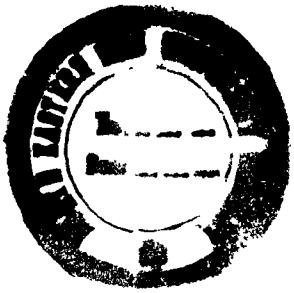
CREATION OR EVOLUTION
A CRITICAL APPRAISAL FROM THE PERSPECTIVE OF PHILOSOPHY OF RELIGION



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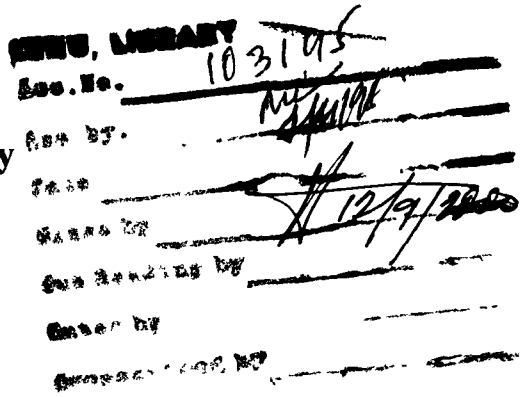

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DECLARATION

I, Mr. P.C. Biaksiama, hereby declare that the subject matter of the thesis is the record of work done by me, that the contents of this thesis did not form the basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/ Institute.

This is being submitted to the North-Eastern Hill University for the degree of Doctor of Philosophy in Philosophy.

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Finally, no words are adequate to express my love and gratitude to my wife and children. They have given me admirable support in patient understanding during the course of my research. Half way through this research, my wife and I had the misfortune in the death of our beloved daughter Lalawmpuii Pachuau at her tender age of only fifteen. Her untimely demise has made me view life never the same again. It is only the thought that she continues to live with the Lord, the Almighty Creator of heaven and earth, that steadied my spirits and sustained me in my work, inspite of the feeling of an unfathomable void. The present research work is lovingly dedicated to her memory.

November, 1997. **(P.C. Biaksiama)**

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER - 1

INTRODUCTION

CHAPTER - I

INTRODUCTION

Man is endowed with a natural curiosity about the origin and development of things around him. At a higher level of consciousness, he extends the curiosity to himself and his universe at large. This curiosity is the beginning of the enterprise of knowledge that effectively finds its expression in religion, philosophy and science. If it is systematically and methodically pursued, it can lead to mature religious, philosophical and scientific attitudes towards the world. The question of the origins assumes a philosophical importance, not as such, but in as much as the kind of answers available for us are treated as some kind of postulates for our ideologies in every other domain of human activity. Hence, it is imperative that we approach the problem of the origins with an open mind in order to achieve whatever objectivity, that can reasonably be obtained, and also a clear understanding of what is known, what is knowable and, above all, what is unknowable. It therefore becomes important that we understand the limitations inherent not only in the scientific and philosophical methods followed, but also the limits of objective transparency and the subjective capacities, lest our enterprise of knowledge end up as a pursuit of pseudo-philosophical problems. This is all the more important for the study of creation and evolution undertaken in this thesis.

The proposed dissertation, in studying creation and evolution, aims at illuminating, to a limited extent, the philosophical problems associated with the origins and development of things. Yet, far from being a study in cosmology or metaphysics, it envisages to carry out the study from the perspective of philosophy of religion. The rationale of the perspective must be stated clearly. Creation is generally treated as a religious doctrine purporting to answer the problem of the origins. The doctrine finds its expression, beginning with naive mythologies to sophisticated philosophical theories. The impulse is generally attributed to the will of a creator god, irrespective of the manner of creation. Evolution, on the other hand, is treated as a scientific theory, purporting to answer the same set of problems. The impulse is attributed to blind and mechanistic forces in nature. If the expla-

nations in creation are theological, in evolution, they are claimed to be scientific. As a student of philosophy, I must examine critically both the sets of claims.

