

**THEISM AND
ATHEISM IN
SCIENCE**

**IS EVOLUTION
HERETICAL?**

WHITTLESEY

1886

THEISM. ATHEISM IN SCIENCE.

IS EVOLUTION HERETICAL?

BY COLONEL CHARLES WHITTLESEY.

About 1840 there was published in England without date or preface, by an unknown author, a very erudite work, entitled "Vestiges of Creation." A second edition or sequel was afterwards issued by the author defending his theory, in which appears dates as late as 1843. This was republished in the United States, by Harper's Brothers, also undated.

Like Junius, the writer still remains *stat nominis umbra*. Hugh Miller, in his "Footprints of the Creator," replied to the "Vestiges of Creation" with equal erudition and more eloquence.

His invisible antagonist refers to researches of Darwin repeatedly, but the latter had not then published his work on the "Origin of Species." The author of the "Vestiges" adopts the Continental theory of spontaneous or aboriginal generation, or *evolution*, which was then synonymous with *development*. He is, however, not an atheist but a theist, and everywhere attributes evolution to a divine law and law-giver. His expressions are numerous and explicit; always repudiating the idea of fatality and materialism—For example:

(*Vestiges, Harper's Edition p. 84*) "Let us see how the doctrine of creation by law, agrees with this expounded view of the organic world."

(*p. 82.*) "Those who object to the hypothesis of a creation by the intervention of law, do not perhaps consider how powerful an argument in favor of the existence of God is lost by rejecting this doctrine."

(*p. 197-198.*) "It is proper to enquire if there be necessarily, in this doctrine of natural law, any peculiarity calculated materially to effect our hitherto supposed relation to the Deity. * * * For let us but

fully and truly consider what a system is here laid open to view, and we cannot well doubt that we are in the hands of One who is both able and willing to do us the most entire justice.

"In this faith we may rest at ease, even though life should have been to us but a protracted disease, or though every hope we had built on the secular materials within our reach was felt to be melting from our grasp. Thinking of all the contingencies of this world to be melted into or lost in the greater system, to which the present is only subsidiary, let us wait the end with patience and be of good cheer."

Numerous quotations might be added of a similar import from this gifted writer, who should never have hesitated to avow himself. Though he adopted scientifically the hypothesis of Oken, Lamarck and De Maillet, the misapplication of their doctrines to atheism in morals and religion he does not fail to denounce. This author whose diffuse style and broad learning bear strong resemblance to Lyell's, begins the process of evolution with the universe in its nebulous condition. He adopts the theory of La-Place and Comté in regard to the condition of matter throughout stellar space, in the form of incandescent vapor, having a motion of revolution from west to east.

By concentration, according to the nebulous hypothesis, stars were thrown off, and from them planets and their satellites, by a law of mechanics well understood.

Though there are astronomers who have doubts of the correctness of this hypothesis, it is generally received at this day.

In its place there is no alternate theory of sufficient prominence to

discredit La Place. From this archaic stage of evolution the "Vestiges" assumes the origin of life as an analogy, and on the ground that development must be an universal law, pervading all conditions of matter, impressed upon it by the Creator.

At that time the distinction between the origin of species by divergence from existing forms, and the origin of species by the generation of life, was not clearly considered.

At the present time the proofs of divergence are so frequently wanting, that there is the same necessity for a generous confidence which existed in regard to the insect acarus supposed to be generated by electricity by Doctor Bastian.

The utterances of Mr. Darwin are quite similar:

"There is grandeur in this view of life with its several powers, having been originally breathed by the Creator into a few forms or into one, and that while this planet has gone cycling onward according to the fixed law of gravity from so simple a beginning, endless forms, most beautiful and most wonderful, have been and are being evolved."—*Origin of Species*, p. 429.

"I am aware that the conclusions arrived at in this work will be denounced by some as highly irreligious. He who denounces them is bound to show why it is more irreligious to explain the origin of man as a distinct species by descent from some lower form through the laws of variation and natural selection, than to explain the birth of an individual through the laws of ordinary reproduction. The birth of both species and individuals are equally parts of a grand sequence of events which our minds refuse to accept as the result of blind chance."—*Descent of Man*, p. 612.

However, not long before his death, Mr. Darwin, in a private letter to a friend on the Continent, published after his decease, made use of

expressions from which atheists have claimed that he was of their belief, or rather disbelief. It is also true that the origin of species by divergence from preëxisting forms does not imply at the same time, an origin of life. Neither does it follow that development may not exhaust itself and cease in a given line when its purpose is accomplished. All minerals, from the oldest, to those of the newest rocks, crystallize under the proper conditions. When each crystal is perfected, by a mysterious process that never varies, and is rigidly controlled by material laws, the process in that special instance ceases because its work is finished.

The disciples of Darwin, especially those young naturalists who are predisposed to materialism, have pushed his doctrines beyond those of their leaders. In regard to species, varieties and races, the distinctions are not so well defined, that it is very difficult to show divergences.

For genera, families, classes, orders and sub-kingdoms, the differences are better determined.

Divergences among them are therefore more difficult to establish, which will be referred to hereafter.

But if it is admitted that in the animal kingdom, divergences are traceable to the dawn of life, there is behind this, untouched, the question of the institution of vitality, or the origin of animal life.

The origin of the pre-existing mineral kingdom is easy of solution by theists; but this, like that of animal life, must be accounted for by materialists, on scientific or philosophical grounds only; and here their conclusions fail at the most important point.

What were the primitive forms of plants or animals is not known.

By analogy geologists infer that the earliest ones were animated jellies, or gelatinous foci, of which the rhizopods are an example; but of which

the fossilized condition is too obscure to be studied. There are premonitions of more ancient living objects, but this is inferential, not proven.

Probably this is the reason why mineral gelatines were selected by believers in spontaneous generation as the seat of primordial existence.

Following up the line of descent to this inevitable point, we reach a position where divergencies cannot occur, and the vague influences of environment, natural selection and inheritance cannot be considered, because there was but one individual. We are face to face with the naked question of the origin of life, either by a supreme creator or by what must be of equal potency, — self-generation. The latter is only a different name and location for the same power, where a mineral without life impresses inert matter with what it has not, showing a far reaching design of progression, which is infinite. Back of this the atheistical scientist is required to explain the origin of the few simple substances which form the basis of the material universe. The theistical scientist is content to admit of a supernatural pre-existing mind, which originated these primordial atoms, and designedly invested them with the capacity of combination and development, known as natural laws, which from their origin have been in constant activity.

On the assumption that these simple substances are self-created, we shall be compelled to believe that matter preceded mind in the order of existence, and originating with something that did not exist, impressed upon itself a capacity to originate life, and evolve worlds. Those sixty-five unconscious substances could have no precedence over each other, or have had any form of mental action until animal life occurred.

These are the proper fields of science, requiring all the powers of the human intellect. Not one of them is

as yet fully understood, but it is plainly observable, that they are everywhere at work and will so continue through interminable æons. The origin of matter, the subsequent origin of vegetable life followed by animal, must be regarded as creative acts. If the missing link shall be discovered connecting the monkey and the man, a guiding hand is still necessary to select one or more pairs out of many thousands, and fix the time when their progeny should become progenitors of the race.

Materialists claim that it is impossible to conceive of the self-origin of a being with power to create matter. Such a conception is indeed beyond our powers except as a logical inference. The distance of the remotest star, which is finite, is especially beyond our comprehension except as a mathematical demonstration, or that of the nearest star, or even of the farthest planet of our own system. Incomprehensibility attaches to thousands of facts, which are not on that account to be denied. Very few if any of the laws of nature will be considered as fully understood even in this scientific age. Within every one of us are faculties, of the existence of which we are conscious every hour, but their mysterious workings we understand little better than the mystery of Deity.

If human incomprehensibility is a good ground for denying the supernatural origin of the laws of nature, which ensure continuous regulation, it is good ground for denying our own existence.

The self-origin of matter and of nature's laws requires a faith as much more sweeping as millions of such conceptions require more faith than one. In either case we are to be directed by reason, and the consideration of what is within the range of our observation; having intellect enough to make us responsible for a correct conclusion.

The construction of the universe under any of the plans hitherto discussed implies a previous spiritual existence. There is an order and a succession of events which demand thought as well as action, implying a determination or mental design prior to the existence of matter. Inert inorganic matter directing its own origin is a clear absurdity.

There are in the United States numerous theists and Christians who are scientists of reputation, who accept the theory of Darwin so far as it has a settled position in natural science. Their religious convictions are not disturbed by a doctrine purely scientific. That it has been misapplied by materialists to questions of religious belief outside the domain of science, neither weakens nor strengthens it as a scientific truth. I knew a mathematician who concluded to settle the question of a future state by an algebraic formula. The question of a divine agency in this universe is one of ethics, not of the exact sciences. On moral subjects philosophers cannot claim a monopoly of authority.

What Darwin claims to have demonstrated in regard to development of species in animals, covers but a limited portion of the general theory of evolution in the natural world.

If the doctrine is true, it cannot be limited to one department of nature, but must apply to all parts of the universe. Its mission must be universal and this divine plan must have begun to take effect as soon as a particle of matter existed. The design was to carry out a system of natural law which has operated and shall operate as long as there may exist a world of matter. Further on I shall refer to some of the most prominent phases of development in the planetary and stellar systems, and to well-established changes or metamorphoses in the rocky beds of this planet, all indicating a plan, formed before the creation

of matter. In this vast scheme there is a valuable and beneficent purpose, extending through the whole of it, which operates with harmony in all departments of nature, including its mental and spiritual phase. If any thing has originated spontaneously in the sense of independence of this plan, it must be an opposition creation. While the all-pervading principle of evolution is true as a scientific fact, it by no means follows that materialistic evolution, as applied to questions of ethics, is true. To extend it so far as to cover the origin of matter or of life, is an assumption not warranted by science or observation.

Darwin and his compeer in natural science, Huxley, rejected the theory of spontaneous generation. The former, however, carried his conclusions so far in relation to the origin of species that his claims came very near to the origin of life. Prof. Huxley endows protoplasm with almost the same potency. Their disciples, in many instances, go beyond both of these philosophers, evidently on account of their eagerness to combat theology and deity nature to the exclusion of nature's God. The late Prof. Barande, in France, and Louis Agassiz, in the United States, very much circumscribe the Darwinian theory of development. Profs. Dawson, Guyot and Dana restrict it to changes within narrow limits.

As the contest now stands, there is no point in the line of attack which is scientifically more weak than spontaneous generation.

Even though it should be proven to be true that life had been evolved from sea-foam or from star-dust, or gelatinous points, from solutions of silix, or by protoplasm, the necessity of a ruling spirit, more ancient than any of these substances; and the belief in theism would be evidently strengthened.

THEISM AND ATHEISM IN SCIENCE.

II.

EVOLUTION IN THE PLANETARY AND STELLAR WORLD.

BY COLONEL CHARLES WHITTLESEY.

The consideration of a subject so immense that it staggers the greatest of human intellects, is introduced, not because it is new, but because it lies at the foundation of Evolution, and is largely mechanical in its nature. The space occupied by the stars is as a sentiment wholly inconceivable. As a problem in mathematics, however, by the use of known distances we are enabled to grasp it mentally, to a limited extent. The stellar system has its bounds, and if these are beyond our direct comprehension, what shall be said of the space beyond?

Inconceivable immensity has thus added to it space still more immense, through which the stellar system moves, probably in an orbit of its own. If we are only vivified minerals, our sense of nothingness as a part of this vast creation, should sink us still lower, in our own estimation.

