that they make no progress in intellectual attainments, and have no desire to explore "the works of the Lord, and to consider the operation of his hands," which would be a supposition none would be willing to admit.

Anatomy and Physiology are subjects which we may naturally conclude, will occasionally occupy the attention of the inhabitants of heaven. The object of these sciences is, to investigate the general structure and economy of the animal frame, and especially the parts and functions of the human body. If we are led to admire the skill and wisdom displayed by the Creator, in the formation of the human system, as we are made acquainted with all its

parts by the sciences of Anatomy and Physiology, how much more will we be led to wonder at and admire the grandeur and magnificence of our spiritual bodies after the resurrection, when they will be "fashioned after Christ's most glorious body." The faculties of the spiritual body will then be invigorated, its tendency to dissolution destroyed, every principle of disease annihilated, and everything that is loathsome and deformed for ever prevented ; its beauty will be exquisite, its symmetry perfect, its aspect bright and refulgent, and its motions vigorous and nimble ; its sensitive organs will be refined and improved, and the sphere of their operations extended ; its auditory organs will be tuned to receive the most delightful sensations from the harmonies of celestial music, and its viseral powers rendered capable of perceiving the minutest objects, and penetrating into the most distant regions. New senses and faculties of perception, and new powers of motion, fitted to transport it with rapidity from one portion of space to another, will, in all probability, be superadded to the powers with which it is now invested. And, surely, the contrivances and adaptations which must enter into the structure of such an organical frame, cannot be less curious and exquisite, nor display less wisdom

and intelligence than those which we now perceive in our mortal bodies. On the contrary we must necessarily suppose thousands of the most delicate contrivances and compensations, different from everything we can now conceive, to be essentially necessary in the construction of an organized body intended for perpetual activity, and destined to an immortal duration. To investigate and contemplate the contrivances of Divine wisdom, by which the elements of disease and death are forever prevented from entering into this renovated frame, and by which it will be preserved in undecaying youth and vigor throughout the lapse of innumerable ages, we must necessarily conclude, will form a part of the studies of renovated man in the future world; nor can we help thinking, that the knowledge of the wonders of the human frame we now acquire, may be a preparatory knowledge or qualification for enabling us to form an enlightened and comprehensive conception of the powers, qualities and peculiar organization of the bodies of the saints after the resurrection.

Another branch of study in which the saints in heaven will engage is History. History contains a record of past actions, or events, and makes us acquainted with the transactions which happened hundreds or thousands of years ago.

When viewed in its proper light it may be considered as nothing else than a detail of the operations of Divine Providence, in relation to the moral intelligences of this world. It illustrates the character of the human race, and the deep depravity in which they are involved, and displays the rectitude of the character of God, and the equality of his moral administration. History, therefore, will form a prominent object of study among the celestial inhabitants, as furnishing those materials which will illustrate the ways of Providence, and display the wisdom and righteousness of Jehovah in his government of the world. At present we contemplate only the fragments of the history of mankind. Of the history of some nations we are altogether ignorant, and of the history of others we have only a few unconnected details, blended with fabulous narrations, and extravagant fictions. Of no nation whatever have we an entire history, composed of authentic materials; and, consequently, we perceive only some broken, detached links in the chain of the Divine dispensations, and are unable to survey the whole of God's procedure towards our race in one unbroken series, from the creation to the present time. We know nothing decisively respecting the period which man remained in a state of inno-

cence, nor of the particular transactions and events that happened before the fall. And how little do we know of the state of mankind, of the events which befel them, and of the civil and religious arrangements which existed during a period of sixteen hundred years, which intervened between the creation and the deluge, though the world was then more populous and fertile than it is at present, or ever has been since that time. How little do we know of the state of mankind immediately previous to the flood; of the consternation and terror which must have been displayed over all the earth, when the fountains of the great deep were broken up, and the cataracts of heaven opened; and of the dreadful concussions of the elements of nature, when the solid strata of the earth were rent asunder, when the foundations of the mountains were overturned, and the whole surface of the globe transformed into one boundless ocean. How little do we know of the gradual rise of idolatry, or even of all the circumstances which attended it, and of the origin of the great empires into which the world has been divided. How little do we know even of the history of the Jewish nation, posterior to the period of the Babylonish captivity. Whither were the ten tribes of Israel scattered among