I could do this meaningfully either in philosophy of science or in philosophy of religion. In the heydays of positivism, one would readily adopt the perspective of the former. Our contemporary philosophical scene, however, is no longer as sure of the problems of origin as were the early positivists. Gone are the days when scientific theories were presented as complete and irrefutable. Thanks to the philosophers of science, we are today better equipped to understand both the nature of scientific truth and the scope of progress in science. Gone too are the days, when scientific rationality was appealed to make science the panacea for human ills. Post-modern man is painfully aware of the impoverishment of human 'spirit' brought about by the neglect of primordial traditions both in religion and philosophy. He is increasingly speaking of various forms of creationism as alternative theories for evolutionism and uniformitarianism, that served as the two foundational pillars to many ideologies of modern secular cultures. Hence, my perspective of philosophy of religion for the study, I hope, is not without its own philosophical justification.

Yet, the scope of this study is clearly limited. I am not concerned here with the problems of origin in general, rather only with those of the living beings. Hence, I study the origin of life, species and man. I find the need to reiterate this point, because it is possible to study the theory of creation as a metaphysical theory of absolute beginnings of everything. If it is taken in this sense, it cannot be strictly contrasted with the theory of evolution. The latter does not claim to be a theory of absolute beginnings, but only a theory of beginnings of life, species of living beings and man himself at a certain point and out of a pre-existing matter. Yet, it has, in its wake, dealt a mortal blow to all forms of creationism. Hence, in as much as the beginnings of life-forms are sought to be explained, the two models of creationism and evolutionism are presented as alternative contenders to supply the required philosophical foundation for our idealogies and human institutions.

Evolutionism and creationism are today the two main contending theories for the explanation of the origin of all living things. The former explanation makes use of the naturalistic means to throw light not only on origins, but also many related issues. It attempts to explain the origin, development and

meaning of all things in terms of natural laws and processes which operate today as they had been in the past.[1] The latter, diametrically opposed to evolutionism, involves a process of special creation, which is (1) supernaturalistic; (2) externally directed; (3) purposive; and (4) completed.[2] The characteristic mark distinguishing the two explanations consist in this that evolution is purported to be scientific, whereas creation is more often regarded as religious, therefore, unscientific. The contending and alternative claim of the two theories is highlighted by the conjunction 'or' in the title of the thesis. My present study will critically examine the nature of the two theories. Is evolution so scientific as to exclude all elements of religion within it? Is creation so religious as to be totally rejected as unscientific? What are the philosophical justifications for, or weaknesses of, the respective theories? Can there be a theistic evolution? Can there be a scientific creation, in the sense of its being corroborated by scientific evidences? These are some of the questions that will engage my attention in the study undertaken.

In order that the scope and extent of this study be clearly understood, we need to define some of our terms, especially because some of them may be used in a number of senses. First of all, science is 'our attempt to observe, understand, and explain the operation of the universe and of the living things it contains. Since a scientific theory, by definition, must be testable by repeatable observation and must be capable of being 'falsified', if indeed it were false, it can only attempt 'to explain processes and events that are presently occurring repeatedly within our observations.'[3] I am aware, the above definition is only a tentative and working definition. As such, the theories of evolution and creation are to be judged from the above definition, if we are to investigate the conditions fulfilling the criteria of a theory to be scientific.'It is inherent in any definition of science that statements that cannot be checked by observation are not really about anything.... or at least they are not science.'[4] How do the theories of our present concern stand related to science?

If the theories of creation and evolution are seen as explanations for the origin of living things of earth, are they scientifically and philosophically adequate? The facts are that there were no human observers to the origin of life and species, man included, prior to his appearance on the earth. These '*original*' events must be unique historical events. We have no means of knowing if the events have occurred only once on the earth. If it has occurred elsewhere in the universe, too, cannot be said with certainty, with whatever evidences that can be adduced today. No one has ever seen anything

created from the non-living matter; much less the transformation of one simple species into another more complex, and often advanced form. The theory of evolution presumes that the radical change of matter into life occurred by chance, and likewise, through gradual developments, new species have evolved, man himself being an evolved product. The theory of creation, on the contrary, presumes that a supernatural creator God is the cause for the origin of everything in this universe, both living and non-living. Thus, creation and evolution are, in fact, far from being scientific, two theoretical constructs supposedly explicatory of things as they are found to exist in the nature. The constructs themselves should stand or fall in the face of circumstantial evidences that can be proffered for or against them respectively.