Necessarily the first steps in the origin of matter were the production of the simple substances. These being originated in the form of primordial atoms, were at the same time endowed with affinities for combination. The development of the material universe in its present condition, might be effected by laws impressed upon those few substances.

Such a mode of action is aptly expressed by the word "evolution," a process wholly different from a direct creative act.

Such an act is so clearly superhuman and supernatural, that man could never comprehend it without the aid of an outside intelligence; nor the origin of vegetable life or animal life from inanimate or dead matter. No mortal has professed to have the capacity to conceive of the process of a primordial creation.

All modes are alike unfathomable and so is the idea of annihilation of matter. But of the fact of creation there can be no doubt.

We can also conceive of an originating agent or force, and that qualities could be impressed on matter by it such as are familiar to us. These qualities acting with regularity through vast periods of time for valuable ends clearly indicate an intention.

The earliest known condition of matter is the nebulous mass of La Place, when metals and metalloids existed in the state of vapor. It is universally admitted that gravitation was inherent in this mass, and that it had a motion of rotation. By mere cooling and gravity there would be a general condensation. In a rotating body, condensation produces an increase of its angular velocity. Astronomers now hold with Herschel and La Place, that as the revolving nebula increased in velocity of revolution, its outer portions would be thrown off as separate bodies, becoming stars.

Probably the nebulous mass embraced the entire space now occupied by the stellar system. It probably had a regular motion in a vast orbit, returning to itself like those of the planets. Should that theory be true, the disrupted portions would move in orbits, forming a celestial group, such as we behold. This is the teaching of science. The time required for a single period of revolution exceeds five millions of years.

It is settled by astronomy that the stars have a motion in regard to each other, which is being studied with great interest.

As the process of condensation went

on, chemical action and segregation, which belong to the fixed properties of matter, became practicable; and new solids and compounds would be evolved under pre-existing laws.

As consolidation progressed, chemical action would be intensified, and consequently galvanism and electricity. No new qualities were necessary in the existing molecules, but only better opportunities of action. All the simple substances known to us formed that primordial nebulous body. None have been originated since. When sulphur and oxygen are brought into contact, they unite not from selection or choice, but from the effect of natural law with which they were from the first endowed. If this process is a mode of self or individual action it cannot be distinguished from self-creation, which requires a mental entity and volition somewhere. With this there is necessarily a power of choice, and instead of uniting in atomic weights with fixed proportions, which are eternal, they might vary in different ages or in the same age. Any theory which ignores a designing author, by whom these qualities are impressed upon the atoms at their birth, must contemplate an endless series of new impressions.

Such is the present state of knowledge among those best qualified to know. The same process in the development of each star or sun, in due time resulted in the formation of planets and their satellites, which, in the case of this earth at least, became habitable. Thus qualities inherent in the primitive globe, might be transmitted to the planets, resulting in an atmosphere, oceans, strata of rocks, and mineral deposits. When that stage was reached, both vegetable and animal life became possible. Evolution and development are thus far possible and reasonable. At this point materialists propose to enlarge their meaning, so as to embrace a self-vitalizing power of matter hith-

erto without vitality. The crystallization of minerals had hitherto been the nearest approach to vital force, and this action is galvanic and chemical.

In the order of events, vegetation preceded those animal existences, which belong to the lower and less perfect phases of life.

Coupled with the doctrine of self-evolution or self-development, as used in natural science, is the denial of an intelligent First Cause.

This doctrine teaches evolution carried to the extent of self-creation. We can conceive of the impress of such qualities upon matter, for a purpose, but the conception of a purpose or plan without a thinking agent is impossible.

Materialistic evolution requires a universe without a head. It is as fundamental to that system of ethics, that the vast celestial mechanism should have no mental contriver, as it is to the self-development of life. It is equally necessary to the doctrine of the origin of man by self-evolution.

Behind all these propositions, is the negation of an active deity, in any and all natural laws and processes.

Metamorphism.

The Darwinian doctrine of the "Origin of species" covers only a limited field in the broad domain of evolution.

Cosmogenic evolution was not one of Darwin's studies. This lies far back of animal and vegetable life. After the stars and planets had assumed form, and had taken up their orbits, their materials continued to change in texture, a process that is expressed by "metamorphism," which is still going on in the rocky beds of this planet, presenting another broad field of the effects of change. Where it will end no scientist can foretell. There are numerous instances where its effects are visible, but the cause is not. When molten metals or stone are allowed to cool they become solid and crystalline. This changed condition is due to no

new qualities, but to the action of those of which they were invested at their origin. Bars of wrought iron of a brittle or crystalline texture have been known, in the course of years, to become more ductile and fibrous. Probably they formed a galvanic battery with magnetic currents.

A chain composed of large links was put on an inclined plane in a coal mine at Mineral Ridge, near Miles, in Trumbull Co., in Ohio. To make it take hold better the engineer cast on each link a round ball of iron. The effect was to change the fibrous character of the links, and render them so crystalline that they broke and became useless. Many years since, on Center street, Cleveland, Ohio, there was a lime-kiln sunk in the blue laminated clay of this vicinity. It was located about 15 rods west of the bridge across the Cuyahoga river.

After the abandonment of the kiln I found that the lamination of the blue clay, which was originally horizontal, presenting its edges to the heat of the kiln, had become vertical and parallel to its curve. The change extended eight or ten inches outward, forming a true slate, less and less laminated away from the kiln.

I have a specimen of kidney iron-ore from the mines near Zoar, Ohio, which was compact before it was calcined, except on the exterior, where there were concentric layers. When deposited it was a compact carbonate of iron, altered to an oxide externally, which gave it the name of "shell ore" among furnace men. After calcination in a large pile at the yard of the furnace of Ford, Howard & Co., in Akron, Ohio, there were a number of pieces which assumed the form of small columns, radiating from a center, like miniature basaltic pillars. The last two instances were due to prolonged heat below the melting point. Such are a few among many examples.

Nearly all the slaty rocks of the

world have undergone metamorphism from some cause, changing the lamination and segregating mineral masses, veins and beds of quartz. In the Green Mountain range of Vermont the slates and the limestones show similar changes from the Canada line to New Jersey. From fossiliferous limestone the finest of marble was produced by natural processes. These are instances of slow but widespread changes embracing the universe, and which in part come under our observation. Mineral veins, and most forms of mineral deposits, can be referred to this universal law, which must have had a design and a designer. The first processes are part of a system, each having a bearing upon the next, throughout the series. An inspiration runs through the whole, which materialists call nature or natural law, while they close their eyes and their mental perception to the fact of an originator.

The most delicate galvanic action was connected with dynamical disturbances, all pointing to the concentration of metals in bodies that man could appropriate. Metallic segregation in veins, beds and masses is more conspicuous in mountain ranges, where fissures are most numerous and electrical activity is greatest.

Such laws of development are traceable to the remote past, before the deposition of sedimentary rocks, and thence forward to the present hour.

Geologists explain the origin of mineral coal, another beneficent gift to the race, by means of a tropical atmosphere, in all parts of the earth, not due to the tropics or confined to any latitude. Before this planet had lost all its external heat, the seas were at a temperature too high for air-breathing animals, and were enveloped in dense clouds of vapor. The atmosphere was charged with carbonic acid, and thus, at the ocean level, trees, ferns, and mosses sprang up of

gigantic size and rapid growth. This astonishing vegetation, when buried by sedimentary strata, became carbonized and preserved for our benefit.

It would be very instructive to reproduce the theories of geologists in regard to the cause of metamorphism, but they are so numerous and so various that too much space would be required.

The United States Geological Survey has for many years been engaged upon the mines of precious metals in Nevada, California, Colorado and the Rocky Mountain region. Every resource of modern science has been brought to bear upon both the practical and theoretical aspects of those wonderful mineral deposits. A brief reference to the government reports will be interesting as an instance of the power and universality of metamorphism in the texture of rocks. These learned investigators, after the most patient examination, agree that the mineral concentrations are due to that cause.

On the cause of these changes they express themselves with great caution, although they are among the world wide instances of this inscrutable agent. They represent that there is great complexity, and that the processes of mineralization occupied a length of time beyond conception. Sir Chas. Lyell held finally to the conclusion that all the changes observed in geology might be accounted for by visible causes now in operation, acting through immense periods of time.

DEVELOPMENT OF TERRESTRIAL ELECTRICITY.

Reference is seldom made to what is evidently a general cause of electrical excitement or disturbance, one of the finest examples of self-regulation in nature. These manifestations accompany, and therefore must depend upon the *unequal distribution of heat*. In this way, by a universal law of change, as general and appar-

ent as that of gravitation, the normal equilibrium of terrestrial electricity is disturbed. In some of its phases the electrical force is thus put in motion, currents are formed, concentrations take place, and discharges occur, visible in the form of lightning.

It must be a material substance or it could not produce momentum, existing throughout this planet and doubtless throughout the material universe.

The fact that in the air, the water, and the earth there is a perpetual difference of temperature, no one will question. In the atmosphere it is the cause of motion, from the mildest breeze to the most furious tornadoes. It affects the quantity of invisible moisture and the visible rain-fall. Electrical action is excited by the daily changes of temperature, particularly when the sun passes the meridians, and on a more extended scale by its annual movement in declination.

During the warm months in every latitude there are local thunderstorms, whirlpools and waterspouts, which generally occur in the afternoon, when the solar effect is greatest. As the sun approaches or departs from the solstices, it carries with it a series of storms, which are generally called equinoctial. The currents of the ocean are compounded largely of the differences in heat, between the equatorial and solar regions, and the effects of the equally extensive currents of the atmosphere, due to the same cause. These general and local variations cause the atmospherical and terrestrial electricity to vary, which affects the germination and growth of seeds and of plants, and the assimilation of food in animals. In the mass of the earth this simple but universal operation is and ever has been producing its results.

Between the molten central parts of the earth and its solid exterior, there is a perpetual difference of temperature, producing galvanic currents,

which act upon minerals in solution; the consequences are crystallization, segregation; the formation of veins, and the concentration of metals in various forms. Magnetism, both animal and mineral, may be traced to the same source, over which there may be some external influence from other planets, and even from the fixed stars. The nervous systems of animals and plants are so constituted as to perform electrical functions which vary with the daily changes of the atmosphere.

The difficulties which present themselves to many minds in finding a sufficient mechanical power, may be overcome by considering this widespread effect of changes in temperature, as the sun moves to and from the equator in declination, causing its heat to vary every day. When it has reached its greatest northern declination, it presents itself to the earth every succeeding day, with the warmest belt, receding towards the south.

Inequality of temperature pervades all the materials of this earth, and thus there is everywhere an unfailing source of motion. Nearly all the energies of nature may be traced to this quiet agent, whose effects are at

times prodigious. It realizes the conceptions of perpetual motion.

On the side of magnetism we may consider the earth as an incessant exciter, through the unequally heated state of its central parts compared with its surface. On the surface the equatorial zones are always at a higher temperature than the temperate, and the temperate than the arctic. This all-pervading cause, though at the foundation of nearly all the activities of the material world, is so gentle and common that it is not duly considered even by philosophers.

The difference between a self-regulating apparatus, like terrestrial electricity, and a self-originating one, is plain enough. A moving force being applied, the printing press, steam engine or hundreds of other mechanical contrivances may each regulate itself more or less completely. It was never claimed that this is an evidence that they are their own originators. Science is important and philosophy valuable, but the world is not ruled by them. Natural science, like natural philosophy, cannot be determined by opinions or hypothesis. Here nothing is settled that does not rest on facts or demonstrations based upon them.

THEISM AND ATHEISM IN SCIENCE.

III.

SIGNIFICANCE OF INVOLUNTARY ACTIVITIES.

