

Section B and C

Volume-19

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11. EVOLUTION AND BEHAVIOUR

A. EMERGENCE OF EVOLUTIONARY THOUGHTS

The term “evolution” which literally denotes the process of continuous change is ever present in the world. It has been stated that nothing is constant in this world except the constant change. The plants, the animals, the planets and stars, the earth’s topography, the chemical compounds of the universe, and even the chemical elements and their subatomic particles change continuously through space and time. Changes in relation to plants and animals (living world) are described under the heading “Organic Evolution” whereas the changes occurring in nonliving world constitute “Inorganic Evolution” or cosmic evolution. The most concise definition of organic evolution in the words of Darwin himself is “*The descent with modification.*” It states that the various plants and animals existing at the present time are modified descendants of somewhat different plants and animals which lived in the past. These ancestors, in turn, are thought to be the modified descendants of their predecessors.

Historical Development of the Concept of Evolution

CHARLES DARWIN’S name is closely associated with the concept of evolution and for many people Darwinism is evolution, but this concept for the first time appeared in the writings of ancient Greek Philosophers. Thales (624-548 B.C.), Democritus (611-547 B.C.), Anaximander. (588-524 B.C.) Empedocles (495-435 B.C.) and Epicurus (341-270 B.C.) sought simple natural explanations for all the phenomena. Their ideas about evolution were extremely vague and were mainly based upon abiogenesis.

For many centuries it was believed that the stars, the earth, plants and animals were all created by God in the same form as these are seen today. From this it could be concluded that the living world is unchangeable and the characteristics of living things are permanent. ANAXIMANDER (611-547 B.C.) presented a fantastic idea that men were first formed as fishes and after casting off their fish-like skins they migrated to land and started living as men. XEMOPHANES (576-480 B.C.) a contemporary of Anaximander recognized fossils and suggested that petrified bones represents animal remains. Empedocles believed that plants arose out of the earth. The animals also developed from mud as individual parts, which later joined together in haphazard fashion. EMPEDOCLES is recognized as “The factor of Evolution.” He presumed that evolution of animals was by a series of attempts by nature to produce more perfect forms, the imperfect eliminated.

ARISTOTLE a well-known philosopher as well as a great biologist, worked out an elaborate theory of gradually evolving forms of life. He suggested that the various organisms constitute a series, the so called ladder of life, in which organisms could be arranged in the sequence of increasing complexity. After this for centuries together nothing was added to the knowledge of evolution.

Evolutionists of mediaeval age were Bacon (561-1626), Bonnet (1720-1793), Kent (1724-1804) who revived the idea of organic evolution. The trio of 18th century, Linnaeus (1707-78), and Erasmus Darwin (1731-1802) is well known for shaping the idea of evolution. Linnaeus, the great taxonomist advocated the theory of special creation but his taxonomic work proves to be of great help in support of the theory of organic evolution. BUFFON was recognised as the father of the modern applied idea of evolution. ERASMUS DARWIN, the grand father of Charles Drawin was responsible for shaping the ideas of his grandson.

Jean Baptiste De Lamarck propounded the first logical explanation of organic evolution in his *Philosophic Zoologique*. His theory is well known under the heading 'Inheritance of acquired characters', which advocates that the organisms change in response to the changes in the environment, and all these changes are inherited, and are incorporated generation after generation. But the most acceptable explanation was put forward by CHARLS DRAWIN and ALFRED RUSSEL WALLACE. Drawings theory of "**Origin of species by Natural Selection**" was most popular and most acceptable theory of organic evolution. HERBERT SPENCER (1820), Thomas Huxlev (1825-95) and Ernftel Haeckel (1834-1919) were the staunch supporters of Drawinism.

But Drawings theory in itself was not upto the mark and had many drawbacks, which have been washed out by the later workers. The neo Darwinians, August Weisman (1824-1924) is known for his theory of Germplasm and DEVRIES for his theory of Mutation. American writers Jordan Kellogg, Gulick and Crompron put forward isolation theory, and its significance in evolution. Carl von Nageli, Theodore Eimfr, Cope and Whiteman are associated with the idea of Orthogenesis.