the nations? what events have befallen them? and in what countries are they now to be found? Of the history of all the nations in the world, (the Jews only excepted,) from the time of the deluge to the days of Hezekiah, a period of nearly two thousand years, we remain in profound ignorance. And yet, during that long period God has not forsaken the earth; his dispensations toward his rational offspring were still going forward; empires were rising and declining; one generation passing away, and another coming; and thousands of millions of mankind ushered into the eternal world. Those chasms in the history of mankind, which hide from our view the greater portion of God's moral dispensation, will doubtless be filled up in the eternal state, so that we shall be enabled to take a full view of the whole of the Divine procedure, in all its connexions and bearings, towards every nation on earth. But the history of man is not the only topic in this department of knowledge, that will occupy the attention of the inhabitants of heaven. The history of angels—of their faculties, intercourses, and employments—of their modes of communication with each other—of their different embassies to distant worlds—of the transactions which have taken place in their society, and of the revolu-

tions through which they may have passed—the history of apostate angels, the cause of their fall, and the circumstances with which it was attended—the plans they have been pursuing since that period, and the means by which they have endeavored to accomplish their infernal devices—will doubtless form a portion of the Divine dispensations which the saints in light will be permitted to contemplate. Over this part of the Divine economy a veil is spread, which we have reason to believe will be withdrawn when that which is perfect is come, and “when we shall know even as we are known.” It is also probable that the leading facts in relation to the history of other worlds will be disclosed to view. The history of different planets in the solar system, and of those which are connected with other systems in the universe—the periods of their creation, the character of their inhabitants, the changes through which they have passed, the peculiar dispensations of Providence respecting them, and many other particulars, may be gradually laid open to the “redeemed from among men,” for enlarging their views of the Divine government. By means of such communications they will require a clearer and more distinct conception of the moral character and attributes of God, of the

rectitude of his administrations, and of "his manifold wisdom" in the various modes by which he governs the different provinces of his vast empire. Under the impressions which such views will produce, they will rejoice in the Divine government, and join with rapture in the song of Moses, the servant of God, and in the song of the Lamb, saying, "Great and marvellous are thy works, Lord, God, Almighty! Just and true are thy ways, thou King of saints!" Having now noticed the various branches of science which in all probability will be studied by the celestial inhabitants, we ask the reader to investigate the matter impartially, and then judge. Though when we come to know the reality, it is probable that everything may not be found to be exactly as we have supposed, yet, according to the present arrangement, it is the most rational conclusion we can arrive at. That the celestial inhabitants will possess a superior intellectual capacity is positive, from several considerations, and is a fact so universally admitted, that it needs no illustration here to substantiate it; that their range of vision is also enlarged is equally admitted, and from the magnificence and splendor of the works of creation, and the more perfect conceptions which redeemed men will there possess of the principles

of the natural sciences, it is evident that the diversity of the scenery of the Heavens will present an unlimited range and endless variety of objects for contemplation far beyond our present conceptions. Let us now consider some of the objects presented to our mental sight, in this vast assemblage of systems and worlds, which lie within the sphere of human vision. The first idea that suggests itself, is, that they are all material structures, in the formation of which infinite wisdom and goodness have been employed, and consequently, they must exhibit scenes of sublimity and of exquisite contrivance, worthy of the contemplation of every rational being. If this earth—which is an abode of apostate men, and a scene of moral depravity, and which, here and there, has the appearance of being the ruins of a former world—presents the variegated prospects of lofty mountains, romantic dells and fertile plains, meandering rivers, transparent lakes and spacious oceans, verdant landscapes adorned with fruits and flowers, and a rich variety of the finest colors, and a thousand other beauties and sublimities that are strewn over the face of nature ; how grand and magnificent a scenery may we suppose must be presented to the view, in those worlds where moral evil has never entered to derange