BY COLONEL CHARLES WHITTLESEY.

There are involuntary movements in animal bodies, among which are the circulation of the blood; respiration, digestion and circulation of fluids. On the mental or spiritual side, there are like activities, that are not the results of the will, such as dreams, visions, and memories. From whence come these unbidden realities? Are they natural or supernatural? Human volition does not originate them.

By whom were they first put in action? The theist and the atheist alike, refer such manifestations to some form of law.

Here the atheist rests, leaving the mystery of their origin unanswered.

To a believer in a Creator, his modes of action through nature are of limited interest, compared to the fundamental power underlying nature.

Materialists, of the Hæckel school, fall back upon the impossibility of miracles; that is, of the direct action of a divine power.

Can there be a broader miracle than the origin of matter? Can there be a more miraculous event than the vitalization of the flowers of plants?

There are scientists who believe that all forms of the vital forces should be attributed to electricity. If so, electricity has supernatural attributes, the authorship of which must be in itself, or in some superior power not human. Where is the origin of electricity? It being established or admitted that there is a creating mental power, everything relating to its activities, resembles closely

the miraculous. It is not less so because it applies to matter in the condition of minerals and plants, than to animal and mental life. The latter presents facts that are more difficult of "interpretation," because its metamorphoses are more numerous. The mental faculty in man is more developed than in the oyster, or even in the anthropoid apes.

If there is no futurity for any of them, it does not appear to be important, what the limit of progress and change may be.

In the economy of animal life there are fluids, by which medical prescriptions are carried to their destination, and by which digested food, reaches the parts for which it is designed.

Involuntary action of the heart sends the blood to the extremities, and by a reverse action it is returned in an oxygenated and purified condition, through the veins, to go perpetually on the same mission. The minute valves of the bladder and the perspiration tubes of the skin act in the same manner. These phenomena cooperate for the same common purpose—the maintenance of life. Where is the sustaining power of these movements?

Did those complex machines originate by a fiat of dead matter? If so it is the most wonderful of miracles.

Commencing with the embryonic ova of the animal kingdom, there is a line or law of development, which is uniform within each genera. The law of propagation within genera is equally fixed and universal, but does not

overleap the limits of genera. Over this the individuals have no control, and thus wherever that control lies, it is superhuman. A system so complex, ubiquitous and practical is moved not by man.

The origin of contagious diseases is not clearly defined by medical experts, but it is admitted that they are generated under certain conditions which occur subject to established law, probably by the circulation of microscopic growths in the atmosphere or in the water. If a self-acting machine invented by man, capable of digesting food should be shown to an atheist he would discover in it a design.

In all latitudes the human stomach performs the function of transmuting food into a group of liquids that are absorbed by the system and become bone, horn, sinew, muscle, &c., constituting the animal body. It has been observed by scientific travelers in all parts of the globe, that the temperature of the stomach in man is everywhere the same, whether he resides in the arctic or the torrid zone; and it is also at the point where the gastrous fluid transforms food into nutrition most readily. Is this involuntary process an unthought of accident, that has happened in precisely the same way through the period that men have existed?

There is a connection between heat and light, and a very large number of involuntary results in living objects. Such are the ciliary movements, and the capillary action in plants. There are many scientists who believe that heat is not a material substance, but a condition of violent activity among material molecules. They consider heat and force to be convertible, and thus simplifying a large class of phenomena, by consolidation through the effect of inconceivably rapid vibrations. If this hypothesis is tenable, it makes the claim of a plan, as contrasted with chance more and more palpable. Thus the discoveries and

refinements of science, point persistently to a supreme regulator in all departments of the natural world.

Heat and its opposite or negative cold, though not a substance, play an important part throughout the earth. Because satisfactory definitions cannot be formed, as to their modes of action, they are none the less matters of fact, observed by every observer. Heat was certainly primordial, or at least coeval with matter. This and light have relations to each other that are visible wherever there is life, animal or vegetable.

To refer involuntary action to the unthinkable or unknowable, is only an ambiguous mode of stating that the limit of human perception has been reached. Those who deny superhuman inspiration, encounter that limit in thousands of instances which they are very loth to admit.

Memory, the most mysterious of our faculties located in the brain, is largely involuntary, and also numberless unbidden thoughts, that rush through our minds. The impressions they leave engraved or photographed on the nervous ganglia for future use, are wholly involuntary. Reason or the act of reasoning, may be wholly voluntary and subject to the will, but without memory would be of little use.

If human existence is in some form eternal, this must continue to be the most important faculty, and subject forever to fixed mental laws. Such control must lie outside of humanity, inasmuch as it did not originate there.

Man is frequently conceited, but is nevertheless painfully impotent, never having been able to make a law of material nature or to change one, or to comprehend any of them perfectly. His efforts to place himself at the head of the universe, present the most ridiculous of all pretensions. Over his entry into the world he had no control and has no foreknowledge

of the time or manner of his exit. His plans for life may at any hour be disappointed by death. Beyond the mortal life with infinitesimally few exceptions, his name, influence and authority are lost, even under the most carefully drawn testaments. Whether he originates by the agency of mineral or animal bodies; sea foam, star dust, protoplasm, monads, ascidians or acaria, he is in the future more physically helpless than at his birth. During life his impress upon other men is so near to nothing, that he is at once forgotten by the millions who live on. Yet if he makes one valuable discovery in nature, he hopes for enduring fame in a future, the

existence of which he denies. A stone dropped in mid-ocean does not sooner disappear, but there are numerous philosophers who are not satisfied with the make-up of the universe, especially its moral features. Numberless books have been written to prove that as individuals, they should not be subjected to any power higher than themselves, and that they are capable of improving everything within the domain of ethics. This is the aim and such are the pretensions of "Synthetical Philosophy," "Positive Philosophy," and "Scientific Philosophy" in many books under many names, admitting nothing beyond matter.



THEISM AND ATHEISM IN SCIENCE.

IV.

MOSAIC COSMOGONY MORE ALLEGORICAL THAN LITERAL.

BY COLONEL CHARLES WHITTLESEY.

It is evidently not the purpose of the sacred books of the Hebrews to teach science. Their objects are of a moral and religious character, with only incidental references to secular knowledge by way of illustration. What relates to chronology, general history, geology, and natural philosophy, is not more prominent than is necessary for elucidation. If this view is correct, it follows that the cosmogony of Moses, in the first chapter of Genesis, was not intended as a treatise on cosmical events. A construction more in harmony with the great purposes of morality, theology and religion, running through the Hebrew records, than the secular learning of those times. Such discoveries were left to the intelligence, genius and industry of mankind, and which are even yet feebly developed.

Under such an aspect, religion is belittled, and science not weakened. Their domains are better defined and separated; unless where they necessarily support each other. It is nearly fifty years since a sharp contest was commenced between scientists and theologians on presumed discrepancies, based largely upon the first chapter of Genesis, coupled with a theory that there was an intent to describe physical events from the stand-point of natural science. Under a different hypothesis the literary world might have been spared a large part of the books that have been published, to establish or to overthrow contradictions. Science has not been wholly a loser, because all forms of investigation bring out valuable truths; even those which fail to establish the point at issue. Religion has been the greatest sufferer.

With this distinction in mind, let us compare the record of nature, as far as it is understood, with the descriptive parts of the first chapter, and show how far they correspond.

The Order of Cosmical Events in Genesis compared with Science.

Chapter 1, Verse 1.

"In the beginning God created the heaven and the earth."

No time or period of creation or description of the mode of operation is given in this verse.

The word "create" is found in the first chapter, only in the verses 1, 21 and 27. In verses 11, 12, 20 and 24, the earth and the waters "*bring forth*"; and in verse third and in several others, the word "*made*" is employed. These differences cannot be accidental. They include processes not identical with a divine creative fiat, and cover all forms of origin or evolution by law. No reference is made to the primitive condition of matter.

Verse 2.

"And the earth was without form and void, and darkness was upon the face of the deep, and the spirit of God moved over the waters."

There are differences of translation or of the copies of this chapter, which, however, are not very essential in a descriptive sense, and must be left for Biblical critics to deal with. In the authorized English version, First of Chronicles 14-15, the spirit of God is represented as moving in the tops of mulberry trees. On this passage there are scholars who hold that the Hebrew expression for *wind*, is nearly the same for the Spirit of God; and would be a better translation. An

authorized Catholic Version of 1778 substitutes something personal or material, and different from the above.

The recent English version has not changed the reading of that of King James in verse two. Is it not possible that among the ancient orientals wind represented the breath of the deity?

Verses one and two were probably one sentence in the original, and should be construed as having that relation to each other. If such is their relation, their phraseology embraces all of that vast period from the creation of simple substances in a nebulous condition, and the organization of the celestial system.

The earth was in its orbit and solidified; at least there were some igneous rocks, and possibly some sedimentary ones. It was enveloped in darkness, probably in clouds, resting upon waters which submerged most of the solid parts.

Such a condition of the earth is here very well described, but vegetable and animal life cannot be inferred. When the leaves of the book of nature are opened, traces of algæ and of low forms of marine life are discovered, which are as ancient as the cambrian, not mentioned in this chapter. All references to the changes which occurred in the great nebula, occupying incomprehensible periods of time, and finally resulting in the formation of planets, are omitted.

Verses 3 to 5 inclusive.

These contain the first mention of light, and the first cosmical day. It is not yet determined by scientists whether light is a material substance. It may be only an emanation producing vision, by means of rapid vibrations. If so it is the opposite or negative of darkness, as cold is of heat.

The late Professor Guyot entertained a theory, that the light here referred to was not solar but temporary, either electrical or phosphorescent.

Such is not a physical impossibility, but presents one of very many forced constructions of the Hebrew records: to meet hypothesis of concordance or of discordance with natural science.

If light is not a material substance, it is incapable of creation, but it is capable of being "brought forth." Nothing but light is here introduced to account for the evening and the morning of the first day. A very common feature of Eastern literature is the fact that the order of narration does not necessarily follow the order of events. There are such discrepancies in the Mosaic records.

The earth could not have existed prior to the sun and stars. It has, however, been mentioned and partially described, as in existence before the firmament and the celestial bodies. There are possibilities that the descriptions may be misplaced; but it is safer to leave the difficulty unsolved than to resort to violent solutions.

Through this chapter there is a clear moral and religious purpose, on which the Hebrew system is based. It is manifestly not an attempt to teach mankind science, but *moral law*, both by direct statements and by the ancient mode of allegories, which the Oriental mind took in by intuition, more readily than by processes of reasoning. These main ethical points are the existence of a creating power, acting everywhere directly or consequentially, and therefore a supreme moral ruler. The grouping of events into seven periods or days inculcates another fundamental feature of the moral law, that of six days labor to one day of rest.

Verses 6 to 8 inclusive,—a second day.

An expanse or firmament appears above the waters, implying an atmosphere, clouds and a sky. Nothing else is done during this period. It was occupied not in creating, making

or bringing forth anything new; but in providing a new arrangement among pre-existing objects. Hitherto there has been placed upon the record, very little that is specific in a descriptive point of view; showing how little importance was attached to physical information.

Those primeval seas must have deposited sediments which may have been the metamorphic strata of the Laurentian and Huronian eras.

Whether they have any form of marine growth is yet an unsettled question.

Verses 9 to 13—Italian Version.

"God also said, let the waters that are under the heavens be gathered together unto one place and let the dry land appear. And it was so done.

And God called the dry land earth, and the gathering together of the waters he called seas; and God saw that it was good."

These two verses in a natural sense belong to those of the second day or period, presenting no fresh formations, but only movements, that were principally mechanical.