The common belief, as asserted by most evolutionists, that evolution is scientific whereas creation is nothing more than religious, is a facile generalization that stands in need of greater philosophical and scientific evidence than is generally given. In recent years, there is also a growing challenge from the creationists' camp that creation is, in fact, no less scientific than evolution, and that all the known facts of science paradoxically substantiate creation more than evolution. The claims of both the theories will have to be examined in the light of the definition given for science, philosophy merely exercising its function as a critique. It is quite possible that, when both the theories may be found wanting to fulfill the strict criteria of science, they may still correlate and explain the available data in nature relating to the origins from their own respective viewpoints, rather than pass for testable scientific theories. This may make creation not less scientific than evolution. More positively, creation may be scientific as evolution itself. If so, one can perhaps speak of a scientific creationism, even when one has rejected strictly theological creationism, such as the Biblical creationism.

As distinct from science, religion is a faith directed to an ultimate concern. This too is a tentative definition. Viewed as faith, it is a commitment to a person, or idea, or ideal, provided it demands one's allegiance with an ultimacy. In a wide sense, religion includes 'all that any person commits himself to basically or unreservedly.'[5] In the light of this definition, I may be permitted to employ the term 'religion' in this study to represent not only everything involving belief in God or gods, but also all that any person basically and unreservedly commits himself to, in theory, or practice. This would at once make the theory of evolution as religious as creation itself is. For the theory of evolution has provided an ideological base for a great

deal of modern secular societies and their civilizations. Truly, evolutionism, like creationism, has become a veritable 'religion' of the modern humanism and its various enterprises.

This is partly due to the fact that evolution came to represent the concept of progress, or amelioration in successive improvements. This notion, originally advocated in biology by Darwin, came to be enthusiastically applied to social, moral, political and even religious domains. This has made evolution not less religious than creation itself is. More positively, evolution is as religious as creation itself is, opening the doors at once for a theistic evolutionism, even if it compromises with the evidence of the scriptures in some of the religions. Therefore, one of the aims of the study undertaken is to understand and evaluate the nature of this new 'religion.' Once again, philosophy is pressed into service to bear upon this study with its critique. The critique is valid, despite the possible protests by the evolutionists that their theory has nothing to do with religion, or philosophy, for that matter, but is strictly scientific. Creationists, on the other had, admit without hesitation the religious nature of creationism, since it indisputably involves a belief in a Creator God. They tend to argue, with pursuasive force, that evolution is no less religious than creation. Conversely, they point out that creationism itself may be supported by scientific evidence.

İmplicit in the function, assigned to philosophy in the debate between creation and evolution, religion and science, is the definition of philosophy. "Philosophy is the critical examination of the meaning, truth and grounds of ideas, and of the methods by which the ideas are arrived at .... Philosophy is not a subject which has its own autonomous subject-matter..... It is rather an attempt to clarify and reflect critically on what is entailed in the truth-claims and methods of the discipline."[6] Any subject-matter is good enough for philosophy in as much as it has no subject-matter of its own, but philosophy is a critical reflection on the truth claims and methodologies of other disciplines. Because of my admitted penchant for primordial traditions, which religions eminently represent, and because this is motivated by the failure of evolutionism for being a meaningful basis for our pluri-form modern civilizations, I tend to make this study primarily an exercise in philosophy of religion.

The above discussion makes it clear that no theory on the origins can be devoid of scientific, religious and, above all, philosophical implications. Creation manifestly implies the existence of a creator, conceived as a person or

persons, an impersonal infinite force, an intelligence, a providence and such other supernatural characteristics that religions, as a matter of fact, have imputed to him. The scientists of the creationistic persuasion assume that the universe is the product of a design, a purpose and,therefore, a direct volitional and creative act of God. Thus, there may be creationists who subscribe to their creationism purely on the basis of their scriptural teachings. Yet, others may look for scientific evidences, which do not so much prove as corroborate their creationistic beliefs. The kind of creationism referred to in this study is scientific. Therefore, this study does not rely on Biblical revelation, rather it fully utilizes the scientific data to support and expound the creation model.

There have been a few studies purporting to study the one or the other aspects of scientific creationism.[7] It is may fond hope that, in adopting a philosophical approach, the debate between creationism and evolutionism will receive a better conceptual illumination. Along this line, creation science implicit here appeals to the scientific evidences for creation and inferences from these evidences that indicate (1) sudden creation of the universe, energy and life from nothing; (2) the insufficiency of mutation and natural selection in bringing about development of all living kinds from a single organism; (3) changes only within fixed limits or originally created kinds of plants and animals; (4) separate ancestry for man and apes; and (5) design in nature.[8] In doing this, creationism is seen to be in direct opposition with evolutionism, whose tenets of progressive amelioration, by way of purely blind and mechanistic forces, are called into question as scientifically and philosophically unwarranted.