the harmony of the Creator's works, where love to the Supreme, and to one another, fires the bosom of its inhabitants, and produces a source of happiness. In such worlds, we may suppose that the sensitive enjoyments, and the objects of beauty and grandeur which are displayed to their views, as far exceed the scenery and enjoyments of this world, as their moral and intellectual qualities excel those of the sons of men. In the next place, it is highly reasonable to suppose, that an infinite diversity of scenery exists throughout all the worlds which compose the universe; that no one of the millions of systems throughout the works of Creation, exactly resembles another in its construction, motion, order, and decoration. There appear, indeed, to be certain laws and phenomena which are common to all the systems which exist within the limits of human vision. But, with the exception of these general laws, so far as we have been able to determine the appearance of the planets by the aid of the most powerful telescopes, there is a great diversity of scenery existing in each; if we examine our earth, we shall find an almost endless diversity of objects continually presenting themselves to our view. In the animal kingdom we find more than 100,000 different species of living creatures, and

about the same variety in the productions of vegetable nature ; the mineral kingdom presents to us an immense variety of earths, stones, rocks, metals, fossils, gems, and precious stones, which are strewed in rich profusion along the surface, and throughout the interior parts of the globe. Of the individuals which compose every distinct species of animated beings, there is no one that bears an exact resemblance to another. Although there are about one thousand millions of inhabitants that now people the earth, and all the other millions that have existed since the world began, and were those to be compared there would probably be found no two that would present exactly the same aspect, in every point of view in which they might be contemplated. In like manner no two cows, horses, dogs, lions, elephants, or other terrestrial animals, will be found bearing a perfect resemblance. The same observation will apply to the scenery of lakes, rivers, grottos, mountains, and all other diversified landscapes which the surface of the earth and waters present to the traveller, and the student of nature. If from the earth we view the other bodies which compose the solar system, we shall find a similar diversity, as far as our observations can extend. From the surface of one of the planets* the sun will appear seven

times larger, and from another 360 times less than he does to us. One of these planets is destitute of a moon, but from its ruddy aspect, either in its surface or its atmosphere, seems to be endowed with a phosphorescent quality, to supply it with light, in the absence of the sun; while another is surrounded with four, another with six, and another with seven resplendent moons, much larger than ours. Even our moon, which is among the smallest of the celestial bodies, which is the nearest to us, and which accompanies the earth in its revolutions round the sun, exhibits a curious aspect, different from what is formed on the terraqueous globe—the altitude of its mountains, the depths of its vales, the conical form of its insulated rocks, the circular ridges of hills which encompass its plains, and the celestial phenomena which are displayed in its firmament, present a scenery which, though in some points resembling our own, is yet remarkably different, on the whole, from the general aspect of nature in our terrestrial habitation.

Having now glanced at the scenery of the heavens, and its diversity, as fit objects for the contemplation of celestial beings, we will now more particularly notice the intelligence and senses of superior beings in the redeemed state.

Among sentient beings in this world we find a regular gradation of intellect, from the aquatic and insect tribes up to man, who stands at the top of the intellectual scale, as lord of this lower world. We perceive, too, a great difference existing between the intellect of different persons, owing partly to their constitutional organization, and partly to the degrees of cultivation the faculties have received. But it would be highly unreasonable to suppose that the most accomplished genius that ever adorned our race, was placed at the summit of intellectual perfection. On the other hand, we have reason to believe that man, with all his noble powers, stands nearly at the bottom of the scale of the intelligent creation. As to the number of species which diversify the ranks of superior intellectual natures, and the degrees of perception which distinguish their different orders, we have no data afforded by the contemplation of the visible universe sufficient to enable us to form a definite conception. The following description, in the words of a celebrated Swiss naturalist, may perhaps convey some faint idea of the powers of some of the highest orders of intelligences :

“To convey one’s self from one place to another with a swiftness equal or superior to

that of light; to preserve one's self by the mere force of nature, and without the aid of any other created being; to be exempted from any kind of change; to be endowed with the most extensive senses; to have distinct perceptions of all the attributes of matter, and all its modifications; to discover effects in their causes; to raise one's self by a most rapid flight to the most general principles; to see in the twinkling of an eye those principles; to have at the same time, without confusion, an almost infinite number of ideas; to see the past as distinctly as the present, and to penetrate into the remotest futurity; to be able to exercise all these faculties without weariness: from these considerations we may form some idea of the intellectual powers of superior intelligences, but even still our conceptions of the superior qualities of the inhabitants of the spirit world fall far below the reality."

