EVOLUTION VERSUS INTELLIGENT DESIGN

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The concept of evolution, since its inception as a scientific theory through publication of Charles Darwin's "Origin of Species" in 1859, has faced religious opposition. Of late Creationism (disguised as Intelligent Design or in brief ID) has been gaining acceptance, specially in USA. According to a series of polls, conducted during the last 25 years, about 50% Americans believe in the original form of Creationism (Lewontin, 2005). Even President Bush of USA has said "yes" to teaching of evolution and ID side by side in science classes (Dawkins & Coyne, 2005). While the school board in Dover, Pennsylvania have voted against introduction of ID as an alternative to evolution in biology classes (Goodstein, 2005), inclusion of ID in curriculum along side evolution has been accepted by the school board in Kansas (Wilgoren, 2005). Though Pope John Paul II regarded evolution as more than a hypothesis, in November 2005 Pope Benedict XIV has spoken in favour of ID (Schonborn, 2005).

What is ID?

ID has been outlined with clarity by Schonborn (2005). According to this author ID accepts that humans and other organisms have evolved from a common ancestor, and that evolution has been going on this planet over a long period. Extinct species, in course of evolution, have been ancestral to the present species. The author holds that the present evolutionary theory or neo-Darwinism is "reducible to pure chance and necessity". ID rejects this view, and believes that in evolution there must have been "an internal finality", by which he means a divine plan. Lewontin (2005) points out that some upholders of ID believe that the ancestral line, leading to man, received special guidance and attention from the Super Power, though the rest of evolution has occurred through natural selection of unguided mutations. Cardova of Intelligent Design and Evolutionary Awareness (IDEA) describes ID briefly this way: "…the concept (of ID) is that a divine hand has shaped the course of evolution" (Brumfiel, 2005).

Is ID Science?

If ID were a scientific theory, papers in this area should have appeared in peer-reviewed scientific journals. But there are no such papers published (Dawkins & Coyne, 2005). ID has not stimulated any experimental investigation.

Lewontin (2005) points to another weakness in ID. ID is obviously based on Genesis. According to Genesis God took only three days to create the physical universe. But, as per nuclear physics and astrophysics Earth has existed for millions of years. Why not those, believing in ID, challenge physical sciences, and why they should concentrate on biological sciences alone?

Though ID is "simply creationism camouflaged" (Dawkins & Coyne, 2005), those, who uphold it, do not mention God, religion in general and Bible (Lewontin, 2005). Cardova, a vigorous campaigner for ID, has said, "Intelligent Design doesn't have any theology to it" (Brumfiel, 2005). But he told Brimfiel over a cup of coffee that he was driven to ID on realization of significance of religious faith.

The Rev. George Coyne, the Jesuit Director of the Vatican Observatory, has categorically declared that "Intelligent Design isn't science, even though it pretends to be". He has also said that teaching of ID along side evolution is "wrong", and like mixing apples with oranges (ANSA News Agency Report, 2005).

Dawkins and Coyne (2005) point out, "It (=ID) is not a scientific argument at all, but a religious one". Evolutionary biologist, Stephen J. Gould regarded science and religion as non-overlapping areas (Deanin, 2005). Orr (2005) has discussed at some length the seemingly scientific evidences, provided by two scientists, Michael Behe, a professor of biological sciences at Lehigh University, and William A. Dembski, a mathematician. Orr has contradicted their so called scientific evidences. He points out that, though since the writings of these scientists about ten years have elapsed, they have not led to any experiment or investigation. On the other hand, Orr has emphasized that sound scientific theories are those which lead to new experiments and which provide a sudden insight into once puzzling patterns. He says that Darwin's theory has been one of the best theories in science, as it has been gathering more and more support through countless experiments and observations, and has convincingly explained some puzzling situations, for example: why there are no native mammals in oceanic islands. In fact many such puzzling situations, which could be cogently explained by the evolutionary theory, may be cited. At the end of his essay Orr remarks, "they're (= scientists are) alarmed because intelligent design is a junk science…..Intelligent design has come this far by faith.".

What weaknesses the supporters of ID see in the evolutionary theory?