Differences among creationists, however, do exist. This study does not claim to address itself to these differences. I follow the position taken by the mainline creationism. It is represented in recent years by a growing number of scientists from such diverse disciplines as Anthropology, Palaeontology, Palaeobotany, Zoology, Geology, Philosophy, Religion and others. The common stand taken by all creationists is that, even though creation cannot be scientifically proved, the observed scientific data fit into the creationist model just as well, or even better than into the evolutionary model, for the explanation of the problems in respect of the origin and development of everything, in particular, living beings. This thread of thought runs through every chapter of the thesis, even when the chapter is devoted to explicate one or the other aspect of the evolutionist model.[9]

Evolution, on the other hand, "is a non-theistic theory of origins which by definition excludes the intervention of an outside agency of any kind. Evolutionists believe that by employing natural laws and processes.... it is possible to explain the origin of the universe and all that it contains." [10] Its rejection of a creator God in explaining the origins goes along with the advocacy of purely natural and mechanical forces as the agents of origination and progressive transformations. It has all the appearance of a scientific theory. Yet, one of the visible features of the theory of evolution, both in popular and scientific literature, is the near dogmatic assertions by its proponents. The confidence exuded by one of the foremost evolutionists of the century, in such assertions as 'Life is a product of the evolution of inorganic nature, and man is a product of the evolution of life,'[11] is symptomatic of refusal to concede any other alternatives. Moreover, such refusal to entertain alternatives is all the more serious, when the evidences adduced are rather tenuous. This study will devote a considerable amount of discussion on critically evaluating the claims of the evolutionists, taking into consideration its merits as well as demerits. It will extend its scope from the rather crude forms of evolutionism found in Darwinism to its sophisticated forms, incorporating the new scientific discoveries in the area of molecular biology, especially genetics, under the name of *Neo-Darwinism*.

In my attempt towards a critical evaluation of the nature of a theory of evolution, I also intend to focus my attention on the underlying philosophy of evolutionism. There is a sense in the contention of the philosophers that statements about the origins are not purely factual. If evolution is said to be a fact, how are we to determine its nature? Obviously, it cannot be by way of empirical evidences. For the questions of the origins fall outside the purview of empirical sciences, since the process of the absolute origin of anything, of the transformation of matter into life, of the change of one species into another, of an ape-like primate into man is neither observed nor replicated to be repeatedly observable for any empirical test. If so, the problem of the very first origins is largely a priori. It serves as a mere postulate of our thinking. Whatever confidence it generates in our thinking is then achieved by 'faith'. It is a certainty of insight, not of sight.

In fact, every step we take in life, as it happens often, is a step of faith. Even the pragmatist, who insists he will live by what produces the best result, believes that his pragmatism is the best policy, and to that extent he goes by an *a priori* postulate. He too is complelled to believe in such abstractions as

the truth of a postulate. Thus, one cannot but believe in something; to do without it is impossible. All that we can expect however is that it should be a fairly reasonable faith. To assert that evolution has taken place in the unseen past, millions of years ago, involves a declaration of faith, - faith in a particular worldview, and therefore basically a belief which is 'religious' in nature. Hence, it should not surprise us, if evolutionists are also guided by a set of creeds which, though incapable of refutation, are claimed somehow to explain the origin of everything. Admission of the religious nature of evolution are not less forth-coming in our days:

> Our theory of evolution has become..... one which cannot be refuted by any possible observations. It is thus 'outside of empirical science,' but not necesarily false. No one can think of ways to test it..... [it] becomes part of an evolutionary dogma accepted by most of us as part of our training.[12]

Evolutionism as a creed, covers strictly speaking, not only living beings, but everything, in as much as it is a fundamental postulate for the study of the origins. Hence, Henry Morris was compelled to observe, 'a theory which incorporates everything really explains nothing! It is tautologous.'[13] Evolutionism then becomes a belief-system, a 'scientific religion', as it were. Belief in evolution is thus exactly parallel to belief in special creation - both are concepts which believers know to be true but neither upto the present, has been capable of proof."[14] All creeds, it may be noted, are dogmatic and authoritarian, even if not also peculiarly hierarchical in tone, as is evidenced from a typical comment given by a leading evolutionist:

> Evolution of the animal and plant world is considered by all those entitled to judgement to be a fact for which no further proof is needed.[15]

This could easily pass for the dogma of any religious body.