A being possessed of faculties such as these, is raised as far above the limited powers of man, as man is raised above the insect tribes. The Scriptures assure us that beings approximating in their powers and perfections to those now stated, actually exist, and perform important offices under the government of the Almighty. The perfections of the angelic

tribes, as represented in Scripture, are incomparably superior to those of men. They are represented as possessing powers capable of enabling them to wing their flight with amazing rapidity from world to world, for the angel Gabriel, being commanded to fly swiftly, while the prophet Daniel was engaged in supplication, approached to him before he had ended his petition. During the few minutes he was engaged in his prayer this angelic messenger descended from the celestial region to the country of Babylon. This is a rapidity of motion far surpassing that of light, and far beyond the comprehension of the most vigorous imagination. They have power over the objects of inanimate nature, for one of them "rolled away the stone from the door of the sepulcher," at the time of our Saviour's resurrection. They are acquainted with the springs of life, and the avenues by which they may be interrupted, for an angel slew 185,000 of the Assyrians in one night. They are perfectly acquainted with all the relations which subsist among mankind, and can distinguish the age and character of every individual throughout all the families of the earth, for one of these beings recognized all the first-born in the land of Egypt, and exerted all his power in the destruction of the first-born of

the Egyptians. And as they are "ministering spirits to the heirs of salvation," they must have a clear perception of the persons and characters of those who are the objects of Divine favor, and to whom they are occasionally sent on embassies of mercy. They are endowed with superior physical powers and energies; hence they are said to "excel in strength;" and the phrases "a strong angel," and "a mighty angel," which are applied to them, are expressions of the same perfection. Hence, they are represented in the book of Revelation as "holding the four winds of heaven;" as executing the vengeance of God upon the proud despisers of his government; as "throwing mountains into the sea;" and "binding the prince of darkness in chains, and casting him into the bottomless pit." They are endowed with immortal youth and vigor, and experience no decay in their intellectual and physical powers, for the angels appeared as young men, though they were doubtless several thousand years old. They are possessed of vast powers of intelligence; hence they are exhibited in the book of Revelation as being full of eyes, that is, endowed with "all sense, all intellect, all consciousness; turning their attention every way; beholding all things at once

within the range of their understanding, and discerning them with the utmost clearness of conception." The human form in the vigor of youth, is the most beautiful and symmetrical of all the forms of organized beings with which we are acquainted ; and, in these respects may probably bear some analogy to the organical structures of other intelligencies. When any of the angelic beings are sent on embassies to this world, we find that, though they appeared in a beautiful form, yet, there was a marked difference between them and human beings, although it partook of the human form. The angel who appeared at the tomb of Our Saviour, exhibited a bright and resplendent form ; his countenance was like the brightness of lightning, and his raiment as white as snow, glittering with extraordinary luster beyond what mortal eyes could bear ; the angel who appeared to Peter and delivered him out of prison, was arrayed in such glorious apparel that the whole prison was illuminated by the light, although dark and gloomy as it was where the apostle lay bound. That these beings have organs of speech capable of forming articulate sounds, and in joining in musical strains, appears, from the words they uttered on these and other occasions, and from the song they sung on the Plains of Bethlehem,

when they announced the birth of Our Saviour. They appear to possess the power of rendering themselves invisible at pleasure; for the angel that appeared to Zacharias in the sanctuary of the temple, was invisible to the surrounding multitudes without, both at the time of his entrance into, and his exit from the "holy place." That superior beings connected with the heavenly world, have additional senses to those which we possess, is highly probable; especially when we consider the general analogy of nature, and the gradations which exist among organized beings in our world. It forms no reason why we should deny that such senses exist, because we can form no distinct conception of any senses besides those which we possess.

