

which circled around the central sun, a further condensation of which caused another outer ring to be thrown off, to be condensed, and become another planet, to circle round the central sun—the second consequently having a smaller orbit than the first. This process was repeated until the whole of the planets of the solar system had been thrown off which now circle around our sun. Consequently, at one time the combined matter of the sun and planets of the solar system, when in a nebulous state, filled up the entire space at present circled around by the outermost of our planets in its orbit.

These orbs keep continually cooling, and as their motion lessens in velocity they will all gradually, one after the other, fall back into the sun from whence they came. The heat engendered by these concussions will again resolve the whole of our present solar system to its former state of a nebulous, fiery cloud, again filling up the entire space at present circled around by the outermost of our planets in its orbit, again to be condensed into orbs, and so on to all eternity.

The history of our solar system is the history of all other systems—suns, planets, stars, comets, aerolites, and all the orbs and heavenly bodies whatsoever. So much for the nebular hypothesis, propounded by Kaut, mathematically expounded by Laplace, based on positive science, by Herschel.

Now for Spontaneous Generation. As the earth gradually cooled down, land and water began to appear, and organic life became evolved by the spontaneous action of the essential properties of matter. You have all seen the common experiment in physics of loosely strewn steel filings on a paper, down underneath which is lying a magnet. Immediately the fragments of steel arrange themselves in geometrical lines. And another where an unshapen mass of matter, previously arranged in chemical proportions, by merely waving a feather over it suddenly assumes the most beautiful crystalline forms. So, as soon as the heated matter of the earth had cooled enough to form a medium for the existence of organisms, and the hitherto unorganized, but organizable, matter (Protoplasm) was ready to spring into organic life, it took place by spontaneous generation.

The most complicated animal organism, such as that of man, is only a combination of an infinite number of single individual cells, all working together as a co-operative community, to accomplish one definite purpose.

The theory of spontaneous generation was rendered easy of conception by the existence of organisms so simple as to consist of only one single cell. But easy conception has been carried further, next door to ocular demonstration, by the discovery of organisms even lower than simple cells. The *Bathybius* is merely a lump of mucus, possessing organic functions. It has been lately attracting great attention, especially the *Bathybius Haeckelii*, discovered by Professor Huxley, and named by him after the great German philosopher Ernest Haeckel.

The scientific corps of the Challenger expedition found great numbers of these lowly specimens of animal life inhabiting the vast depths of the ocean. So much for the nebular hypothesis and spontaneous generation. Now for Darwinism.

The investigations of Huxley, Darwin, and others in the border land of vegetable and animal life, prove that there is no dividing line, and so also in the border land of unorganized and organized matter there is no dividing line. It is an unbroken succession from unshapen nebulous matter to orbs and worlds, thence from unorganized matter to organized vegetable and animal life. It has been demonstrated by a multitude of proofs that with regard to the infinite variety of forms of animal life, from a simple cell to man, so called species, of which there are hundreds in one department alone, that of insects, there is no such thing as species, there is no dividing line, they all shade insensibly the one into the other through the whole series.

Haeckel and other evolutionists have traced the gradual process of the development, evolution of animal life from the lowest form, the *Bathybius*—which is lower than a cell, that assumed organic life by spontaneous generation—through all the intermediate links up to the most complicated. One form springing out of another throughout the entire pedigree by means of variation, descent, adaptation, and natural selection.

In the same way as the nebular hypothesis, spontaneous generation, and Darwinism account in a simple and natural manner for the origin of the whole universe around us, celestial and terrestrial, animate and inanimate. So language, religion, the arts and sciences, political and social economy, the soul of man, the mind, human intelligence, has been shown to have been a growth, to have been developed, evolved in precisely the same manner as the earth and other orbs, and any inhabitants, vegetable or animal which may exist upon them. As representatives of the various forms through which the evolution of animal life has taken place may all be seen in existence at one time in our own day, from the *Bathybius*, which is only a little lump of fatty matter, possessing organic functions, up through all the infinite variety of forms and species, to the most complex—man. So, what is called the human soul, or mind, or intelligence, can also be seen in the different representatives of the human family in the different parts of the world at the present day, in all the stages of its development, from that of the Digger Indian, the Earthman, Bushman, and other tribes of men, scarcely to be classed as superior in intelligence to the lower animals, up to the enlightened European or American. In like manner the germ of every living member of the human family exhibits to day the whole process of evolution of all the infinite variety of animal life as it assumes in succession the forms of all other animal germs.

Evolution supposes that all these vast changes must have occupied vast, immeasurable periods of time to accomplish; and an unlimited amount of testimony of the highest authority proves that vast, immeasurable periods of time have not been lacking.

