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REMARKS ON LAMARCKIAN CONCEPT OF ANIMAL EVOLUTION AND PHILOSOPHY OF BIOLOGY

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“Lamarck would be astonished to know that ‘Lamarckism’ has come to mean the inheritance of acquired characters. In the first place, he did not believe that all acquired characters are heritable, and in the second place in saying that some are, he was only repeating that everyone “knew” and had “known” since antiquity” (G.G. Simpson, 1961).

INTRODUCTION

The publication of the theory of natural selection on the origin of species (or descent of species) brought intellectual debate on the idea of evolution. Darwinism (or the theory of natural selection) had to fight with the supporters of biblical ideas of the origin of living beings in one hand and on the other hand on the methods of origin of living ones especially with the supporters of so-called Lamarck’s ideas. Darwinism own. But Lamarckism is still maintaining its influence in some quarters of intellectual and political world; although it has been proved that several explanations on evolution usually labelled as “*Lamarckism*” are not valid.

The object of the present article is to present what Lamarck actually said on evolution of animals and how it was interpreted from time to time and a note on the relationship between Lamarckian philosophy and modern philosophy of biology.

For the above purpose I have taken help of the most popular and dependable English translation, followed by celebrated evolutionists, of Lamarck’s *Philosophie Zoologique* by Hugh Elliot (1914). In addition to this remarks on the subject by celebrated Zoologists have been taken into considerations. In order to present Lamarck’s words, quotations from the English translation by Elliot (1914) have been cited as and when required.

LAMARCK AND EVOLUTION

Some critics of Lamarck believed that he did not propose any genuine mechanism of evolutionary changes. On the contrary Simpson (1961) observed, “Lamarck (1744-1829) was, however, the first to maintain clearly and consistently that all taxa have arisen by evolution and are a phylogenetic continuum”. Mayr (1976) remarked that Lamarck’s master doctrine was that all classes of animals form a unique and graduated series from the simple to the most perfect; and Lamarck could be designated as the founder of the theory of evolution. It is fact that in several pages of *Philosophie Zoologique* ideas on evolution are available, but Lamarck’s discussion of aquatic animals clearly indicate his ideas on evolution. He wrote :

“I do not doubt that mammals originally came from the water, nor that water is the true cradle of entire animal kingdom.”

“We still see, in fact, that the least perfect animals, and they are the most numerous, live only in water, as I shall hereafter mention; that is exclusively in water or very moist places that nature achieved and still achieves in favourable conditions those direct or spontaneous generations which bring into existence the most simple organized animalcules. Whence all other animals have sprung in turn” (pp. 175-176).

“.....After a long succession of generations those individuals, originally belonged to one species, become at length transformed into a new species distinct from the first” (pp. 38-39).

From the above it appears that Elliot (1914) was right to comment.”.....The most fundamental purpose of Lamarck’s Zoological work was to convert the belief in the fixity of species.” Darwin in the sixth edition of his ‘Origin of Species’ (1872) in the chapter entitled, “An Historical Sketch” wrote, “In these works he

upholds the doctrine that all species, including man, are descended from other species. He first did the eminent service of arousing attention to the probability of all change in the organic, as well as in the inorganic world, being the result of law and not of miraculous interposition". Simpson (1953) remarked, "he believed, first of all, that there is some mysterious inherent tendency for life to progress from the simple to the complex from the less to the most perfect". Simpson (*op. cit.*) also commented, "Lamarck was acute enough to observe that life does not really form such a progression. He explained away this inconvenient fact by saying that the course of evolution is perturbed by local adaptation. Adaptation was said to result from the activities and habits of organisms, which modify their anatomy. He assumed as did almost everyone from the dawn of history down to and including Darwin, that such modification would be inherited in like form by offspring."