From the preceding facts concerning the powers, abilities, &c., of angels, we may form a faint idea of the powers which renovated man may yet possess? If we admit that the spirits will be in a progressive state of existence, who can set bounds to their intellectual powers? Or what mind can conceive the amount of knowledge they may obtain through the rounds of eternity, being favored as they are, with superior facilities for acquiring information on all subjects that gratify, edify and strengthen their intellectual powers? From what has been stated

in the preceding remarks, respecting the numerous and august objects that may be presented to the contemplation of celestial intelligences, we may conclude, that the chief subjects of study in the heavenly world, will be History and Philosophy. Under the department of History may be comprehended all the details which will be exhibited to them, respecting the origin, progress and consummation of the plan of man's redemption, together with the moral, natural and political history of other worlds, with their natural scenery and the providential occurrences which they have witnessed, and, as a matter of course, the same chain of history will be studied which is pertaining to our world. Under the department of Philosophy, all those magnificent displays which will be exhibited, of the extent, magnitude, the motion, the mechanical structure, the scenery, the inhabitants, and the general constitution of other systems, and the general arrangement of the universal system, comprehended under the government of the Almighty. On these topics, with all their subordinate and infinitely diversified ramifications, the minds of the redeemed intelligences from this world, will find ample scope for the exercise of all their powers, and will derive from the investigations of these subjects and com-

panionship with angels, archangels, and all that is holy, pure and good, in a world freed from the pollutions and disarrangements occasioned by man's transgression, perpetual and uninterrupted enjoyment, throughout an endless existence. That these subjects will be investigated by superior beings in another world, may be inferred from the scriptures, especially from several passages in the book of Revelation.

Sources of Future Misery. In connexion with the subject under consideration, we will stop to notice the state of man before he partook of the forbidden fruit. The general interpretation of the Scripture has been, that until the fall of man, death did not exist in the world, even among the inferior animals, for the Bible asserts, "that by man came death." (1st Cor. 15 chap. 21 v.) "And by one man sin entered into the world, and death by sin." (Romans 5 chap. 12 v. But Geology teaches us that myriads of animals lived and died before the Creation of man. Not only Geology, but comparative Anatomy and Zoology teach us that death among the inferior animals, did not result from the fall of man—but, from the natural organization of the animal frame given them by their Creator.—for it does not say that death passed upon all animals, but upon all men, for

the reason that all have sinned—an act that inferior animals could not do. In like manner, 1st Cor. 15 chap. 21 v., is also limited in its signification, as may be seen from the latter clause of the verse, viz : “by man came also the resurrection from the dead,” for the object here, is to draw a contrast between Adam and Christ, as to their influence upon the human family. “That death,” says Mr. Taylor, “with which God threatened Adam, and which passed upon his posterity, is not the going out of this world, but the manner of going. If man had continued in innocence, he would have died placidly, and without vexatious circumstances; he would not have died by sickness, misfortune, defect or unwillingness, but when he fell he began to die, man being made a corporeal being, of materials that must decay by wear; he would necessarily have died, but if he had not transgressed, the pains of death would have been obviated.” (Holy Dying, p. 295.)

Having now noticed the case of man before the fall, and witnessed many of the evils in this world originating from his disobedience, we will now proceed to notice some of the probable sources from which his misery will be drawn in another world.

As one part of the happiness of the righteous will consist in “seeing God as he is;” so it will, in

all probability, form one bitter ingredient in the future lot of the unrighteous, that they will be deprived of the transporting view of the Creator's glory, as displayed in the magnificent arrangements he has made in the system of nature. Confined to one dreary corner of the universe, surrounded by a dense atmosphere, or a congeries of sable clouds, they will be cut off from all intercourse with the region of moral perfection, and prevented from contemplating the sublime scenery of the Creator's empire. This idea is corroborated by the declaration of Scripture where they are represented as "banished from the New Jerusalem," "thrust out into outer darkness," and reserved for the "blackness of darkness for ages of ages." And nothing can be more tormenting to minds endowed with capacious powers, than the thought of being forever deprived of the opportunity of exercising them on the glorious objects which they know to exist, but which they can never contemplate, and about which they never expect to hear any transporting information. If it be one end of future punishment to make wicked men sensible of their folly and ingratitude, and of the mercy and favors they have abused, it is probable that in that region in which they shall be confined, everything will be so arranged as to bring to their recollection the comforts they

