Lamarckism

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Lamarckism is the first theory of evolution, which was proposed by Jean Baptiste de Lamarck (1744-1829), a French biologist. His famous book "Philosophic Zoologies" was published in 1809, in which he discussed his theory in detail.

Lamarck's Propositions: Lamarckism includes four main propositions.

(i) Internal Vital Force: All the living things and their component parts are continually increased due to internal vital force. Lamarck.

(ii) Effect of Environment and New Needs: Environment influences all types of organisms. A change in environment brings about changes in organisms. It gives rise to new needs. New needs or desires produce new structures and change habits of the organisms. Doctrine of desires is called appetency.

(iii) Use and Disuse of Organs: If an organ is constantly used it would be better developed whereas disuse of organ results in its degeneration.

(iv) Inheritance of Acquired Characters: Whatever an individual acquires (to possess) characters in its life time due to internal vital force, effect of environment, new needs and use and disuse of organs, they are inherited (transmitted) to the next generations. The process continues. After several generations, the variations are accumulated upto such extent that they give rise to new species.

Examples in Support of Lamarckism:

(i) Evolution of Giraffe:

The ancestors of giraffe were bearing a small neck and forelimbs and were like horses. But as they were living in places with no surface vegetation, they had to stretch their neck and fore-limbs to take the leaves for food, which resulted in the slight elongation of these parts. Whatever they acquired in one generation was transmitted to the next generation with the result that a race of long necked and long fore-limbed animals was developed.

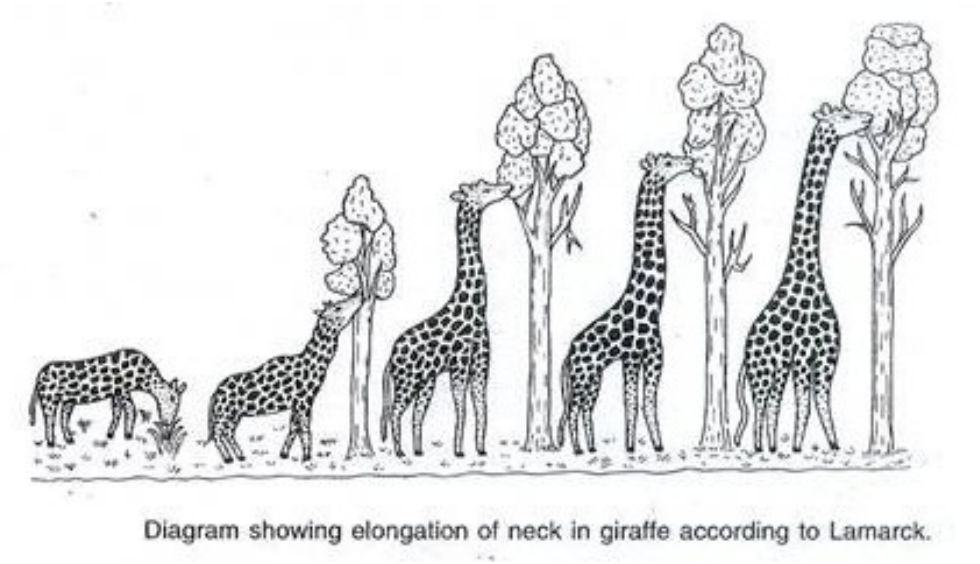

Diagram showing elongation of neck in giraffe according to Lamarck.

(ii) Webbed Toes of Aquatic Birds:

Aquatic birds like ducks have been evolved from the terrestrial ancestors.

(iii) Disappearance of Limbs in Snakes:

The snakes have been evolved from lizard like ancestors which were having two pairs of limbs.

(iv) Flat Fishes:

They are flat and bear both the eyes on one side and live at the bottom of the water. During the embryonic stage their eyes are present laterally, one eye on either side. The body of these fishes is not flat at this stage but later on both the eyes is shifted to one side and the body becomes flat to withstand the pressure of water.

(v) Flightless Birds:

The ancestors of these birds (e.g., Ostrich) were capable of flying, but due to some environmental factors they had plenty of food and were well protected. So they did not use their wings and that is why the latter became vestigial.

(vi) Retractile Claws of Carnivorous Mammals:

The ancestors of carnivorous mammals such as lions, tiger etc. had ordinary claws for tearing the flesh of their preys. As the latter gained in running, the carnivorous mammals also had to run fast for which claws were a hindrance. The animals, therefore, developed retractile claws.

(vii) Deer:

The ancestors of deer were not having so much speed in running, but as they needed protection from other animals of that time they started running, due to which present speed were achieved by the deer.

(viii) Cave Dwellers:

The ancestors of cave dwellers had normal eye sight. On account of living under continuous dark conditions, the animal lost their power to see.

(ix) Emergent Hydrophytes:

The effect of environment and inheritance of acquired characters is clearly seen in emergent hydrophytes like Ranunculus aquatilis. Here the submerged leaves are dissected while the emerged ones are simply lobed. When the plant is grown out of water, all the leaves are un-dissected. In the submerged environment all the leaves are dissected.

Criticism of Lamarckism:

(Evidences against the Inheritance of Acquired Characters):

The first proposition of the theory does not have any ground because there is no vital force in organisms which increases their body parts. As regards the second proposition, the environment can affect the animal but it is doubtful that a new need forms new structures. The third proposition, the use and disuse of the organs is correct up to some extent. The fourth proposition regarding the inheritance of acquired characters is disputed.

Mendel's Laws of Inheritance and Weismann's Theory of Continuity of Germplasm (1892) discarded Lamarck's concept of inheritance of acquired characters.

(i) Theory of Continuity of Germplasm. August Weismann (1834-1914), a German biologist, was the main opposer of the inheritance-of acquired characters. He put forward the theory of continuity of germplasm. According to Weismann, the characters influencing the germ cells are only inherited. There is a continuity of germplasm (protoplasm of germ cells) but the somato-plasm (protoplasm of somatic cells) is not transmitted to the next generation hence it does not carry characters to next generation. Weismann cut off the tails of rats for as many as 22 generations and allowed them to breed, but tailless rats were never born.

(ii) Boring of pinna (external ear) and nose of Indian women is never inherited to the next generations.

(iii) The wrestler's powerful muscles are not transmitted to the offspring.

(iv) Circumcision of penis is in Jews and Muslims but it is not inherited to the next generation.

(v) Dull progeny of Nobel Prize winners cannot be explained by Lamarckism.