It is interesting to note that the word "species" was important for Darwin, but for Lamarck it was secondary and he was more concerned with the level of complexity in animals. Moreover, Lamarck considered that environment (? Nature) is an important factor in evolution but he did not explain the role of natural selection as done by Darwin. He said, ".....as changes occur in the environment.....corresponding changes occur" (p. 109). According to Dobzhansky (1951) ".....Lamarck took for granted adaptive modifications following use and disuse of organs and proposed to explain evolution as a result of such modifications. Actually it is the ability of organs to react adaptively to the effects of use and disuse that, must be explained as an evolutionary achievement", but it was not mentioned by Lamarck."

PILLARS OF LAMARCKIAN CONCEPT OF EVOLUTION

Lamarck's belief on the evolution of living beings is now widely accepted. Let us now examine what he considered as the causal factor in evolution. Following ideas are considered pillars of Lamarckian concept of evolution.

1. Direct effect of the environment :

Both anti-Lamarckian and neo-Lamarckians believe that the direct induction of hereditary changes in organisms by the environment is a Lamarckian concept. Simpson (1953) pointed out that this was flatly denied by Lamarck. Hardy (1974), too, contended that Lamarck never supposed that environment influences directly. Fortunately, Lamarck himself put an explanation what

he meant by "influence of environment" in the following statement (p. 107).

"I must now explain what I mean by this statement : The environment affects the shape and organization of animals, that is to say that when the environment becomes very different, it produces in the course of time corresponding modifications in the shape and organization of animals.

"It is true, if this statement were to be taken literally, I should be convicted of an error; for, whatever the environment may do, it does not work any direct modifications whatever in the shape and organization of animals." Mayr (1976), too, considered that Lamarck emphatically rejected the direct effects of the environment on the higher animals which display activities.

2. Evolution through desire of the organism :

The common picture of Lamarckism is the gradual increase of the neck of a giraffe. The whole set of pictures depict that giraffe through its desire to reach an objective and by this desire growing the long neck in succeeding generations. Jones (1953) wrote that although Lamarck denied the voluntary striving of animals, yet his statement, "sentiment interieur" is often interpreted as voluntary striving. Probably this instigated people to draw the cartoon. Actually Lamarck said, ".....If one of the extremities of the order is occupied by the most perfect of living bodies, having the most complex organization, the other extremity of the order must necessarily be occupied by the most imperfect of living bodies, namely those whose organization is the simplest" (p. 60). According to Mayr (1976). T.H. Huxley during his review of the Origin of Species by Darwin, in Times said that according to Lamarck, "the new needs will create new desires, and the attempt to gratify such desires will result in appropriate modification." Mayr (*op. cit.*) comments..... There is great danger that the hurried reader will remember only the word "desire". The cause of this misunderstanding is the mistranslation of the French word "besoin" (need) as wants. It is also the contention of Simpson (1964).

3. Inheritance of acquired characters :

The idea of inheritance of acquired characters is now almost synonym of Lamarckism. The common examples in day to day experience against and in support of the theory of inheritance of acquired characters are (1) the docking of sheep's tails and circumcision of man (of particular faith) have been

carried for thousands of years without producing any heritable effect. The practice causes pains to the subjects which they do not need for their survival. (2) The thickened skin on the sole of human foot and the sternal and allar callosities of the Ostrich, seem to be directly related to pressure arising from the habitual position of these animals. The callosities are also visible in embryos, in which the callosities are not needed at all, but they are hereditarily fixed. In these cases subjects need was for survival on the hard surface. Lamarck believed it, but in restricted sense. According to Lull (1922) Lamarck believed it but never tried to prove. Mayr (1976) observed that Lamarck said about the mechanism by which transmission takes place. Hardy (1974) commented, that Lamarck's contention that changes in the environment can bring about changes in the habit was overlooked. And "he should perhaps be given more credit for having being the first to insist that changes in habit would form an important element in the process". Simpson (1961) refuted the contention that Lamarck believed the importance of inheritance of acquired character in a strong word. He wrote, "Lamarck would be astonished to know that "Lamarckism" has come to mean the inheritance of acquired characters. In the first place, he did not believe that *all* acquired characters are heritable, and in the second place in saying that *some* are, he was only repeating what everyone "knew" and had "known" since antiquity."