Hence, in the final analysis, the reasons for the popularity and influence evolution exerts among the intellectuals and the institutional set-up, are not so much scientific as dogmatic. This makes the need to evolve viable alternative explanations of origins imperative. It is interesting to reflect on the motive among scientists for adopting evolution. The theory of evolution is "universally accepted, not because it can be proved by logically coherent evidence to be true, but because the only alternative, special creation, is clearly incredible."[16] Hence, in our study undertaken here, we ought not to overlook

the anti-religious biases of the evolutionists, however paradoxically religious they themselves are in the process. Gish, who carried out an indepth study of such incoherence in the heart of evolutionism, thinks that the majority of the scientific community has succeeded in combining the evolutionary theory with a humanistic philosophy, and in clothing the whole complex with the term 'science'. This complex of a non-theistic religion with evolutionary philosophy, as its creed under the guise of 'science', is being taught in the text books. 'It has become our unofficial state-sanctioned religion.'[17] Therefore, a critical evaluation of the two alternative theories of origins, I believe, can be a good enough philosophical exercises. Besides, it also has an important value to the general system of education.

Having explained so far the nature and scope of the study undertaken, I may now briefly state the schema of the thesis. In chapter two, I clarify philosophically the two concepts of creation and evolution. Both the concepts can be traced back to systems of philosophies, religions and mythologies, long before they become grist to Darwin's mill. The problems of beginnings and development have arrested the best of human mind. If poets, philosophers and religious men have specially shown their wonderment at the origins, scientists have shown the same wonderment at progress or development. The attitude of wonderment is at the root of both the concepts, although the conceptual elaboration in respect of them has come about only steadily. While the culmination of the concept of creation finds itself in the Biblical concept of creation out of nothing, to serve as a postulate of much of western religions, the fuller growth of the concept of evolution finds itself in the publication of Darwin's *Origin of Species*, to serve as an equally formidable postulate of western sciences. The debates within creationism between philosophers and theologians have not been any less than those between philosophers and scientists within evolutionism. Philosophers at any rate have been in the eye of the intellectual storms, blowing from creationism and evolutionism from the beginning. If it is felt that my treatment of Darwinism in this thesis is longer than that of creationism, it is because of the tremendous impact the former has had on all our modern thinking. Yet, any work in philosophy of religion would devote a chapter on creation, while speaking of the Judeo-Christian concept of God, but not on evolution, which is the pillar of much of our modern thinking.

Chapter three deals with the crucial evidences for evolution, namely, the fossil records, vestigial organs in the higher forms of life and, above all, the

theory of the embryonic recapitulation. What is the philosophical worth of these evidences? The scientific evidence as such can be interpreted in any number of directions. Evolutionists have used them to substantiate their own theory. It is the task of the philosophers to evaluate if the evidence concerned qualifies itself to prove something; if it does not, can we say that it is disproved? Or, can we make use of the same evidence to fit into another model, either complimentary or even contradictory? It is precisely here that the alternative model of creationism can be examined to see if it can meaningfully throw light on the evidence of fossil records. Whichever model actually fits better with the facts may have a greater claim to be on the path to truth.

I am aware, I have to be judiciously selective in the evidences to be examined. My choice is dictated by the emphasis that evolutionists themselves vociferously give as the compelling evidences. The basic mechanisms, or processes through which evolutionary change from one species of living being to another is said to have occurred, are subject to evaluation. Natural selection, inheritance of acquired characteristics, hybridization, mutation and cloning are generally said to be the basis of evolution. Chapter four is devoted to an analysis of the mechanism of evolution. I have a strong hunch that often exaggerated claims are made in respect of these mechanisms. Darwin made the natural selection, along with the concept of the survival of the fittest, the bed-rock of his theory. So too, in *Neo-Darwinism*, mutation is often claimed to be the most conclusive evidence. My penchant has come to feed on the conceptual muddle that exists in the debates here. A critical evaluation is the need of the hour. Some recent hypothesis, like Goldsmith's 'Hopeful Monsters' or 'Punctuated Equilibrium', has introduced in the mechanisms concerned a great deal of fancy that religious mythologies would envy. Do some of these hypotheses need some sound 'exorcisms' at the hands of philosophers. Students of philosophy often fear to venture into these questions, because it often calls for a great deal of technicalities. The little that I do here may serve as an incentive to the scientists to sharpen their conceptual skills. Here, too, I want to see how the alternative to evolution becomes a genuine possibility, which perhaps is not sufficiently explored so far.