Two main weaknesses are pointed out in the theory of evolution by the supporters of ID, viz., (i) gaps in fossil record, and (ii) that organs are too complex to have evolved by natural selection.

The first objection is raised by those, who are not well aware of the various limitations to fossil formation and to their study. Animals and plants with hard parts are much more likely to leave behind fossils than are thoroughly soft bodied organisms. Only those animals and plants are likely to fossilize, which on death fall into situations, which favour fossilization. There is an abundance of fossils in nature, but only a small percentage of them could be discovered and studied, as there are only a small number of trained excavators and palaeontologists amongst us. Anderson *et al.* (2004) have pointed out that a large number of well preserved insect fossils in amber are in private collections, and, therefore, are not available to taxonomists and experts of different insect groups for identification, adequate description, and bringing them to scientific record.

Manuscript 1485; Received 24 December 2005; Finally accepted 10 January 2006; Date of publication 21 February 2006

In spite of the above pointed limitations to discovery and study of fossils, several fairly complete sequences of evolutionary history could be recorded through fossils, and not even in a single case a fossil, discovered, has been found to be a "misfit" in a sequence, which is being worked out.

Moreover, evidence for the evolutionary theory does not come from fossils alone; it comes from several different areas of biology. In all cases comparative anatomy and comparative embryology could explain how the complexity of an organ has evolved.

Francis S. Collins, Director of the National Genome Project in USA, and the acknowledged head of the American Government's efforts to decipher the human genetic code, finds that, on comparing human genes with those of other mammals, worms and even bacteria, such basic similarities are seen as "are absolutely compelling" to accept the fact of evolution. He has said, "If Darwin had tried to imagine a way to prove his theory, he could not have come up with something better (than what the genome studies are revealing), except may be a time machine". He has further said, "asking somebody to reject all of that (= the evidence from the genome study) in order to prove that they really do love God - what a horrible choice" (Deanin, 2005).

My views

In my view science and religion represent two different attitudes of curious and searching human mind. "Science represents…. attitude of enquiry through analysis and classification of data, collected through observations and experiments. Observations are made using usual and normal senses, and inferences are reached through simple logic. Care and objectivity are expected, when deriving inferences and reaching results, so that the results are verifiable" (Verma & Saxena, 2000). Religion, on the other hand, is based primarily on faith, and may include, in some cases, use of intuition and a sixth sense. These two approaches should be taken as non-overlapping.

It should be recalled that neo-Darwinism does not include only what Darwin said in his theory; so much has been added to the basic theory of Darwin after him. The process of meiosis, the chromosome theory of inheritance, role of syngamy or fertilization in the production of genetic variability in a population, mutation have all been post-Darwinian additions to the theory of evolution. Ernst Mayr, often described as the Darwin of the 20th century, emphasized the role of isolation in evolution. The entire science of biology has been remoulded in the post-Darwinian period on the basic theme of evolution, and every part, thus moulded, is convincing and cogent.

There are certain phenomena in the living world, which are not explained very satisfactorily in terms of neo-Darwinism, as it stands today. A few such cases are: (i) appearance of epidermal callosities in an ostrich embryo in certain parts of its body, which are those parts on which the bird, after hatching, will face extra friction, and (ii) development of ant domatia (or ant lodgings) in myrmecophilous plants before arrival of ants. It has been suggested that such cases are due to changes acquired through responses to environmental needs, getting gradually absorbed into the genetic mechanism or the "Baldwin effect" (a mild version of Lamarckism!).

Simpson (1953) explains evolution of the so called "Baldwin effect" through the following three steps:
(1) Organisms react with the environment so as to produce behavioural, physiological or structural changes, which are not hereditary (somatic), and which show some advantages for survival, i.e., adaptative for the individuals.
(2) There happen mutations in genetic factors, such mutations, which produce hereditary characters similar to those mentioned above, having the same adaptive advantages.
(3) Mutant genetic factors, as mentioned under (2) are selected by the natural selection process, and show the tendency to spread among the population through the generations. The result is that those non-hereditary adaptations become hereditary.