Verse 11.—"And he said, 'Let the earth *bring forth*' the green herbs and such as may seed, and the fruit tree yielding fruit after its kind, which may have seed within itself upon the earth,' and it was done."

Verse 12.—"And the earth 'brought forth' the green herbs and such as yielded seed according to its kind, and the tree that beareth fruit having seed each one according to its kind, and God saw that it was good. And the evening and the morning were the third day."

This relation corresponds to the observed order of vegetable life, having precedence to that which is animal. When the solid land rose above the seas, it must have presented sedimentary beds, in which are evidences of marine growths both vegetable and animal, and they, by implication cov-

er the extensive era of the Cambrian, Silurian and Devonian formations.

The mode of the origin of land plants and fruit-producing trees is not given, except by the agency of Deity, direct or indirect. Original creation is not here intimated. A most important phase of this earth has been reached, in which life is possible by animated beings, but the circumstances of this interesting process are very imperfectly set forth. The question is not, what the Creator knew about his universe, but what is expressed in this chapter.

Verses 14 to 19—Fourth day.

"Lights were then 'made' in the firmament of heaven, to divide the day and the night, and to be for seasons, for days and for years.

"A great light to rule the day, and a lesser light to rule the night, and stars, and he set them in the firmament of heaven."

Very little light was necessary to the existence of mollusks or other marine invertebrates; but land plants, producing seed and fruit, require both solar light and heat. The transactions of the fourth period, do not purport to have been creative acts. Suns, comets, planets and satellites, may have been coursing along their respective cycles for cosmical ages; before the atmosphere of the earth, the expanse or the firmament, permitted the full vivifying action of light and heat on this globe. By the above description, they were then set in order, to stimulate land growths, for the use of beings that were to follow. Whether this vegetation was the successor of lower forms perfected by a law of evolution, cannot be affirmed or denied on this record.

Verses 20 to 23,—fifth day.

"And God said, let the waters 'bring forth' the creeping creatures having life, and the fowl that may fly over the earth under the firmament of heaven."

21. "And God 'created' the great whales, and every living and moving creature which the waters brought forth, according to their kinds; and every winged fowl, according to its kind."

22. The mission of marine creature, was to "multiply and fill the waters," and of the birds to multiply upon the land.

Life is here first brought upon the scene. The testimony of the rocks is explicit in regard to its appearance in the archaic strata as invertebrates; which it is not easy to separate from the vegetation of that era.

Materialists now claim that without divine will or agency direct or indirect, life was evolved from marine jellies.

Here it is affirmed that every living and moving thing in the waters was created. The description is clear and comprehensive. To marine vegetation there is no reference in this record as it has reached us, nor can it be inferred by a fair construction. In that field there is a vacancy or gap which must remain a blank.

There may have been lost portions of importance, an explanation that can merely be suggested, not acted upon.

Other Scriptural breaks are discernible, where the same difficulties arise, which must be left for future investigation, and are entirely distinct from direct discrepancies.

Sixth day—remainder of chapter one, verses 24 to 31.

Verse 24. "Let the earth bring forth the living creature in its kind, cattle and creeping things, and beasts of the earth, according to their kinds."

Here is the first mention of land or air breathing animals. The previous introduction of animal life in the waters corresponds with the order of geology, where there are, first, marine growths algæ or sea weeds, followed by low and simple invertebrates, and

these by vertebrates, well preserved in the stratified rocks. The verse extends to a period on the border between the Devonian and Carboniferous, when rank swamp growths in brackish waters contended with deciduous and evergreen trees.

Verse 25. "And God 'made' the beasts of the earth, according to their kinds, and cattle and every thing that creepeth upon the earth after its kind." No descriptive matter is here added to verse 24. It is a general repetition.

Verse 26. "And he said let us make man in our own image and likeness, and let him have dominion over the fishes of the sea, and the fowls of the air and the beasts, and the whole earth and every creeping creature that moves upon the earth."

Verse 27.—"And God created man in his own image, created he him, male and female created he them."

This completes the descriptive portion of the chapter, beginning with the cosmogony, down to man; whose remains in the quarternary deposits are well known.

It is the first introduction of fishes by name, which have left their impress upon strata as ancient as the upper silurian. Here the word represents an order, in the same manner as the words, fowls and beasts, are put for departments of the animal kingdom.

When it is considered that periods so vast, and events so numerous and complicated, are compressed into a part of one chapter, we shall cease to expect precision of description.

The general coincidence with natural history, overshadows the minor differences. The defects may be attributable to an evident intention not to introduce science, which was left to the exercise of powers given to men.

A moral and religious intent pervades the chapter directly and allegor-

ically. On this plan of interpretation the Mosaic theology is based, and all religious theology.

What philological force should be given to the terms "created," "made" and "brought forth" is not well settled by commentators. If they are interchangeable these expressions carry a meaning different from what would result from separate interpretations, but they would still have a clear relation to each other and include all creations and all processes of formation in a general way.

In these verses, where the word create is not used, a wide door is thrown open to the law of evolution, under divine guidance. Only the material universe is said to be *created* with animal and finally human life.

What is not claimed as due to a creative impulse might be evolved without departing from the letter of our translation. It is agreed that the days are not literal or solar; but that the Hebrew original means a period or era of indeterminate length. The testimony of the rocks makes invertebrate life the most ancient, but of later origin than vegetable life.

In the march of cosmical events, as disclosed in nature, there are three eras or epochs that make a clear impress upon the minds of all those who study the material world, whatever individual views they may hold of its origin. These periods will be shown below, in the form of an abstract, in which their general agreement with the physical history of the first chapter of Genesis will appear.

These periods are not sharply defined, either in Genesis or geology; but there is a general resemblance which is remarkable. The Mosaic account is generally regarded as more than three thousand years old; and when it is considered that neither in Egyptian, Greek, or Latin records prior to Christ there is to be found so comprehensive an exhibit of those

great cosmical periods, where shall we look for the inspiration of chapter One, in a scientific point of view? Its manifest purpose was moral and religious, only a few words and phrases being devoted to purely descriptive matter. In geology and in science, there was not enough known at the beginning of the present century on which to base the groups of three formative periods, which can even now be done with only a reasonable approach to the truth. Each era holds to the progress that had been made previously, and each succeeding era makes a wonderful stride beyond the past.

In the Mosaic account there are breaks, also repetitions and omissions, but these are not discrepancies.

The latter can only be based upon direct statements, that conflict with each other or with nature. Considering the breadth of the subject, and the small space devoted to what is incidental and subordinate to moral law and religious purposes, which are as much more important than nature, as moral forces are superior to mechanical ones, breaks and deficiencies are unavoidable.

The groups are *first*,—an *azoic period*, where dead matter pervaded the universe, in a formative condition.

Group second.—Greater activity, a rapid deposit of sediment, also vegetable and animal life stimulated and quickened under the new order of things.

Group Third.—Great and rapid change; the mollusks flourishing as in the Cambrian Era until now, also marine plants, fishes, birds; land animals and land plants; all holding their own; mammals, reptiles and men, all becoming more universal and powerful throughout the earth.

The boundary of this grouping is not always clearly defined in detail, but with minor breaks and omissions is readily recognized. These defi-

ciencies tend to confirm the belief that secular instruction was not the main design of this chapter. A predisposition for criticism, and the discovery of difficulties where synthetic and general features are pushed aside, can find material for discussion in this as in all scientific propositions.

RECAPITULATION OF AGREEMENTS, DIS-
AGREEMENTS AND OMISSIONS.

Order of events as received by scientists.

First formative process or period.

Origin of matter, the stellar system and planets in their orbits, oceans, the atmosphere or sky, imperfect vegetable, followed by animal life in low forms entombed in the sedimentary rocks.

Second period of progress.

Increase of sedimentary strata and of marine life, vegetable and animal, invertebrates and vertebrates throughout the Silurian and Devonian systems, with coal measure growths, fishes, amphibious and land reptiles, brackish waters still warm, sustain mollusks and a tropical growth of great luxuriance.

Third formative period.

Mesozoic time, tertiary and post tertiary. Fishes, birds, mollusks, land and water plants, shrubs, reptiles, and mammals, the most prominent man.

Order of events in Genesis, Chapter one.

First formative or creative period.

Creation brought forward to the era of the planets, seas, darkness followed by transient light.

First and second day—a firmament spread out, igneous and sedimentary rocks.

No mention of life.

Second period of progress.

Dry land appears prominently above the water. On the land, plants, shrubs and trees, a permanent firmament "set in" order, with sun, moon and stars to mark the day, the night, seasons and years. Creeping creatures "brought forth" in the waters, with fowls or birds on land. First mention of life, amphibious creatures possibly included. No marine vegetation brought into view anywhere—close of the fifth day.

Third formative or creative period.

Air breathing creatures brought forth, land plants, shrubs, trees, man created, not made.

Thus at the close of the third grand division of the cosmos, the Scripture is at the beginning of the first period directly at issue with materialistic evolution.

At the beginning of the present century it would not have been possible to have given the groups of the left hand column of the above abstract, from the scientific libraries of Europe. The grouping of the right hand column based upon the Mosaic record, published fifteen hundred years before Christ, is a better

one than the learning of the continent could have produced, if the parts thus unchallenged and uncontradicted by scientists, shall be stricken out. Even now the portions under criticism and argument by acknowledged scholars being eliminated there remain only here and there limited fields of demonstrated truth. That part of astronomy which rests upon mathematics presents a pleasing exception. The results of chemical analysis and some other physical qualities of matter are generally accepted. In geology especially the department of paleontology, the confusion, contradictions and uncertainties are such, that what professes to be science is but little better than opinion. Whoever studies the reports of state geological surveys, or of the United States will be painfully impressed by the large space devoted to the overthrow of the conclusions of their predecessors. A notable example of these efforts may be seen in the late government and State reports upon the copper bearing range of the upper peninsula of Michigan.

It is a fair presumption that the work of the latest school of investigators obliterating that of a long line of observers of reputation during fifty years will in turn be swept away. All investigations in the field have their value even where they are made to sustain or to disprove a theory. But critics and observers will continue to live, and to treat their predecessors without veneration if not without respect.

To such variable standards and changeable tests, mankind are asked to submit their most important moral interests in deference to science. Materialistic philosophy is still more vague having no standard. It presents a tangled maze of opinions and conceits, each of which is of equal authority, and can be interpreted by every individual so as to conform to his caprices.

Cleveland, O., March 1886.

THEISM AND ATHEISM IN SCIENCE.

Mutability of Science as a Moral Regulator:

BY COL. CHAS. WHITTLESEY.

These chapters have been written under circumstances not favorable to a full presentation of the subject. For many years, chronic diseases incident to service have inflicted almost incessant suffering. But in the wakeful silence of nights, like the solitude of tedious days, there has been excellent opportunity for undisturbed reflection.

Conscious of the uncertainty of life and the certainty of continued disability, I have concluded to commit them to the press, fully conscious of their literary defects. In a subject of such magnitude as the antagonisms between theology and science, style may be overlooked, provided there is sufficient clearness of expression.

Nothing is presented in a spirit of controversy, but with an unswerving faith that all departments of the universe originated with one mind, directly or indirectly. Those who believe they discover discrepancies and wish to place science above all other considerations may rest assured that there is no intention to disparage its achievements, but only to confine it to scientific uses. There is a plain distinction between knowledge which is established beyond reasonable doubt and mere hypotheses or opinions. Books are published under the belief that fluency and an abundance of language with an attractive style, are an evidence of thought and wisdom.

An eminent French archæologist has devoted a volume to the theory that the sun's rays are spirits of the dead, returning to this earth, among whom he recognizes that of his deceased son.