Lamarck in the Second Law said, "All acquisitions or losses wrought by nature on individuals.....are preserved by reproduction to the new individuals which arise, provided that the acquired modifications are common to both sexes, or at least to the individuals which produce the young" (P. 113). Again in the page 124 he said, "Now every change that is wrought in an organ through a habit of frequently using it, is subsequently preserved by reproduction, if it is common to individuals who unite together in fertilization for the propagation of their species. Such a change is thus handed on to all succeeding individuals in the same environment, without their having to acquire it in the same way that it was actually created."

From the above it is clear that Lamarck did not try to prove the importance of inheritance of acquired characters in evolution. Repeatedly he tried to point that changes in the environment can bring about changes in the habits of animals and that is those changes of habit which can be so important in bringing about evolutionary changes (Hardy, 1974).

4. Isolation and geographical race formation :

Dobzhansky (1951) pointed out both Lamarck and Darwin believed that the interbreeding of genetically distinct populations result in swamping of the differences. In page 112 Lamarck wrote, "When the observing naturalist travels over large portions of the earth's surface and sees conspicuous changes occurring in the environment, he invariably finds that the characters of species undergo a corresponding change." In the matter of domestication of dog Lamarck wrote in pages 110-111, "No doubt a single, original race, closely resembling the wolf, if indeed it was not actually the wolf, was at some period reduced by man to domestication. That race, of which all the individuals were then alike, was gradually scattered with man in to different countries and climates; and after they had been subjected for sometime to the influences of their environment and of the various habits which had been forced upon them in each country, they underwent remarkable alterations and formed various special races." In these statements Lamarck hinted on isolation as a factor in evolution.

5. Slow and gradualness of evolution :

Lamarck's belief on the slow and gradualness of evolutionary changes is available in the following statements : In page 11 he wrote, "With regard to living bodies, it is no longer possible to doubt that nature has done everything little by little and successively"; in page 70 he wrote about the aquatic animals, ".....nature led them little by little to the habit of living in the air, first by the water's edge and afterwards on all the dry parts of the globe etc." On slow and gradualness and imperceptibility of evolutionary changes in page 30 he said, "These changes only take place with an extreme slowness, which make them always imperceptible." Again in page 50 he wrote, "An enormous time and wide variation in successive conditions must doubtless have been required to enable nature to bring the organization of the animals to that degree of complexity and development in which we see it at its perfection." In page 114 Lamarck remarked for nature, "time has no limits and can be drawn upon to any extent."

Although Lamarck has not said anything on Natural Selection but he mentioned the nature's ability to produce perfect forms. Lamarck said that nature produces the perfect forms; Darwin said nature selects the (?) perfect forms able to survive in the environment.

POLITICS, LAMARCKISM AND MICHURINISM

French Marxists accepted Lamarckism since it contradicted creationists. Russian Marxists accepted Lamarckism in the name of much debated Michurinism (Darlington, 1953). Michurinists, the neo-Lamarckian plant breeders believe, "By selecting the conditions which force a plant to abandon the fixed trend of its adaptability and thus destabilizing abolishing the conservatism of its heredity (either by sharply changing the conditions of cultivation or by enforced fertilization, especially in the distant crosses) it is possible in subsequent generations, by a proper choice of the conditions of training rapidly to create new requirements of the plant, to create new breeds and varieties differing radically from the initial ones" (Lysenko, 1951).

LAMARCK'S VIEWS AND MODERN PHILOSOPHY OF BIOLOGY

Lamarck's hypothesis was practically deductive. He did not cite any evidence of his contentions. His philosophy was based on seventeenth-eighteenth century tradition although he contradicted creationists, and essentialists and developed uniformitarianism and evolutionism. His uniformitarianism rejected the dogma of recency of earth (about 6000 years, as it was believed by most of the earlier philosophers) and hypothesized an extremely high age. This, in fact, led to the idea of the formation of present land scape as a result of gradual and slow process. Mayr (1976) conjectures that this might have influenced Lyell's idea of uniformitarianism and finally Darwin. Lamarck's 'inherent progression', 'sentiment interieur' etc. appear as vitalistic approach to biological principle like that of ancient Greek philosophers. But vitalism as a biological force is now being debated. Moreover, he was deist and used the word creation which is very much against the word evolution.