To these three steps may be added one more step from Gavin de Beer's book, "Embryos and Ancestors", published some time in the 1960s. This author talks of embryonic inheritance, by which he means that a descendant inherits from its ancestor not only its adult features but also its embryonic stages or ontogeny. Thus, according to this theory, that stage, in which pharyngeal pouches or gill pouches develop in a land vertebrate embryo, does not correspond to the adult stage of the piscian ancestor but to that embryonic stage of the fish ancestor, in which gill pouches were being formed. This is due to embryonic inheritance. In course of evolution certain modifications get introduced into the inherited ontogeny. Subsequent disappearance or withdrawal of gill pouches in the land vertebrate embryo is due to such a modification. De beer has enlisted several types of modifications, introduced in the inherited ontogeny, giving examples. Among those types are retardation and acceleration, that is development of certain features may get delayed or hastened, again through natural selection. If we imagine in case of development of callosities in embryonic ostrich or of ant domatia, the role of acceleration in development of the feature in question, which has become a part of inheritance through the three Simpson's steps, the early appearance of these features in ontogeny may be explained. Similarly, retardation may explain degenerate eyes in cave forms. In human evolution retardation seems to have led to paedogenesis.

If this explanation appears tortuous or winding and not fully convincing, we should search for better explanations and make suitable and acceptable additions to neo-Darwinism, which already has taken shape through so much addition and supplementation to the basic theory of Darwin's natural selection. Working out and supplementation to the modern theory of evolution is a challenge to scientists, who should not succumb to the popular demand, and take to the 'atavistic' step to turn to Creationism.

An effort to offer a supplement to the evolutionary theory has

been made by Eva Jablonka and Marion J. Lamb in their book, "Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral and Symbolic Variation in History of Life" (reviewed by Pigliucci, 2005). In this book epigenetic factor has been explained thus: "…phenotypic modifications can precede genetic changes". How does it happen? The explanation offered: "Consider existence of 'hot spots' that make mutations in certain regions of the genome much more likely than others". Perhaps by 'hot spots' the reviewer means those parts of the genome in which mutations are readily induced in presence of certain environmental factors. An evidence, offered, in support of this notion: "….the impressive ability of some bacteria to increase the mutation rate of a specific gene involved in the metabolism of a given amino acid when the amino acid becomes scarce in the environment". Obviously, accumulation of more (and more convincing) evidence will make the epigenetic factor acceptable to evolutionists in general. The reviewer of the book makes it clear that the epigenetic view does not support Intelligent Design, and that it is intended to be an expansion of neo-Darwinism.

Another effort in this direction is from Kirschner and Gerhart (Charlesworth, 2005). They point out that a mutational adaptive change may be accompanied by correlated adaptive phenotypic changes, and this way origin of complex organs through random mutations may be explained. One supporting evidence: "…. a change in the shape of a bone …. induces corresponding changes in the placement of blood vessels, nerves etc.". But, as Charlesworth says, there is not enough support for this notion.

Richerson and Boyd (2005) have regarded cultural influences having a role in Darwinian selection. One example cited by them: automobile accident deaths of reproductive age adults are more frequent in technologically advanced countries than elsewhere. Hence survivors in traffic should leave behind more offspring, and Darwinian selection should favour shorter reaction time. But it seems that such cultural influences may result only in intrapopulation genetic fluctuations, which would not lead to any considerable evolutionary change or to extension of existing biodiversity. Some good examples of such changes have been described in Remmert (1980). In the example, mentioned above, it can be well imagined that, with introduction and proliferation of computer controlled cars, the process of selection may start in the reverse direction.

Religion is a biological necessity for the human species (Verma & Saxena, 2000), and, as has been pointed out by the human genome study leader Francis S. Collins, most scientists are believers in God. But vast majority of them take religion and science as non-overlapping and distinct areas.

In my opinion teaching of ID in science classes will hamper development of scientific temper and perception in the learners. As Bruce Alberts, a microbiologist and President of the National Academy of Sciences in USA, has put it, incorporation of ID in science curricula "is sort of saying that science should stop trying to find explanations for things" (Brumfiel, 2005).

Even if ID acceptance is spreading like a wild fire in some parts of the world, the curious and investigative human mind will continue to search for rational explanations.

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