A clergyman of some reputation has published as a serious fact in science, that the days of creation are literal; requiring but a short period of time; overthrowing by two assertions the work of the geologists of the northern hemisphere during fifty years, and denying the existence of a glacial era. Boulders or lost rocks are accounted for as ejections from volcanoes that are no longer visible.

A strict separation of questions of natural science from those of theology will promote mutual charity and consideration among those who are not specialists in both.

When, in the tardy progress of events, any fact or doctrine shall be firmly established, to that extent clashing will cease, and of all persons, those who have confidence in the God of nature can there leave it. Every position as it shall be ultimately fixed will be helpful to the race. Solid intelligence cannot eventually debase it, to whatever unfortunate uses science may be temporarily put. Such studies, so far as they have developed material truths, will remain to counteract vicious ethics.

My intent is to show that there is a want of perfection in science and, therefore of stability, wholly inconsistent with claims to infallibility. Whatever school assumes to arbitrate upon ethical and moral questions, must demonstrate its stability in order to gain confidence.

A very slight comparison of learned authorities shows the reverse of unity. Permanence must be an attribute of every world-wide system subject to inexorable law. In the world of

natural science and natural philosophy where is its regulating head or appelland court? If theology is not infallible, ~~there is behind it~~, the belief in a ruling and regulating power which is universal, and if theists are in the right, there is nothing that cannot in some way be brought to a satisfactory test. "Treading in the paths of material nature they may for a time separate, but surely to converge and meet in the future.

"Evolution in natural science is like Galileo's revolving earth—a reality. Between this and the moral or ethical deductions of materialists is a gulf that is impassable. That evolution as an atheistical doctrine in morals is false; cannot alter nature.

None of the 'fraternity of schools penetrates farther into the material world than astronomers, whose methods are based on mathematics and natural philosophy. In animated nature, there is not as great exactness, and therefore more scope for opinion and instability.

"Persons who deny a first great cause detract from the simplicity of nature, and leave its moral grandeur out of view. Its material grandeur is overshadowing to all persons alike. Its moral greatness, when circumscribed by animism, mortal life and annihilation, becomes frail and unimportant.

Wonderful views of the stellar system have been disclosed by an increase in the diameter of object glasses in telescopes from 9 to 11, 13, 19 and 23 inches.

"Clark and Sons of Massachusetts have in this way given to astronomy new worlds, and to those before known new and surprising beauties. Sirius, which by common consent had been regarded as the nearest star to our solar system, is found by Bessel to be more distant than several lesser stars, thus making changes even in astronomy. Double stars have long been known. Prof. C. S. Burnham, of

Chicago, in 1862 discovered a companion of Sirius, but of much less magnitude, revolving around their common centre of gravity in about fifty years. They are thirty-seven times the distance from each other that the sun is from our earth. Their mass is about twenty times that of the sun. There are thousands of binary, triple, quadruple and greater congeries of stars, revolving about their centres of gravitation, having a proper motion in space as groups. There are also nebulae not yet resolved.

The gorgeous cluster of the Pleiades, which has been admired by oriental shepherds from remote ages, presents to the eye a group of seven stars. Small telescopes increase the number to forty-four, and the great refractors to more than six hundred, all with direct as well as revolving motion. Prof. Kirkwood infers that they form a combined system, and that it is infinitely impossible that it has resulted from chance. He says that the new questions which these wonderful groups present are so complex as to baffle the greatest living astronomers. Humboldt when contemplating these "island worlds" was roused to a state of scientific wonder how they could rotate, and yet be in a state of stability. A fair inference is that they are not. Such changes are not more striking than those of minuter objects, but appear more astonishing, because they occur on a scale inconceivably grand. Under given mutations of a physical character, the system is probably indestructible, or at least its components.

To carry out the moral government of God, he must be eternal, and also the subjects of that government. Annihilation of any part of it at any time would limit its perfection, as applied to intellectual beings. Its characteristics are like the metamorphism of the rocks, slow of operation, but given sufficient periods, produce cer-

tain results, that proclaim a benevolent intent. With a very large proportion of mankind, from the lowest to the highest, their designs and their acts are the reverse of benevolent. Of the best plans devised by them to promote the happiness of others, they feel no certainty of their future success, on account of the shortness of life, and their impotence over those who survive them. Here lies the reason of the mutability of everything human. No school of scientists has been more positive than that which affirms self or spontaneous generation.

It is nearly one hundred years, in the days of its leading advocate, Prof. Oken, since those doctrinaires placed the origin of life in something called "seafoam." Thus the greatest function of deified power, the origin of life, was ascribed to spontaneous action wholly disconnected with deity, which in all forms they denied. Experiments were not furnished to demonstrate the facts of such an origin; only incessant assertions.

As those scientists succeeded in convincing some of the German people of the truth of the doctrine, immediately there arose among men of learning another equally infallible explanation of life development, through some vital energy in "stardust," whatever that is. This was followed by ascribing similar powers to ascidians, then to monads and to monaria, which when first observed are undistinguishable from vegetable organisms.

Next the acarus horridens took the lead, and now under the fiat of the philosopher of Jena, gelatines or gelatinous points. Like its predecessors this is an assumption, not sustained by proof.

On such variable foundations, can mankind be expected to commit their moral destiny? As scholars, though by no means infallible, their study of nature is becoming more and more valuable. As moralists they cannot

certainly be more reliable than as scientists; whose claims are contradicted by other scientists equally profounded. There is not more inconstancy in natural science than in other like pursuits, which are without an umpire, in fact less. Its mission is the interpretation of nature, which is more stable than art; and as fast as the true interpretation is reached science becomes fixed.

While mind and talent of the highest order are necessary to penetrate and expose the secrets of nature, materialists deny the necessity of intellect of any order to originate a world. If their positions are good, they become intellectually and morally supreme. This is the teaching of their philosophical works, which recommend to their fellow-men that they are morally independent.

There are naturalists not theists so far committed to the doctrine of origin by the divergence of species, as to attribute in their something like a premonition of what is to follow. To pronounced materialists any such looking forward must be self or spontaneous mental action. On a theistical basis such a premonition might be accounted for as a feature imposed upon matter whether animate or inanimate, laying a foundation for another step in its development. On the contrary hypothesis it must be self-action in each case. It cannot consistently be claimed as the result of law while they deny the existence of a law maker. Without law the subject of each premonition has individual action which must be independent. What can be more unphilosophical than myriads of such self-originating existences acting in concert? If it is not wholly imaginary such action must be mental, and if one creature has it so must all.

Similar ambiguous phrases are current in Mr. Darwin's writings, which allow of a construction closely allied to that of premonition. Preordina-

tion by mind presents nothing ambiguous, but terms, such as "natural selection," "effects of environment," and "origin of species," not subject to a supreme regulator, have been honestly construed by thousands to include self-action and to cover the origin of life.

When that conclusion is reached, thought and foreknowledge naturally follow. Unless between mind and matter, there is something intermediate connecting both, there remains a break between spiritual and material entities. While they are separate the material can act only subject to an intellectual guide. Those who believe in self-generation will not deny that there is order and system at and after the origin. How can they exist without agreement and design? The Darwinian doctrine of change within living species is very much strengthened by the broader and deeper one of primordial evolution.

Looking over all phases of existence, whether animal or vegetable, it cannot be successfully denied that there is proclivity to change. This feature is not confined to living creatures, but embraces the mineral kingdom from its remotest periods, and such must have been the design of a will, equal to its successful management. Those who discredit and deny the doctrine of evolution will profit by a study of these changes, going back as far as our knowledge extends. They will be found to exhibit an harmonious progress, clearly expressing a controlling power, whose modes of operation are beyond the control and largely beyond the understanding of humanity. This vast scheme is not confined to natural science or to the material world.

On the question of instability I have already referred to a disposition among geologists to discredit the conclusions of their predecessors. This is manifest not only in the United States, but in Europe, from the earliest reports and records.

Examine the prolonged discussion upon our Azoic and Metamorphic systems, including the dreadful Taconic series. In archæology and its cognate studies, the range of discrepancies is still wider, on account of less exactness of method, and therefore more exuberance of imagination. There is no lack of earnest research, but an honest difference of opinion. There is not unanimity among archæologists in regard to the presence of the elephant and mastodon in the United States since the occupation of the red men.

Several members of the Academy of Science at Davenport, Ia., have examined stone relics from ancient mounds in that vicinity, on which are rudely engraved images that have been considered as representing the elephant. This academy has a stone pipe in the general form of an elephant, and in Missouri such an effigy has been found. The Bureau of Ethnology as a part of the Smithsonian Institute at Washington, denies that the elephant and the red man were contemporaneous, and decline to admit the genuineness of the engraved tablets, or the fact that the elephant was intended to be represented.

Very strenuous efforts are being made to effect uniformity of action upon great practical subjects, by means of congresses and conventions. The peace of Europe is measurably assured by meetings of the powers and general conference upon political questions. Fortunate and valuable as these discussions may be, they have no abiding authority, or final certainty of success.

In medical practice, which controls the greatest of our needs, there are among practitioners the widest differences, amounting to contradictions. By means of schools and medical colleges these differences are being reduced, but when will the day come when doctors shall agree! In scientific matters there are in Great

Britain and the United States associations for the advancement of knowledge, where the most learned professors and students meet annually to compare their conclusions. Their published papers represent the highest development of science in all its departments. By these records it is evident that their minds are far from accord upon any of the great questions of science.

In mathematics and astronomy no investigation has embraced more talent and public patronage than the effort to find a standard measure independent of the meter. The French government employed Prof. Arago in 1822 to survey a meridian of longitude through Paris and determine the length of a degree of arc. A given portion of the meridian he surveyed became their standard meter. English mathematicians deny the accuracy of the French work by some 1800 meters.

For this purpose, for an invariable reference in case the English standard yard should be lost or injured, the government makes use of the semi-polar axis of the earth. The accuracy of the British determination is denied by French mathematicians as subject to a greater error than has been ascribed to the arc of Arago. From the progress of schools towards unity in the past two centuries it may be inferred that a geological era may elapse before it is reached.

Many other institutions in all civilized countries have long been engaged either as individual schools or in connection with universities and the patronage of governments in discussing great questions in nature, including astronomy, chemistry, archæology, medicine, mathematics,

language and social affairs. Where, on any of these subjects, is to be found an exponent that is received with such respect as to silence criticism?

Questions of world-wide religious interest are discussed by representatives of creeds and churches with increasing approach to unanimity. The points that are settled as finalities are few, but solutions appear more and more probable. Upon interpretation, discipline and doctrine, there are broad variances of opinion. Max Muller maintains that evolution embraces not only intellectual matters, but the moral and religious senses.

To this it may be objected that evolution must operate imperatively, not liable to artificial correction; but in Darwin's plan the surroundings play a very important part. A belief in this adds to the grandeur of moral government, by engrafting upon it, as in the material world, new hopes and possibilities for those who accept the idea of immortality.

Every discovery of this kind, whether in spiritual or material fields, adds solidity to what may have been established of a kindred nature before, because it thus becomes more and more universal. As it covers more departments, its necessity for all of them increases, and also the probabilities that it permeates every department of the universe—mental, moral and material. To those who in various degrees indulge in the greatest reverence for secular learning, I submit whether, if the moral sense comes within its scope and purpose, there is as yet stability enough to formulate a code that shall be true and shall promise to be perpetual.

THEISM AND ATHEISM IN SCIENCE.

VI.

The Law of Undulations.

BY COL. CHAS. WHITTLESEY.