Man has existed upon the earth for hundreds of thousands of years, but that length of time is only very short, almost inappreciable, when compared with the geological age of the earth's crust. It is only less than one third of one per cent., or as one day when contrasted with the length of fifty-two weeks, a complete year.

The only divine revelation which the evolution philosophy recognizes as true, is written every where in nature, and to every one (with healthy senses, and a healthy reason, it is given to participate in the unerring revelations of the temple of nature, by his own inquiry, and independent discovery.

The evolution philosophy is based on positive facts. Natural selection is a positive fact. The laws of inheritance and adaptation are universally acknowledged physiological facts, the former traceable to propagation, the latter to the nutrition of organisms. The struggle for existence is a biological fact, which with mathematical necessity follows from the general disproportion between the average number of organic individuals, and the numerical excess of their germs. But as adaptation and inheritance, in the struggle for life, are in continual interaction, it inevitably follows that natural selection, which every where influences, and continually changes, organic species, must, by making use of divergence of character, produce new species. Its influence is further especially favored by the active and passive migration of organisms which go on everywhere. If we give these circumstances due consideration, the continual and gradual modification or transmutation of organic species will appear as a biological process, which must, according to causal law, of necessity, follow from the actual nature of organisms and their mutual co-relations.

The evolution philosophy teaches that the whole of the organic world, through the whole series of the vegetable and animal kingdoms, from the lichen up to man, are all composed mainly of one sort of matter; which, in all cases, even those at the extremity of the scale, are almost identical in composition. Also every living action, from the vibrations of the cilia of the foraminifer to the imagination of Hamlet, or the composition of the Messiah, is accompanied by, and in a sense finds an equivalent expression in the definite waste or disintegration of material tissue.

It is no less certain that the muscles of a horse are strained by a heavy load, than it is that the brain of Shakespeare underwent molecular agitation, producing definite chemical results, in the sublime effort of imagination.

Sooner or later we shall arrive at a mechanical expression of consciousness, just as we have arrived at a mechanical equivalent of heat. By the law of correlation of physical forces, any given amount of force of one kind can be expressed by its equivalent in another—electricity in heat, heat in weight, etc.

The evolution philosophy traces the development of all things, the whole universe, from the primeval state of a nebulous fiery mist, and on through the whole variety of forms of matter inanimate and animate, vegetable and animal, culminating in man. We can well imagine the intellect of a Shakespeare or a Homer as being at some time latent in a fiery cloud.

As regards the origin of the mental faculties of animals, and more especially their specific expressions, the so-called instincts, we must regard instincts as essentially the habit of the soul, acquired by and transmitted and fixed by inheritance through many generations. Instincts are therefore like all other habits, which, according to the laws of cumulative adaptation and established inheritance, lead to the origin of new functions, and thus also to new forms of the organs. Here, as everywhere, the interaction between function and organ goes hand in hand. Just as the mental faculties of man have been acquired by the progressive adaptation of the brain, and been fixed by continual transmission by inheritance—so the instincts of animals, which differ from them only in quantity, not in quality, have arisen by the gradual perfecting of their mental organ, that is their central nervous system, by the interaction of adaptation and inheritance.

Instincts, as is well known, are inherited, but experiences and new adaptations of the animal mind are also transmitted by inheritance, and the training of domestic animals to different mental activities, which wild animals are incapable of accomplishing, rests upon the possibility of mental adaptation. We already know of a series of examples in which such adaptations, after they had been transmitted through a succession of generations, finally appeared as innate instincts—and yet they have only been acquired from the ancestors of the animals. Inheritance has here caused the result of training to become instinct. The characteristic instincts of sporting dogs, shepherd dogs, and other domestic animals and the natural instincts of wild animals, which they possess at birth, were in the first place acquired by their ancestors by adaptation. They may in this respect be compared to man's knowledge, a priori, which, like all other knowledge, was originally acquired by our remote ancestors, a posteriori, by sensuous experience. It is evident that knowledge, a posteriori, arose only by long enduring, acquired adaptation of the brain out of originally empiric or experiential knowledge, a posteriori. The truth of the doctrine of filiation is proved by the well-known facts of comparative anatomy and embryology. All the great and general laws and all the comprehensive series of phenomena of biology can only be explained and understood by the theory of development, and especially its biological part the theory of descent. And that without it they remain completely inexplicable and uncomprehensible. The internal and causal connection between them all proves the theory of descent to be the greatest inductive law of biology.

The advocates of the evolution philosophy naturally ask why does the human germ assume in succession the forms of the germs of all other animals in succession from the lowest to the highest. Instead of, as would