

Principles of Evolution

The idea that the present forms of life has been evolved from earlier forms are called evolution. The development of the principle of evolution took place in four stages —

- I Pre-Darwinian Concept —
- II Darwinian Concept
- III Post Darwinian Concept
- IV Modern Synthesis Period Concept

I Pre-Darwinian Concept → The earliest principle of evolution developed when Jean Baptiste de Lamarck (1744-1829), whose *Philosophie Zoologique* was published in 1809. He was first to present the concept of that at time when animals could be related to each other by descent along branching lines of a family tree. He believed that any trait acquired by an organism during its life time was passed on to succeeding generations — that acquired characters are inherited. By developing the notion that new organs arise in response to the demands of the environment, he postulated that the size of the organ is proportional to its use or disuse. The changes produced and disuse of an organ are

transmitted to the offspring and this process, repeated for many generations, would result in marked alterations of form and function. Although, this theory does not hold right in the present situation, yet it has historical importance. And it was bitterly opposed by

Cuvier (1832) and Weismann (1887.)

II Darwinian Concept - During the latter half of the 19th century, Charles Darwin formulated & advanced his natural selection theory to explain the mechanism of organic evolution and to show that organic evolution had occurred, he presented a lot of evidences. But Weismann (1887) has made a landmark investigation that characters present in somatic cells are not transmitted, but present in germplasm of germ cells were transmitted to generation giving rise to new species.

According to Darwin Wallace theory of Natural Selection, published in Journal of Linnaean Society is July, 1858, variations occur in all populations of living things and because some of the variations result is greater, others is less, probability of survival, the fittest former are likely to be sustained is

coming generations while the later either decline or are eliminated at once. It stated that all progeny produced must attain maturity, and that the environment never permits survival of all offspring of a species in a generation, means that an advantage may be given to individuals having favourable adaptive characteristics. There is a process or struggle which makes survival more probable than do others. This does not mean that struggle constitutes unending struggle. Some characteristics make survival more probable for survival and this is selected by Nature to put into newer generations. Hence Darwin's supported "Theory of Natural Selection" in which divergence of species from a common ancestral stock is brought about by some form of segregation is the original stock so that long term of selection is the population along with isolation evolves new species.

III Post Darwinian Concept - with the powerful support of T.H. Huxley, it became widely established

among biological biologists that evolution had occurred and that it could be explained by processes observable in nature. Beech, Huxley, Cuvier, Haeckel, Weismann and other biologists illustrated the transition from pre-evolutionary to evolutionary interpretations of structural patterns in animals.

However, in the later half of Nineteenth Century, beside Natural Selection, many additional mechanisms and causes were sought by different evolutionists of later part of Nineteenth Century for explaining organic evolution. For instance, Wagner emphasized effect of different environment on isolated forms. Karl Nageli suggested that an inner directive guides the course of evolution mainly independent of the environment. Hugo de Vries (1848-1935) believed that new species originate not in natural selection, but mutations can also be inherited.

IV The Modern Synthesis Period - The Concept
Synthesis of a coherent theory of evolution which takes into account all the pertinent facts of modern

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biology, has been worked out by modern biologists like Huxley (1942), Mayo (1963), Stebbins (1965), Simpson (1953). They showed that the modern synthesis concept, which can explain the origin of variation could provide the most satisfying answer to the evolutionary history of the animals. This theory selected the best aspects of earlier hypotheses and combined them in a new and original manner. In essence, it is a two factor theory, which regards the diversity and harmonious adaptations of the organic world as a result of a steady production of variations and of the selective effects of the environment.

Hence, present state of Principle of Evolution recognizes five basic types of processes — Gene-mutation, changes in chromosome number and structure, Genetic Recombination, Natural Selection and Reproductive Isolation. The first three provides the genetic variability without which changes cannot take place, Natural Selection and reproductive Isolation guide populations of organisms

into adaptive channels. In addition, three accessory processes affect the working of these five basic processes. Migrations of individuals from one population to another as well as hybridizations between same or closely related species both increase the amount of genetic variability available to a population. The effect of chance; acting on small populations, may alter the way in which natural selection guides the course of evolution.