had abused, and the Divine goodness they had despised, and to make them feel sensations opposite to those which were produced by the benevolent arrangements which exist in the present state. For example, in the present economy of nature, every one of our senses, every part of our bodily structure, every movement of which our animal frame is susceptible, and the influence which the sun, the atmosphere, and other parts of nature produce on our structure and feelings, have a direct tendency to communicate pleasing sensations. But in that world every agency of this kind may be reversed, as to the effect it may produce on percipient beings. Our sense of touch is at present accompanied with a thousand modifications of feelings, which are accompanied with pleasure; but there everything that comes in contact with the organs of feeling may produce the most painful sensations. Here, the variety of colors which adorn the face of nature, delights the eye and the imagination; there, the most gloomy and haggard objects may at all times produce a dismal and alarming aspect over every part of the surrounding scene. Here, the most enchanting music frequently cheers and enraptures the human heart; there, nothing is heard but dismal wailings and weeping.

Ungrateful for the manifold blessings they received in this world from the bountiful Giver of all good, the inhabitants of that dreary region will behold their sin, their punishment, in being deprived of everything which can administer to their sensitive enjoyment. With regard to their companions, they will be surrounded with characters possessing the most turbulent dispositions. Here, they hated the society of the righteous, and loved to mingle with evil doers in their folly and their crimes ; there, they will be forever banished from the company of the wise and benevolent, and will feel the bitter effects of being perpetually chained to the society of those malignant associates, who will be their everlasting tormentors. Here, although we occasionally meet with characters possessing malignant dispositions, yet our path of life is often made pleasant and smooth by forming associations with such persons as Doddridge, Howard, Vinning and others, who have appeared in all ages, and among all civilized nations, like angels of mercy, to gladden the hearts of Adam's sin-accursed race ; but there they shall be surrounded with the most fiend-like characters that ever existed in this, or any other planet. To illustrate this subject, let us suppose ourselves surrounded by such

companions as Napoleon Bonaparte, Zenghis Khan, who boasted that grass never grew after his horse's hoofs had passed over it ; as Xerxes who, fired with pride, leading forward an army of 3,000,000 of infatuated wretches to be slaughtered by the indignant and victorious Greeks ; an Alexander, who, with his numerous armies, drove the plough-share of destruction through surrounding nations, levelling cities to the ground, and massacring their inoffensive inhabitants, merely to gratify a mad ambition, and to be eulogized as a hero ; as an Alarie, who, with his barbarous hordes, overrun the southern countries of Europe, overturning the most splendid monuments of art, pillaging the metropolis of the Roman empire ; as a Tamerlane, who overran Persia, India, and other parts of Asia, and carried slaughter and devastation in his train, and displayed his wanton cruelty by pounding three or four thousand people in large mortars, and building them with brick or mortar into a wall ; Zenghis Khan overran a territory of 15,000,000 square miles, and at one time caused 100,000 prisoners to be beheaded, and who, during his fiend-like career, utterly exterminated from the earth fourteen millions of human beings ; as a Nero, who trampled upon the laws of nature and society, plunged into the most

abominable debaucheries, and practiced all sorts of cruelty, murdering his wife, Octavia, and his mother, Agrippina, insulting heaven and mankind, by offering up thanksgivings to the gods, on the perpetration of these crimes, and setting fire to Rome, that he might amuse himself with the universal terror and despair which that calamity inspired, and for the purpose of having something to allege against the christians to justify him in commencing a severe persecution of them by falsely accusing them of firing the city ; as an Antiochus Epiphanes, whose name stands so high on the roll of impiety and crime—having besieged the city of Jerusalem, he took it by storm, and during three days it was abandoned to the fury of the soldiers, and who, according to Rollins' Ancient History, caused 80,000 men to be inhumanly butchered ; he exercised every species of cruelty upon the citizens, and inhumanly put to death all those whom he supposed to be his enemies, that came in his way ; or such a character as Ali Pacha, who caused the massacre of the Gardiotes ; or the Mogul Emperors ; or of the cruel Turks, who murdered 40,000 of the inhabitants of Scio in one night, and at another time 29,400, without any provocation on the part of the Scionians whatever ; or such charac-