When we have considered a large number of the qualities of inanimate matter, and have shown that they form parts of systems pervading this planet and doubtless other planets or suns, it may be inferred that other qualities or functions, not as well understood, belong also to systems with laws. Those best known, are gravitation, crystallization, cohesion, electricity and orbital motions, whose mutual relations are universally admitted.

In animate nature, are qualities equally universal, and as mutually dependent, which form mental and physiological systems. All of them move forward, in accordance to their special laws. If they did not, they could not act in concert, and accomplish specific purposes. This would seem to be manifest. In the aggregate the universe may be compared to the regiments, brigades and divisions of an army, with their batteries of artillery, and squadrons of cavalry, all directed by one will; without which, instead of order and efficiency, there would be insufficiency and chaos.

The creative power of theistical philosophy is none the less a controlling agent because its operations are slow; commencing far back in the life of the universe, and act by endowments, impressed upon both matter and mind.

Special impulses are not impossible, but belong to the miraculous, and lose the form of law, as well as the beauty of systems. It will tend to give clearness to our perceptions of spiritual action, if we consider the principles, qualities and forces impressed upon

matter in primordial times, and how, though fixed in number, they have operated continuously; evolving new principles, qualities and forces.

Scientific details are not of so much consequence, to our thesis, as the persistent relationship of each department to others, which takes the form of a fact. One of these departments or systems, is the manner in which gases, fluids and solids move in curves or oscillations, and not in right lines. The design or purpose of this law of motion, is in some respects not as manifest, as it is in the case of electricity, crystallization and many other attributes, but the fact is as well established. Motion is attributed to two mechanical agencies; direct impulse and gravity, which results in the tracing of curves.

A solid shot discharged from a gun takes the track of a parabola. A stone thrown by hand assumes the same curve. Planets, asteroids and comets are regarded by scientists as having had an impulse in a right line, but being immediately acted upon by gravitation from the sun, gave to their orbits the form of ellipses, of which that orb occupies one of the foci.

Ascending flames from combustion take a wavy form under the effects of buoyancy. The captive balloon or kite struggling to rise, sways to and fro in, much the same manner. A rope stretched across a flowing stream has the same action. Rockets and other pyrotechny which on public celebrations endanger cities, and entrance the hearts of children, come under the same law; likewise their fragments when exploded.

Winds move in waves, the same as the waters, which are wrought into waves. Flags and other sheets acted upon by breezes, are shaped into undulatory folds, and never into flat surfaces. Whether in flumes or other channels, flowing water assumes a wavy movement, which cannot be prevented. If it escapes from pipes, the discharge is in spirits and curves.

In fountains and jets d'eau there are incessant changes, the spray rising and falling continually. It is the same with gases flowing from pipes—always oscillating. A rope or a carpet shaken along the ground takes on the form of waves, loops and billows.

Semi-fluid or viscous matter, such as molasses, tar, molten slag and lava have a sluggish, rolling flow. Earthquakes progress in waves on land and beneath the sea. This is a system which philosophers would never have devised.

Prof. Foreb, on the Swiss geological survey, has a tidal register near Lausanne, on Lake Geneva. This instrument is affected by the commotion of steamers, on the opposite shore thirty miles distant. Sheets of water falling over dams or regular waterfalls like Niagara, sway back and forth incessantly, sometimes giving out musical sounds like the Eolian harp or telegraph wires, in the wind.

Musical string instruments produce harmonious notes by their vibrations. Wind instruments of various forms, made from alloys of metal, produce harmony by vibration.

The human throat was the model trumpet, most perfect of all by reason of its flexibility and obedience to the will and the lung power. Animals have the organs of modulation for voices in as full perfection.

All sounds are the fruit of undulations breaking upon the drum of the ear, transmitted to the brain by special nerves. A stone dropped into quiet water sends a series of concentric waves outward like waves of

sound which extend beyond the point where they cease to be visible. No waters of seas or lakes are so quiet but there are ripples upon the beach, the result of low, broad waves coming in from a distance; probably the result of atmospheric waves due to inequalities of pressure. Neither the air or the water is ever at perfect rest. Some forms of undulatory motion are so common that they do not attract attention.

Stones or metal balls let fall in quiet water sink in wavy lines propelled by gravity only. Lightning approaches to straight or jagged lines, because the initial velocity is irresistible and the course generally downward towards the earth through the atmosphere where the resistance is great for so subtle a body.

Pendulums oscillate with so much regularity that time is measured by them. This motion is so exact that it has been applied to the determination of the standard yard in England.

On all shores there are undulations of the waters besides the tides, that follow each other hour after hour with a regularity that comes very near to perpetual motion. There are also numerous records of great waves propelled by storms or earthquakes, of great height and terrible power, of which that of Krakatoa has been best described.

KRAKATOA.

As recently as August 1884 a volcano burst forth in the sea near Sumatra. It rose in a few hours in the form of a cone, formed by ashes and stones thrown upward to a great height. The shock was so irresistible, that a large tract of rich and cultivated country at the ocean level, was inundated by the wave to an elevation of sixty feet, killing many thousands of people. The atmosphere was made dark by clouds of smoke and dust, which spread several hundred miles in all directions. It was claimed but

not well established, that this volcanic dust appeared in our atmosphere, causing an unusually ruddy glow at sunrise and sunset.

It was however well settled, by tide registers, on the Indian Ocean and on the Atlantic and Pacific coasts; that a wave moved outward from the volcano, across all those seas, which was lost, only when it was broken on some coast. It did not differ from earthquake waves, except in its extent. From the Indian Archipelago it moved northerly, easterly and southerly, along the coast of Asia across to the Pacific coast and to the Pacific Islands. All the tide registers made record of it.

On the Atlantic coasts of South and North America it was observed, and coming around Cape Horn appeared on the Pacific coast separate from the direct wave from Sumatra.

In recent years natural philosophers have measurably abandoned the theory that the rays of the sun are projected in right lines. In place of this there is one, requiring rapid vibrations at the sun and stars, which transmit light through space, by undulations, and requires the presence everywhere of an ether, too subtle to be tangible; but which is admitted as indispensable to the new theory. A new interest is thus given to undulations in general. These vibrations strike the retina, and through the nerves of the eye reach the brain producing the sensation of light.

The proofs of its existence or of its nature are not very satisfactory.

"Something of this indescribable, or at least, undescribed ethereal character is also required to sustain the theory that heat is only a violent agitation of particles. If such an ether exists, it cannot be for light only. There are other mysterious phenomena to which an equally mysterious process is necessary. Such as the transmission of sound through solid bodies, which requires a medium

ethereal enough to penetrate the spaces between the particles. It might also be a promoter of the passage of electricity, through its various conductors, solid or fluid.

It is well known that sound is conveyed through wires and cords by diaphragms, distinct enough to give signals without electricity, but wonderfully improved by the use of it. Everything points to a general system of undulatory movements so universal that it has taken rank as one of the general qualities of matter, however indefinite the details may be. The propelling power of the Krakatoa waves, which belted the earth and were lost only when they broke on every shore, may not be satisfactorily explained by a first impulse forward, acted upon by gravity. It requires an almost infinite force to stretch a line to a strictly horizontal position, and there the only opposing force is the gravitation of the earth at right angles to it.

Unconfined fluids and gases are so exceedingly sensitive to inequalities of atmospheric pressure that they are never at rest.

A broad field of conjecture is opened by admitting such an ether, where new possibilities and profound queries force themselves upon us.

Can it hold the position of a medium of thought along the brain and be at the same time material?

Unfathomable as such speculations may appear, they are portentous to materialists, not to theists. The position of the former is nothing without annihilation. Spontaneous generation implies spontaneous destructibility.

Shakespeare had not been educated up to that form of morality when he advised his fellowmen to ponder and bear the ills they have, rather than plunge into an unknown sea of troubles which they knew not of. Persons of a suicidal proclivity may well pause long enough to consider whether any

power but the creative one can annihilate anything.

Having brought into view some phenomena of solid bodies, especially such as seem to partake of an ethereal or intangible character, we may consider those by which the clearly material is connected with what is less tangible. The doctrine of universal ether as a medium of light that has become prominent is almost bewildering. It indicates a depth of contrivance which goes beyond the doctrine of right line rays, and is a surprise in nature.

If this medium of undulations stimulates or otherwise affects the nerves, it should have some connection with the mind.

In a chapter on the brain and nervous system this possibility will be considered. If the theory holds good, it will be another cord reaching into other systems, binding and intertwining them still closer. Such a bold hypothesis requires, if not a demonstration, at least something more than plausible argument.

If established there must stand within sustaining distance an invisible, all powerful, infinite mind who, in the language of Garfield, comes so near to the children of men that his whispers are audible to them. It is only by such magic power that dead matter from its original condition has been developed into life and perfection in a manner that astonishes the greatest of human intellects. Only upon this view can the mental be brought into such close unison with the material, such as a creator would naturally bestow upon his creatures. It would save investigators much perplexity, if instead of laboring to exclude a deity they would recognize him as inspiring the forces of nature.

This is not science but knowledge of a higher grade and good reasoning. The theory of a pervading ether requires more imagination or faith than that of an all-pervading spirit.

Apparently the wave-like motion is a mode of transmission that requires the least expenditure of force. An analogous evidence of wide spread mechanical contrivance is the structure of bones, where by means of hollows and cavities the greatest strength is obtained with a given material. Whatever the newly found medium for light may be its susceptibility to impact, must be beyond comprehension. Some scientist has estimated the vibrations of light to be 180,000 in a second. The late Prof. E. Desor of Neufchatel concluded, that the transmission of thought requires time not exactly measurable. Electricians have been able to measure the velocity of the electrical wave. Oscillations of material substances imply momentum which implies a material agent or impulse. No form of undulation is mental; wherever vibrations occur, in whatever portion of the universe there must be matter, however attenuated or imponderable. Motion is one of the life sustaining provisions of nature. Its office in the atmosphere is to purify it, extending to caves and mines. In the waters, whether of lakes, rivers or seas, there are self regulating movements that prevent stagnation.

The mechanism of the universe acts in concord, within fixed limits of change; which are not productive of discord.

Meteors which reach the earth from other bodies might, if they were large and numerous, increase its bulk and change its relations to the asteroids and planets. The remarkable shower of November 1833 was entirely gaseous, and dissipated in the atmosphere. As yet astronomers have observed no perceptible increase. The increase of ice on land during the glacial era, produced a slight change in the centre of gravity, and the level of the sea.

Prof. Geike of the geological survey of Great Britain has given an explanation, which shows it to be self-

regulating and returning to its normal condition.

It is due to astronomical causes, and to combinations between the eccentricity of the earth's orbit and the revolution of the line of the apsides. It requires about 11,000 years to come on, and the same to retire, or a period of about 22,000 years.

This oscillation embraces a moderate change on an extensive scale, and is going on now. The ice neve and snow of Greenland, British North America and Alaska, slowly increases southward until the astronomical conditions change, the temperature is raised, the mass thaws from its southern border, and is resolved into water and the normal condition returns. One result was the lowering of the ocean level, by the solidifying of its

waters retained upon the continents. —Professor Hilgard, of Washington, calculates the change in the center of gravity of the earth to have been only six hundred (600) feet. This is an illustration of the compensations of nature by its self-regulating processes.

There is proof of the existence of cave-dwelling men at that period, who probably retreated before the increasing cold. A number of pre-glacial animals have left their bones in the clay, sand and gravel derived from crushed rocks and boulders. Many genera survived the Arctic cold. To the controversy in regard to the elephant and the mastodon, as a cotemporary with post glacial man, reference has already been made in discussing the instability of science.

THEISM AND ATHEISM IN SCIENCE.

VII.

The Brain and Nerve Mysteries.