The most controversial part of the theory of evolution is perhaps the ape-man theory, according to which the descent of man is traced back to an ape-like primate(s). In subjecting this theory to a critical examination in chapter five, I may have to confront some of the findings, the interpretations and the methodologies of anthropologists. Yet, it is sorely required, because a great

deal of scholarship here is inspired, not necessarily from science as such, but by fanciful art. Invariably, anthropologists claim to have found the much sought-for 'missing link' between man and ape in the fragments of fossils. These fragments are then reconstructed into imaginary beings to fit into the procrustean bed of ape-man theory. They have received impressive names, *Australopithecus*, *Ramapithecus*, *Zinjanthropus* etc., to testify to the existence of ape-man; likewise, *Homo Erectus* under the names of *Java Man*, *Peking Man*, *Nebraska Man*, *Neanderthal Man*, to testify to the first beginnings of man as we know him today.

There are a number of philosophical issues bearing on a whole range of thought from methodology to interpretation to the contents of the fossils themselves. I am shocked at the slip-shod approach of a good bit of scholarship, here, that is sustained more by enthusiasm and fancifulness than by rigorous analysis and soundness of logic, to ensure a modicum of objectivity, demanded by scientific research. I want the students of philosophy to see clearly that not always our intellectual pursuits are strengthened by 'objectivity'. For, when the alleged fossil evidences are brought under scrutiny, the whole question of missing links in fact may take the back seat, but a great many philosophical problems may come to the fore of anthropological debates. This once again may bring the element of a 'mystery', when we are discussing the origins of man. The problem of the origin and nature of man seems to overshoot the boundaries of science, and place us in the heart of a mysterious creation.

This brings us to the threshold of a discussion, rather exclusively, to the alternative theory of creation. The sixth chapter examines the philosophical and the scientific evidences for creation. The philosophical evidence for creation may be sought from many quarters. However, I shall restrict myself to the argument from design: design requires a designer, and everything around us has a design and purpose in the divine scheme. My choice for the argument from design is dictated by the fact that scientific evidence is claimed to render the argument not only weak but also futile in recent times. Paley is said to be effectively replaced by Newton. I want to see in this chapter how compelling is the evidence from science to disprove design. Hence, I study the design argument, as it developed from the dawn of history upto the best-seller, *The Blind Watchmaker*, of our times.

Yet, I will not do it either generally or in a hackneyed fashion, but by way of showing how evolutionism has given rise to many philosophies without

the elements of supernaturalism. Scepticism in traditional belief systems was made possible by the failures of religions to meet the arguments of the sceptics on scientific grounds. Hence, I shall seek scientific evidences for design from the complex living organisms, the amazing genetic code, the chemical process of photosynthesis, the uniqueness of the planet earth as it is known to us, the marvellous functions of water, the incredible instinctual animal kingdom and the second law of thermodynamics. The philosophical issues associated with this complexity are many, if not also frightful, at times, not only to forms of life, but also to our human institutions. Some of the issues that I touch upon may make scientists, both positive and social, to rethink of the direction for their research. At any rate, it may be concluded that a directionless and chance-filled processes of matter and force cannot adequately explain the problems of the origin. Hence, the claims of evolution may have to be counterweighed with those of creation.

The concluding chapter will first summarize the results of my study in the foregoing chapters. But, more importantly, I shall point out in it the advantages of treating philosophically the twin theories of Creation and Evolution in contraposition. Surprisingly, they are the only two valid alternative theories of the origins. Since evolution is found to be as 'religious' as creation, even as creation is found to be as 'scientific' as evolution, we need to compare and contrast them to have our problems of origin better illumined. No theory in science should be allowed to freeze into a dogma, immune from the challenges of alternative theories. Both academic and religious freedom may be said to demand it. Therefore, the study may not be without a practical suggestion that the scientific evidences for both creationism and evolutionism must be placed before our students in our academic circles without any fear or favouritism. By implication, it may be suggested that the modern prejudice against creationism in favour of an one-sided treatment of evolutionism should cease. The harmony between science and religion may be elusive, but this study may be a small step in the direction towards truth, the object of scientific as well as religious pursuits. ❐