ters as the Grand Segnior who ruled in Turkey in 1821, during the Greek Revolution, who had the gates of his seraglio decorated with five hundred heads, and twelve hundred ears, being taken from the prisoners who fell into the hands of the Turks, at the taking of Ipsara, in 1824. We might fill a volume with a detail of the cruelties and debaucheries which these tyrants, and many others, not here named, have committed, but enough has already been said, to give the reader an idea of what man might, or can be, when unrestrained by moral principle and above the reach of the civil law ; enough has also been said, to give an idea of what comfort could be expected to be taken with such companions as these, and what law or order would be among a community, formed of such characters, or more properly, what a scene of horror, agony and confusion must exist in a community where there is no restraint laid upon their naturally ungovernable passions and desires, to say nothing of the thieves, pickpockets and other outlaws who have ever been the scourge and pest of all civil and moral society. Can intelligent, moral beings imagine a worse punishment that could be inflicted upon them, than to be doomed to spend an eternity where such characters exist, whose passions and appetites can have

full scope, unrestrained by the dictates of reason and the authority of the Divine law. Here, they delighted in debauch, murder and bloodshed; there, they will experience all the bitter pangs of giving a loose rein to these unholy desires. If to these sources of sorrow and bitter deprivation, be added the consideration, that in such minds, the principles of malice, envy, hatred, revenge, and every other element of evil which pervaded their souls while in this life, will there rage without control. And, if we admit that man is a progressive being, and to his sources of sorrow there be added the reflection that he voluntarily made himself miserable, when he might have enjoyed all the blessedness of heaven, and the companionship of angels, and these reflections continue to grow more and more poignant throughout eternity, we may form such a conception of future misery as will warrant all the metaphorical descriptions of it, which are given in Divine Revelation, without supposing any further interposition of the Deity, in the direct infliction of punishment. While he leaves them simply to "eat of the fruit of their own ways, and to be filled with their own devices," their punishment must be dreadful, and far surpassing every species of misery connected with the present state of the moral world.

On the other hand, a consideration of the infinitely diversified sources of bliss, to which our attention has been directed, has a powerful tendency to impress the minds of the saints with a lively perception of the unbounded nature of Divine benignity, and of "the love of God which is in Christ Jesus our Lord." It is chiefly in connection with such expansive views of the attributes and the government of the Deity, that the love of God towards the Redeemed, appears "boundless," and "passing comprehension;" for it introduces them into a scene which is commensurate with infinite duration, but is boundless in its prospect of knowledge, of felicity, and of glory. And, therefore, amidst all the other employments of the heavenly state, they will never forget their obligation to that unmerited grace and mercy which keep their souls from destruction, but will mingle with their sublime investigations,—ascriptions of "blessing, honor and glory unto Him that sitteth upon the Throne and unto the Lamb for ever."

The redeemed in heaven will enjoy perpetual and uninterrupted felicity—the foundation of this felicity will be laid in their complete freedom from sin, and their attainment of moral perfection—their renovated faculties will be

employed in contemplating the Divine glory. The Divine glory consists in the manifestation of the Divine perfections ; the sensible display of these perfections will be given in the works of creation ; in the intelligences which people the material world, their orders, gradations, history and present state ; in the variety of scenery which the abodes of intelligence exhibit ; in the economy and moral order which prevail among them, and in the various dispensations of Divine Providence, in reference to all worlds and orders of beings. The word and the works of God, must always harmonize, and reflect a mutual lustre on each other. What we find to be actually existing in the visible scene of the universe, can never contradict any of the statements of Revelation, but, on the contrary, must tend to elucidate some one or other of its interesting communications. And, since we find in our survey of the system of nature, and assemblage of astonishing objects which tend to raise our conceptions of the Supreme Being, and of the sublime and diversified nature of future felicity, it becomes us to prosecute those trains of thought which the analogies of nature and Revelation suggest, in order to enlarge the capacity of our minds, to exalt our ideas of celestial bliss, and to prepare us for more expan-

sive and sublime contemplations, in that world, where the physical and moral obstructions which now impede our progress, and obscure our intellectual views, shall be completely and forever removed.