CAUSES OF LAMARCK'S DEFAMATION

Lamarck's researchers on geology, meteorology, physiology and many other disciplines were proved wrong even during his life time (Simpson, 1964). Most important factor for his defamation was his poor literary style. Hence readings of his works were boring. His *Philosophie Zoologique* contains several repetitions and confusing statements. Unlike Darwin's *Origin of Species*, Lamarck's book was not written with inductive principles and evidences. To know his views one has to read every page and line has to carry out serious research and find out what he meant.

Lamarck left no note book and founded no school, who could explain his views to his contemporaries. Mayr (1976) commented. ".....If Lamarck had the personality to found a school, his theories might have become the starting point of an improved evolutionary interpretation."

Cuvier's personality and oratory made both Geoffroy St. Hillaire dumb and French people could not hear anything about evolution for about a century. According to Simpson (1953) after the publication of Darwin's theory on Origin of Species critics of the theory of natural selection developed a modified version of Lamarck's views now known as neo-Lamarckism. Simpson (1953) said that the neo-Lamarckians contended that materials for evolution were individual modifications caused by reactions of organisms (a point really Lamarckian) and by action of the environment on organisms (a point flatly denied by Lamarck). The neo-Lamarckians "insisted that such modifications were heritable, otherwise they could have no direct influence on evolution (Lamarck believed this, but so did Darwin and most other students from antiquity to about 1900). Simpson (1964) commented, "This is an ironic joke : that the theory to which all Lamarck's name became and still remains attached and to which all his posthumous fame is due fundamentally different from what he himself intended. It would have been bitterly repudiated by him and he might well have preferred the neglect that his lot while giving."

Elliot (1914) commented that 'anyone of those quotes Lamarck have scarcely taken trouble to read his works.'

SUMMARY

1. Lamarck studied botany, zoology, geology, meteorology, physiology; most of them appeared nonsense in his lifetime. His studies on botany and zoology made him famous.

2. He proposed evolution and contradicted the creationists, catastrophists and essentialists and speculated uniformitarianism. His views that all species including man evolved from other species was upheld by Darwin.

3. Lamarck believed that all taxa have arisen by evolution and are a phylogenetic continuum.

4. He believed that evolution took place from the simplest to most perfect forms, species concept was secondary in his philosophy while it was the corner stone for Darwin's theory.

5. Lamarck considered evolution is a slow and gradual process and the needs unlimited time.

6. Lamarck never said that environment influences directly; and evolution through slow willing of animals as a Lamarckian concept was based on mistranslation of the words 'sentiment interieur' and 'besoin' in the works of Lamarck. Similarly the idea of 'inheritance of acquired characters' was not based on his original statements.

7. Neo-Lamarckians believed materials for evolution were individual modifications caused by reactions of organisms (a point really Lamarckian) and by the action of the environment on organisms (a point flatly denied by Lamarck).

8. His philosophy was deductive as well as subjective in the line of ancient Greek Philosophers. Hence he did not provide any evidence in support of his statements. While Darwin's was inductive and more scientific and intelligible.

9. Lamarck's literary style was poor, confusing and repetitive; he left no notebook and could not form any school.

ABSTRACT

Lamarck's conception of evolution of animals is acknowledged by all. Due to his poor literary style mistranslation of his statements appeared in the literature. Hence the ideas like 'direct effect of the environment', 'inheritance of acquired characters' and 'evolution through slow willing of animals' are being considered as the important factors of evolution as Lamarckian concept. Lamarck believed that in an unlimited time with the change of environment morphology of animals (population) change very slowly and when breeding pairs or individuals have same characters then the changed morphology is inherited.

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