CHAPTER - 2

CONCEPTS OF CREATION AND EVOLUTION

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In this chapter, I intend to introduce and clarify the two concepts of creation and evolution. In doing this, I will try to show how these concepts have given rise to their respective theories. I shall explicate their background, their ancient roots, and their Scriptural foundation, if any. This will help me to focus my attention on their origin, their historical developments and, above all, their influence on today's philosophical and religious thinking. Special attention will be given to their true nature in order to drive home my contention that both creation and evolution qualify to be two parallel 'religious' belief systems.

The term 'creation' taken from the Latin root *creare*, literally means 'the bringing out of something into being'. Philosophically, it means 'fashioning of new forms out of an existent, or given material'. In this sense, it could be said that a potter is a 'creator' of the pot; that he forms a pot out of the material, say, clay. Understood in this general sense, creator is the 'maker', even as creation is the 'making activity' of the maker.

But, in the Judeo-Christian, as well as the Western philosophical context, creation is technically understood as the fashioning of new forms without any pre-existent material; it is a production ex nihilo. The *nihil* that is referred to, here, would include that of the creator's intrinsic subjectivity or of any extrinsic objectivity. Hence, creation would stand for the summoning of the universe into existence out of nothing. This conception of creation is presented dramatically and mythologically in the Genesis account in the Bible. Such a conception of creation entails two important corollaries, both of which are central to western religious consciousness. In the first place, it implies an absolute distinction between God as the creator and everything else as his creature. It is logically impossible to the creature to usurp the nature and status of the creator. In the Semitic tradition, it is clearly ruled out that the creature could ever lay claim to the power of God's creativity of summoning

anything into existence out of nothing. Secondly, the entire created order is absolutely dependent on God as its ultimate cause; it is also dependent on God for its continued existence and action.

Christian philosophers have tried to explicate the relation between the creator and the entire created order, generally, in terms of the Greeco-Roman conception of causation with all its metaphysical significance. One such significance has a direct bearing on the time when the creation may be said to have been effected. Yet another significance has a bearing on the manner of creation. Questions, such as, "Is creation in time? Is it from all eternity? Did creation take place with all its multiple forms at one go? Did it take place gradually ? ", have been asked every now and then in the philosophical debates. Our study on creation and evolution becomes specially pertinent in the context of the questions, debated continually in the western philosophical traditions.

Thus, Aquinas in the Medieval times did not see any contradiction in entertaining the idea of a creation from all eternity. While a creation could be entirely dependent on God, yet, it could be said to be without a beginning. Others, however, argued against the position, on the ground that it militates against the supposed Biblical view that creation has a beginning in time. Augustine, however, equally well known for his orthodox views, argued that creation did not take place in time, rather time itself is an aspect of the created world. In this understanding both space and time become internally infinite to the universe, perfectly consonant with the theory of relativity. Universe cannot be said to have an initial state; nevertheless, its existence and nature may be said to be dependent on the will of the creator. A religious doctrine of creation would hold on to the Biblical insight, irrespective of the time and manner of creation. This would make it natural to the rival theories of the origin in the modern scientific cosmology. The Genesis account then need not be read as a scientific, but as a mythological account, not, however, without a clear metaphysical import of the total dependence of everything created on the creator.

The Genesis account is said to be one of 'fiat creation', *fiat* literally means 'let it be!', embodying there by a divine commanding. It is a creation *ex nihilo*, as described in the first two chapters. What process God used is not described, but it may be supposed that the creator-God used processes, which are perhaps no longer operating anywhere in the universe. The reasons for such a supposition stems not only from the account, falling beyond a scientific

investigation, but also from the nature of God's fiat, to which no 'created-creative power' can lay claim to. No human observer was present at the time of creation; much less is the case that the origin of the cosmos be simulated in a scientist's laboratory. Since the universe is infinite in size and complexity, in the language of the cosmologists, attempts of finite man to speculate on its origin seem to be merely presumptuous. Hence, some religionists have recourse, in respect of knowing anything about the cosmic beginning, to divine revelation. Therefore, creationists believe that the universe is created by an Almighty God, and the knowledge of creation comes through God's special revelation in the holy Scriptures.