Importance of Immortality. From the whole of what we have stated on this department of our subject, we may learn the value of an immortal soul, and the importance which ought to be attached to our immortal destination. What a shadow does human life appear, when contrasted with the scenes of futurity ! What a small point in duration do the revolutions of time present, when compared with a boundless eternity ! What a limited scene does this world, and all its glories exhibit when set in competition with the extent and splendor of that empire which stretches out into immensity, and shall endure forever ! And is man to be transported to other regions of the universe, to mingle with the inhabitants of other worlds, and to exist throughout an endless duration ? What a noble principle does the human mind appear, when we consider it as qualified to prosecute so many diversified trains of thought, to engage in so many sublime investigations, to attain the summit of moral perfection, and to expatiate at large, through the unlimited

dominions of the Almighty, while eternal ages are rolling on! How important, then, ought everything to be considered, which is connected with the scene of our eternal destination! If these truths be admitted, reason and common sense declare that a more interesting and momentous subject cannot possibly occupy the mind of man. It is so profoundly interesting, and connected with so many awful and glorious consequences, that we must be utterly dead to every noble and refined feeling, if we be altogether indifferent about it. If there be only a bare probability that man is immortal, and that the scenes to which I have alluded might possibly be realized, it ought to stimulate the most anxious enquiries, and awaken all the powers and energies of our souls. For it is both our duty and our highest interest to obtain light and satisfaction, on a point on which our present comfort and our ultimate happiness must depend. But, if the light of nature and the dictates of Revelation both conspire to demonstrate the eternal destiny of mankind, nothing can exceed the folly and the infatuation of those who trifle with their everlasting interests, and even try every scheme, and prosecute every trivial object that may have a tendency to turn aside their thoughts from this important subject. Yet, how

often do we find, in the conduct of the various classes of mankind, the merest trifles set in competition with the scenes of happiness or of misery that lie beyond the grave. The groveling pleasures derived from horse racing, balls, and theatrical amusements, the acquisition of a few paltry pounds or shillings, the rattling of dice or the shuffling of a pack of cards, will absorb the minds of thousands who profess to be rational beings, while they refuse to spend one serious hour in reflecting on the fate of their immortal spirits, when their bodies shall have dropped into the tomb. Nay, such is the indifference, and even antipathy with which this subject is treated by certain classes of society, that it is considered unfashionable, and in certain cases would be regarded as a species of insult, to introduce into conversation, a sentiment or reflection on the eternal destiny of man. It is astonishing, the carelessness that certain persons exhibit in a matter which involves their existence, their eternity, and their all. On the contrary, we need but the perceptions of an ordinary understanding to convince us that self love, self-interest and the simplest light of reason, should inspire these sentiments. It requires but little elevation of soul to discover, that here there is no substantial delight ; that our

pleasures are but vanity ; that the ills of life are innumerable, and that after all, death, which threatens us every moment, must, in a few years, perhaps in a few days, place us in the eternal condition of happiness or misery. It is, therefore, the imperative duty of every man who makes any pretensions to prudence or rationality, to endeavor to have his mind impressed with the conviction of the reality of a future and invisible world, to consider its importance and to contemplate in the light of reason and revelation, the grand and solemn scenes which it displays. While the least doubt remains upon his mind in relation to the subject, he should give himself no rest till it be dispelled. He should explore every avenue ; he should prosecute every study from which light and information may be obtained ; he should prosecute his researches with the same earnestness and avidity as a miser would, in digging for hidden treasures ; and above all things, he should study with deep attention and humility, the revelation contained in the Holy Scriptures, with earnest prayer to God for light and direction.

“ If thou criest after knowledge, and liftest up thy voice for understanding ; if thou seekest her as silver, and searchest for her as for hid treasure, then shalt thou understand the fear of

the Lord, and find the knowledge of God. For the Lord giveth wisdom: out of his mouth cometh knowledge and understanding. In all thy ways, acknowledge him, and he shall direct thy paths. Then shall thy light break forth in obscurity, and thy darkness shall be as the noonday." In fine, if we are thoroughly convinced of our relation to an eternal world, it will be our constant endeavor to cultivate those heavenly dispositions and virtues, and to prosecute that course of action which will prepare us for the enjoyment of the heavenly state. "For without holiness no man can see the Lord;" and we are assured "that no unclean thing can enter the gates of the New Jerusalem," and that neither "thieves, nor extortioners, nor the covetous, nor the effeminate, nor drunkards, nor revilers, nor idolaters, shall inherit the kingdom of God."

THE END.