BY COL. CHAS. WHITTLESEY.

A nerve may be studied physically, like other parts of the animal system, but possesses an interest that attaches to no other organ on account of its relation to mind. Our nerves are formed in knots, ganglia and centres of radiation, of which the most remarkable is the brain. In respect to what is wonderful in mind and at the same time a practical power, it compares with the great complex stellar system. It is the seat of all mental action, including reason, passion, memory, the emotions, knowledge, and that group of spiritual activities that are not regarded as material.

Its material side is being examined under the microscope and in the dissecting room, bringing out new wonders and mysteries. Its relations to mind cannot be determined there. When its common centre within the brain case is considered, it is found to dominate over and direct every movement of the intellect, and this subtle essence confessedly directs whatever transpires among men.

Nothing can be more important physiologically than the brain power. It presents, physically considered, no extreme difficulties over other anatomies, such as the muscles, bones, the organs of the senses and those of propagation.

Connected with the nerve system is the mind system, the existence of which needs no argument. Every one is conscious of it. Where demonstrators and chemists leave the nervous system, metaphysicians and biologists take it up. Thus far there is as much certainty as the exact sciences have attained. With the mental, spiritual, emotional and rational functions of our nature everything is different. About them there is some light, but more darkness. How: what

is spiritual is associated with what is material or matter with mind, is a mystery.

What invisible agent puts the spirit in motion within the brain, and guides it along the minor nerves to a certain destination? How is it there transmuted into physical force through muscular power? How far does the spiritual essence act separately from the material body? When the body dies and is decomposed, do thought, memory, emotion and the cognate mental faculties perish also? How far, during mortal life, is the spiritual sensation of one person transmissible to another, and by what medium conveyed?

Such are some of the questions with which mental philosophers have long struggled by the light of nature under great discouragements, but they have discovered enough to show that mental activity is coextensive with human life, and holds a control over all other interests within our knowledge. Outside of theism, they are restricted to reasonings from analogy, which have force, but fall short of demonstration.

It is everywhere admitted that the nerve system is a connecting link between mental and physical action. Whatever view may be taken of the intervention of a supreme spiritual power, it will not be denied that what pertains to the all-embracing nerve system is everywhere uniform, and therefore subject to one law. There is an imponderable substance, to which brief reference is made in chapter three, which is even more universal in nature than the nervous system, because it pervades the mineral kingdom. Its general name is electricity, but its phases are quite numerous. Throughout the vegetable and animal kingdoms nerves act as con-

ductors. They cannot be adapted to each other and reciprocate on so extensive a scale without a design to that effect.

Electricity has shown such vivifying and sustaining effects, that many men of science attribute vital energy to it. This was the theory of Dr. Bastian, upon which his experiments were based. Its gentler manifestations were proven by Galvani, to be constantly present in animals, within whom are self-acting currents, sometimes called animal magnetism. Volta produced a current closely resembling it, by means of a metallic pile, using acidulated water; which was very properly called galvanism. Plants have a nervous system of their own, through which galvanic currents pass. In this way their food is solved at the root, taken into circulation, and the result is growth. There is not much doubt but all electrical excitements, from the mildest to the most terrific, are brought into action by variations of heat, especially solar heat, a universal, perpetual, self-regulating process. These changes produce an immediate effect upon the nervous system. Telegraph operators sitting at their instruments within the range of local storms, find their nerves affected. If the wires show a strong surplus, the circuit is opened and the wire connected with the ground. Bolts of fire have been known to flash over the switch into the earth, portions of lightning discharges in the distance not visible. Persons in the track of thunder storms have their nerves disturbed or shocked.

A surcharge may be fatal, but in milder strength, electricity may be a supporter of life, or a curative for its diseases. The natural world cannot be viewed on a broad scale without discovering the fitness of one department to another. They support each other as systems.

As these systems are better known to science, their mutuality is more

and more apparent. The two which have just been discussed, the nerves and electricity, are examples selected from many others because of their prominence, and because they are more familiar. They also possess an irresistible interest, by their association with mental action.

Mental activities that are involuntary, present greater evidence of submission to law, than those that are under the direction of the will. Some are of a mixed character. The domestic affections are offered as an instance, not because they are generally involuntary, but because they belong to indisputable consciousness in all human beings, not only now, but since the existence of the first cave-dwellers.

The group of affections occupies a greater space among the emotions, and has a more direct influence upon human affairs than any other, and exists without regard to philosophy or cultivation. If analogies are allowed any weight, this is a fair field to introduce them. If universality adds anything to a metaphysical argument, or an almost complete accord with other departments of mental nature, the affections lead. The brute portions of animate nature, in this respect sometimes outdo the rational.

In animals it is often regarded as an instinct, which is entirely involuntary. As arguments upon the distinction between reason and instinct, bid fair never to come to a close, the two faculties may be treated for the present purpose, as the same. Affection, passion, and other emotions in animals, increase with their native intelligence. The less imposing claims of change by development through divergence of species, requires will and supernatural action, somewhere.

Whatever vitality may be, and wherever its forces are located, the spiritual part takes the lead of the physical. Whether the unlearned, or the learned, or all of them, deny



or admit this duplex feature of our existence, will not alter the facts. The question arises as to the capacity of a separation of mind and matter and of separate action? If analogies are stricken from all philosophical treatises, their bulk will be much reduced. Galvanic action of the nerves, telegraphing hither and thither in obedience to will, is a physical fact subject to observation. The will is spiritual and eludes the microscope, but is none the less an actuality or fact. Of that class the mental kingdom is filled, singly and in groups, constituting a system as wonderful as any department of nature, but intangible, except in their effects.

Reason is grand and memory indispensable, but the sentiments and emotions dominate over them.

Memory is surely spiritual, if anything is; but it acts as an agent to the sentiments and emotions, without being at all like them.

The exuberant domestic affections are so various and ethereal, that they are difficult to classify. They are largely sentimental and sometimes artificial, but are ingrained in human nature everywhere. They are mental realities of the highest class, that occupy the brain, and are as manifest as rivers and mountains.

Because they belong to metaphysical and inexact studies, and are often obscure, they none the less form an essential part of the happiness of the race, and must be controlled by law and order, no less than material substances.

The emotional sense which plays a ruling part in domestic life, whether of men, women or children, is not less powerful, though the main springs may be invisible. The difficult question is the relation to or transmissibility from one mind, soul or spirit to another. It does not dispose of this difficulty to deny a living spiritual deity; for all these qualities exist, however the human race originated,

and ideas, sentiments and emotions pass from one to another.

Without a resort to a supernatural agency, involuntary mental action is inexplicable. The child is imbued with the spirit of its parents, not necessarily in their presence, but when far away from home. This sentiment is a regulating power over its conduct. It is not destroyed by the death of parents. It remains as a purely spiritual influence through many years, kept alive by memory, a strictly mental faculty.

The impression left upon a people by the character of a good or patriotic man, personally unknown to them, affects their thoughts and their actions generations after his decease. This spiritual effect is displayed in great practical force by different generals in command of armies. There are many instances where his troops have no personal acquaintance, while they are imbued by his spirit, courage and invincibility.

This is a real power, though a mere sentiment, by which he is multiplied into thousands of men, through which victories are won and the fate of nations determined. It cannot be attributed to the imagination, and if it could, this would prove that imagination, which is ideal, is a power in the world of mind, having a systematized action for valuable purposes. On the atheistic basis, this faculty would need an explanation like the others.

Thus do experience and analogies intimate that there is some mode of transmission of thought and emotion not entirely over the nerves from the living to the living, but from the dead to the living. The mode as a material agency is not comprehensible. There are other involuntary mental operations, in the shape of trances, dreams, somnambulism and visions, that are less tangible than voluntary ones.

In all ages mankind have believed in witchcraft, ghosts or some form of spirit manifestation. Little has been

settled that goes to explain how much reality there is in such beliefs. Astrology and fortune-telling have at all times had their influence, but as yet these practices partake more of fraud than of philosophy. The increase of intelligence steadily diminishes the credence which has been given to all of these classes of beliefs.

It seems reasonable, however, to conclude that a complete moral government requires a systematic use of the spiritual characteristics of our nature. What these characteristics are, cannot be clearly defined by science and its modes. After passing the line of physical observation, we are not necessarily in the unknown.

Every person we meet has moral, social, and spiritual qualities, a soul and mind, as apparent as the body, a study of which is worthy of the most gifted minds. To ignore such knowledge, even in a rough and formative state, or to despise it, is doing injustice to interests that are dear to all our fellow-beings. Looking at the qualities of the mind separately as the phrenological student does when he maps them out on his chart, their names, numbers and localities are not well defined, but as a system they are all present. Their mystical outlines renders definition difficult individually.

Scholars in this field, of necessity contradict each other. Take the emotions, instincts, affections, reason, memory and the mental activities, of which these are a portion; the clouds which rest upon their border lines, cannot vitiate their reality as a group, for, viewed in a body, there is nothing better defined. These faculties in gross constitute the spiritual part of humanity, and are as readily perceived as material objects. No display of sophistry can render so plain a truth obscure. Wherever there is human life, the animal body is subordinate to the mental faculties. Whatever constitutes the soul, mind or spirit may like the nebula not yet be

resolved. But like them they are capable of being resolved. The nebulous mass is a reality, though the individual stars are only partly defined.

Whatever may be the full law of our existence, especially in regard to its perpetuity, no one will be exempt from those laws. Certainly it cannot be varied to suit those who deny futurity. There are other people entitled to consideration. Those who have hitherto lived and died constituting a great majority, have had some form of religious belief, to which immortality is essential. Whatever lies beyond our ken on other planets or systems, it is past argument that here mind is the ruling power.

It may be mortifying to the pride of philosophers that there is anywhere an intellect greater than themselves. To deny such a fact because it is not solvable by them, will not alter the course of nature or weaken the proofs which exist in favor of a supreme regulating mind. By analogy from what is visible, mental potency of any and every kind should be the last thing which is destructible.

If it is so, it must require the same fiat power that caused its existence. If anything idealistic as contrasted with matter has existence, it must be spiritual.

Reasoning from material nature and mental nature as the basis of what we perceive, in almost all countries there has sprung up what is called natural religion.

A mutual correlation of action among the parts of a civil government or between nations, is evidence of intellect and design. In the material world much more comprehensive departments work in harmony, sustaining and not opposing each other.

The sun's rays have an electromagnetic influence direct upon the germination and vitality of plants, and also not as direct but necessary upon the animal system. But important and perpetual solar heat on

the surface of the earth penetrates only a short distance, yet by its incessant changes is a constant exciter of terrestrial electricity.

Beyond this influence upon the earth, is a deep-seated source of heat acting as a universal electrical exciter, in its molten interior. From this, more palpably physical activities are derived, such as currents of the atmosphere, and of the ocean, which are partly the effect of solar heat, acting in concert. It is not a mere surmise to attribute galvanic effects to solar rays, coming to us not from that star only, but other stars; and that electricity is thus equalized throughout stellar space. Gravitation is local, as well as general, throughout earthy particles, producing cohesion. At the same time on a large plan it is necessary to keep up the motion of the planets in their orbits. These various functions assist each other in giving perpetuity to celestial movements, which probably include regular orbital tracks for the stars, combined with revolution in groups, like the planets.

For this general system, light, heat and electricity play their parts, wherever matter exists, especially in animal and vegetable life. It is a coalescing, not a divergent system, to devise and regulate which, a power greater than all is necessary. On questions of conscience and the moral sense, scholars are not peculiarly qualified to decide. Their occupation is not specially humanitarian, but rather tends to cold criticism. The ancient millions did not require the aid of science, to discover a God in nature, or to enjoy the beauty of celestial bodies. Moderns have learned much that relates to the vast and glorious heavens; but what is unknown far exceeds what is known.