Recent outstanding work in connection with evolution comes from FISCHER, Haldane, Huxley, Darlington, Wadpington, Simpson, Mayer, Muller, Dobzhansky, Timofeeff-Ressovsky, Dubinov, Chetverykov, and Teissiers, etc.

Othniel Marsh (1831-1899), Mahilw, Gregory, Romer and Simpson in America; Woodward (1864-1944) and Watson in England and Broom (1860-1951) in South Africa have

contributed immensely to vertebrate palaeontology. Haldane, Fisher and Shwall Wright have provided mathematical evidence to emphasize the role of natural selection in the evolution in populations.

At the same time, when Evolutionists were busy to seek plausible explanation for evolution, some scientists were trying to accumulate facts about evolutionary process. The evidences which support the evolution of living forms, have come from the study of morphology, physiology, taxonomy, embryology of living forms and the palaeontology (the fossils of previously existing forms). The recent techniques have been helpful in demonstrating the evolution taking place in the laboratory within short periods of only a few years. If organisms with very short life cycles, such as fruit fly or bacteria are reared for several generations in laboratory, new kinds of individuals are observed in the progeny. Initially these individuals differ slightly from their parents, but as they increase in number, differences keep on accumulating and a stage is reached when these become so markedly different from their parents that they fail to interbreed with their parents and thus form new species.

In the end it could be concluded that the process of evolution is an ever continuing process, it has not stepped but is occurring more rapidly today than in many of the past ages. In the last few hundred thousand years, hundreds of species of animals and plants have become extinct and other hundreds have arisen. Although, the process is too slow to be observed, there are notable examples of evolutionary changes which have occurred in past recorded in the form of fossils inside the rocks.

Evolution is the gradual development from the simple unorganized condition of primal matter to the complex structure of universe. The doctrine of organic evolution states that the world has evolved and not created as was believed earlier.

The highly organized complex forms of today were not developed as such and will not continue to persist in the same condition but these complex forms are the outcome of a slow and gradual step by step unfolding and branching process from the simple unorganized forms that lived in the remotest past millions of years ago. Those that are thriving today are likely to become modified gradually and slowly into some still modified forms. This gradual unfolding and branching has led to the origin of varied number of species both in animal and plant kingdom.

The evolution of various organisms in this universe is a much complicated process, which has been explained since long and various theories have been put forward from time to time to

explain this complex mechanism of evolution. Some of the important views are being summarised here:

1. Theory of special creation
2. Greek Theories
3. Pre-Modern Theories
4. Modern Theories.

Theory of Special Creation

As discussed earlier in the chapter of origin of life, it was propounded by FATHER SUREZ, the Spanish priest, who stated that the world with all its complex organisms has been created by God in six natural days. The theory simply has the historical importance and can not be accepted.

Greek Theories

Several theories of historical importance were described by Greek evolutionists before the birth of JESUS CHRIST. Some of the most popular ones are given below:—

1. Thales (624-548 B.C.) propounded the theory of aquatic or marine origin of life. He considered oceanic water to be the mother from which all living forms originated.

2. Anaximander (611-547 B.C.) was the [first Greek to explain the origin of universe on a rational basis rather than by myths. He proposed that all living beings have arisen from a primordial fluid, or slime to which they ultimately return. The plants and animals were formed as this mud dried. It was presumed that man himself was first shaped like a fish and lived in water. Later when he became capable of terrestrial life, he burst forth from his fish-like capsule like a butterfly from its chrysalis and assumed human form. The theory is crude, yet the implication is clear.

3. Anaximenes (588-524 B. C.) described air to be the source of life. He proposed theory of biogenesis.

4. Xenophanes (576-480 B. C.) recognized fossils as the remanents of once living organisms and described that once the entire earth was under sea water and life was originated there.

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