Should it prove to be true that heat is not a substance, only an agency, and is convertible with force, another instance of concentration and sim-

licity in nature is established. Light, heat and electricity have a correlation as yet only partially understood. Scientists are on the threshold of their investigations of this mysterious relation. Individually these qualities, agencies or substances, whatever they are, may be indistinct, while as groups they are clearly manifest, like many other phenomena of the universe. Every reduction of their number renders the study of them less complex.

The mental processes are capable of a similar simplification. The terms mind, thought, soul, heart, and whatever mental action they embrace, are as definitions very obscure. As a bundle of faculties crowded into the small space of the brain, with a combined intellectual force, they are definite, all powerful, and their effects easily understood.

Should it be demonstrated that there is an all-pervading ether, another step will have been taken in the pathway of simplification. If this agent has co-relations with light, heat and electricity, the combination probably acts in every kingdom, and every department of each of them in general and in detail. Another proof will thus be furnished of superhuman contrivance. The indications are that such concentrations will be more numerous as knowledge increases. My program does not require an exhibition of learning beyond what has a bearing upon theistical philosophy as seen in nature. Much refined science, not necessary to the subject, and not easily understood by those not specialists; is purposely avoided. In connection with the nervous system there is a highly probable theory that the ubiquitous ether has a circulation in the nerve tissue, through which nerve action is carried on and is accelerated. Such an explanation, when it is established, will present a beautiful simplicity in keeping with many other features of the natural world already brought forward.

THEISM AND ATHEISM IN SCIENCE.

VIII.

General Considerations.

BY COL. CHAS. WHITTLESEY.

Travelers who examine the inscriptions at Hamath without being able to decipher a single word, acquire some correct impressions of the people who made them. Scientists who explore the ruins at Palmyra come to many valuable conclusions in regard to their builders, from which they compose interesting books.

At Babylon and Nineveh, before the inscriptions were deciphered by recent explorers, much had been written that was principally inferential, based upon external observations.

From their camps in the eastern deserts, all these enthusiastic scientists saw, in its fullest splendor, the sidereal heavens revolving overhead, yet some of them are unable to see in that display of celestial mechanism any evidence of an intelligent designer.

Throughout the valley of the Mississippi are ancient earthworks of prehistoric age. Nothing is known of the builders except that which may be inferred from their structures and the relics found in them. Not a phrase or word translated is known to have been written by them.

There are only dumb witnesses, such as mounds, embankments, effigies, implements in bone, stone, flint and copper, with rude pictorial figures on pieces of slate or mica; beads of bone or shell, also carved human heads, birds, snakes and animals, some of them, like the elephant and mastodon, are extinct.

On the inspection of these remains

a special archaeological literature has grown up, describing this people, their religious worship, mode of life and social condition. There are scientists of reputation in this line who admit of no author discoverable in nature who as firmly believe in the existence of the mound-builders and see numerous designs in their relics as though they had witnessed their labors.

Professor Haeckel, of Jena, stands at the head of analytical chemists. His life has been devoted to protogelatinous or protoplasm, including the primordial cells and spores that belong to animal and vegetable life. His leading purpose has been the support of a theory of spontaneous or self-generation. Darwin and Huxley investigated the same question with equal patience and less bias, but were unable to agree with Haeckel, on whose dictum sociology principally rests.

However, this question, regarded as one of natural science, may be settled, there is, like the doctrine of divergence, a point eventually reached where chemistry, philosophy and all science comes to a halt.

In the doctrine of divergence Darwin foresaw that when there existed in the remote past only one pair, it could not exist by development. He adopted the hypothesis that there might have been hermaphrodites as the ancestors of that pair. What might have been goes for nothing in exact science, only what was. Could hermaphrodites breed animals of per-

fect sexual organs different from themselves?

When the existence of sexes is reached in animals, the reproductive cells are different in the male from those in the female. By force of this difference they are impregnated by contact. Protoplasm is not life, neither are the cells, but only media necessary to its propagation. Everything prior to the first introduction of life belonged alone to the mineral kingdom; therefore the gelatines and plasms before that era were chemical, not vital compounds.

Great efforts have been made to explain away this difference, but thus far without success. Evolution in the animal world was impossible until there were animal existences, and therefore there must be back of this point some intelligent power to put evolution in motion, both as to plants and animals.

Does evolution evolve itself? Did evolution exist before there was matter of any kind on which it could act? Were the few simple substances evolved? If all these queries should be answered in the affirmative, spontaneous generation goes back to the origin of all things, and is the supreme Creator, as I have before stated, under a new name, with the same faculties. Evolution and development do not explain spontaneous generation.

All phenomena of the universe are, on this theory, self-originating, but nowhere is there hitherto any mental power, design or contrivances, except the limited ones possessed by the animal kingdom, which was the last to come into existence. Such is the philosophy of misapplied science, denying a designer in the origin of the mineral kingdom with its unfathomed mysteries; in the priority of vegetable as to animal life or in the endowments of matter which has such wonderful capacity to expand and progress under fixed laws.

Great efforts have been made to obliterate the quality known as vitality, and to bring it within the laws of chemical action. In the mineral kingdom there are wonderful transmutations that are traceable to chemical activities, stimulated by electricity, galvanism, magnetism, segregation and gravitation, always within the limit of manifest law.

It has not been shown that such changes, which include the solution, transportation and re-arrangement of particles of matter, have originated any simple substance. These activities are not creative, and therefore bring nothing new into existence. Since the primordial origin of simple substances and primeval life, such a creation has been effected only by the intervention of sex, either animal or vegetable: which, life or vitality is not new matter. It is associated with matter, without being itself material. Germination and propagation among plants and animals, require seeds in some form, pollen and ova to be impregnated, a process not chemical.

Such vitalized matter is pre-endowed with the quality of vitalization; which is not new substance. It is life force, brought into action through the medium of sexuality. If it were otherwise, the great number of skillful chemists and electricians who have labored to produce it chemically would have succeeded. A material base, with proper conditions, is requisite, and electricity, galvanism, segregation with other imponderables, and carbon, hydrogen, nitrogen and oxygen. But their action comes within a mental domain, not a material one. It is an endowment which chemists employ, but which they cannot change. Their success in that direction would be the same as it has been in the origin of vitality by chemical agencies.

Life is capable of variation within the limits of genera, but chemical affinity admits of no variation.

In natural history the first process of classification is the grouping of what is similar. This leads to a separation of what is unlike in individual qualities and facilitates the study of nature. The same feature characterizes the entire range of philosophical and scientific investigation.

First, generalizations, such as kingdoms, orders and so on, down to species. In many departments the grouping covers much that is unknown, while as a group the conception is complete. There is no department of inquiry where this practice is more helpful than in what pertains to mental activities where precise definitions are more difficult to formulate.

Looking at the qualities of the mind separately, as the brain student does when he maps them out on his chart, their names, members and localities are not well defined. Besides their mystical outlines, which render description difficult individually, definitions are wanting to convey precise ideas. Scholars in this field of necessity contradict each other.

Take the emotions, instincts, affections, reason, memory and the mental activities of which these are a portion, the clouds which rest upon their border lines cannot destroy their reality and power as a group, for, viewed in a body, there is nothing better defined.

These faculties, in gross, constitute the spiritual part of humanity, and are as readily perceived as material objects. No display of sophistry can render so plain a truth obscure. Wherever there is life the animal body is subordinate to the mental faculties.

Whatever constitutes the soul, mind or spirit may, like the nebula, not yet be resolved, but like them are capable of being resolved.

The nebulous mass is a reality though the individual stars are only partially defined. Whatever may be the full law of our existence, especially in regard to

its perpetuity, no one will be exempt from that law. Certainly it cannot be varied to suit those who deny futurity. There are others entitled to consideration. Of those who have hitherto lived and died, a great majority had some form of religious belief to which immortality is essential. Whatever may be beyond our ken on other planets or systems, it is beyond argument that on our own, mind is the ruling power.

It may be mortifying to the pride of philosophers that there is anywhere an intellect greater than themselves. To deny such a fact because it is not solvable by them, will not alter the truths of nature or weaken the proofs which exist there in favor of a supreme regulating mind. By analogy from what is visible of mental potency of any and every kind, it should be the last thing which is destructible. If it is so it must require the exercise of the same fiat power that first caused its existence.

In what pertains to ethics, morals and religion the opinions of men of science, wealth, eloquence or political prominence are entitled to no more weight outside of their specialty than those of equal general intelligence.

Throughout the ten most prominent civilized countries it is a liberal estimate to allow five thousand who claim to be learned persons and whose claims are allowable, who are disciples of sociology.

They live in the midst of about three hundred millions of people, at least one-tenth of whom are as good authority on religious subjects, or about three millions who condemn the new gospel of animism.

In the field of natural law, on which natural science is based, the contest between the philosophy of theism and the assumption of Haeckelism, on which sociology is based, is so evident that very few words are necessary to show it. In the place of deity

there is spontaneous generation or self-begetting as the origin, not only of life, but of evolution, and of all there is of law in nature.

To accept of this creative agency requires an overshadowing faith and greater credulity in the unproven than for the wildest religious dogmas.

Experience has proven that there are temperaments to whom extravagant ideas and theories are easily received as truths. Erratic minds do not, however, control those that are better balanced, and cannot do so, even should they become a majority; for their inherent qualities are self-destroying. Like socialists in society, they will not submit to any form of law or organization.

CONSCIENCE.

Conscience is a purely mental quality, and one that no brute creature possesses. It is, in this respect, exclusively an inherent sense, coupled with a capacity of development or improvement, like reason, memory and that group of faculties.

Between the latter faculties and conscience, there is a similarity, but with a closer alliance to the moral side of our nature. The term includes a group of senses: (1) *Common-sense*, or the faculty to do the right thing in the right way; (2) *Moral sense*, or the distinction between right and wrong; (3) *Religious sense*, a higher plane of the moral sense, connected with a living deity. As moral sentiment, atheism sweeps away the entire group. They are all spiritual, not animal qualities, and operate in harmony with each other.

Though they are idealities with not perfectly defined boundaries, their collected power is manifest in the kingdom of mind as it acts upon the material kingdom.

If this relation is not supernatural, how is it maintained?

The inference is plain enough that

it must be due to a universal primordial law or to incessant special power. It is a sufficient definition of conscience to call it the perception of right as contrasted with wrong, of justice with injustice, and good with evil.

The history of mankind shows very few instances of savagery so complete that there are not traces of a moral code. Low and imperfect it may be, but it has still a place in the savage heart. If it is assumed to be due to cultivation and not instinct, such an assumption does not dispose of the capacity for its development, which underlies, in this as in so many other parallel cases, the whole structure of moral and intellectual improvement.

Very refined arguments have been published to show that speech is not a function of nature, but an acquired habit. Articulate sounds in man or animals are mechanical, not mental operations. Animals have rude forms of speech, but not logic; or, if moral sentiment is conveyed, no mode of recording ideas. The parrot can be taught to speak words. It does not make a man of him, give him ideas, reason or moral sense. Man has the same need of an articulate voice that he has of eyes and ears.

Should it prove to be true that heat is not a substance, only an agency, and is convertible into force, another instance of concentration and simplicity in nature is established.

Light, heat and electricity have a correlation as yet only partially understood. Scientists are on the threshold of their investigations of this mysterious relation. Individually these qualities, relations or substances, whatever they are, may be indistinct, while as a group, they are more clearly manifest, like many other phenomena of the universe.

Every reduction of their number renders the study of them less com-