As distinct from creation, evolution suggests that all living things have arisen by a naturalistic, mechanistic and gradual process from a single living source, which itself arose by a similar process from an inanimate source.[1] It is believed that the theory makes for the inter-relatedness of all living things on earth. For example, man and ape are believed to have a shared common ancestor. The divergence from this common ancestor has been variously estimated to have occurred from five to thirty million years ago, depending upon the perspective of the evolutionists. Similar relationships are imagined throughout the animal and plant kingdoms, too. The supposed evolutionary relationships are called 'phylogeny'. Let me address myself to these two basic concepts of creation and evolution at some length.

CREATION

Primordial creation stories

It is noteworthy to observe that the creation stories are nearly universal among the people everywhere. I may briefly refer to only six of these stories from the ancient civilizations of Egypt, Babylon, Central America, China, Greece and Israel. A word of caution at the outset, however, needs to be added. The creation stories are neither historical nor scientific; they are mythological. Hence their value is not to be judged either as true or false. While the category of truth and falsity is extrinsic to them, their significance to human life cannot be underestimated. They are significant insofar as they stem from the collective or individual Unconscious to provide us with structures of meaning to the fundamental predicaments of human existence.

1. **Egyptian Creation Story** : The city of Heliopolis hands down

the story that Amen-Re came forth from the watery mass (Nun) by his own power. He then forms himself into the first divine couple, Shu and Tefnut, representing air and moisture, the one male and the other female. The couple mate to produce a new generation of gods, Geb (earth) and Nut (sky), earth's 'wife'. And so the process of life was set in motion.

2. **Babylonian Creation Story** : The most complete creation account from Babylon is usually called the Enuma Elish. The account begins with the two primeval gods, Apsu and Tiamat, who represent the fresh waters (male) and the marine waters (female). The two gods are compelled to fight a battle with their offsprings, headed by Marduk. The battle ends with the victory for Marduk. The corpse of the goddess Tiamat is cut into two, creating heaven from the one half and the earth from the other half.

3. **The Central American Creation Story** : The Mayan creation myth is part of an ancient epic, the *Popul Vuh*, the greatest surviving Mayan document. Recovered from the Mayan language, the story runs thus :

> In the beginning, only the sky above and the sea below existed in the eternal darkness, and they were calm and silent, for nothing existed that could move or make noise. The surface of the earth had yet to rise forth from the waters..... Hidden in the water under green and blue feathers were the Creators..... "Let creation begin!", the Creators exclaimed. "Let the void be filled ! Let the sea recede, revealing the surface of the earth! Earth, arise! Let it be done. And so they created it.....[2]

4. **Chinese Creation Story** : The ancient Chinese trace the creation of the universe to a cosmic egg with a chaotic mass within it. Complete darkness reigned in absence of the sun or the moon. From within this dark mass, the first being, Pangu, was formed who brought order into this chaotic universe. On breaking the world-egg open, the lighter part "Yang" rose and became the heavens, while the heavier part "Yin" sank and became the earth. Pangu raised the heaven high up in the sky and prevented it from crushing on earth by constantly pushing it up day in and day out with his hands. After setting the heavens right, Pangu was completely tired and fell asleep. He died in his sleep and his body gave shape and substance to the universe. Out of his body formed the mountains, while planets and stars formed out of his hairs and eyebrows. His left eye formed the sun while his right eye formed the moon. His flesh formed the soils of the earth and his blood, the oceans and rivers. His teeth and his bones formed the rocks, minerals and gems. His breath

formed the clouds and the wind, while his voice became lightning and thunder. His perspiration formed rain and the dew. The hair on his body formed trees, plants and flowers, while parasites living on his skin became animals and fishes.

The creation of mankind was effected by the Mother-Goddess Nugua. She herself was formed like a human being, except that instead of legs, she had the tail of a dragon. Not content with the creatures formed out of Pangu's body, Nugua wanted to create creatures who would be superior to all other living things. So she sat down on the shore of the Yellow River, and she took handfuls of wet clay from the river bed and formed them into little human beings. She breathed life into them. Some she impregnated with Yang, the masculine aggressive principle in nature, and they became men. Others she impregnated with Yin, the female submissive principle in nature, and they became men. Others she impregnated with Yin, the female submissive principle in nature, and they became women.

5. **Greek Creation Story** : The Greek cosmology also begins with an original emptiness or chaos. Out of this original emptiness, the first three immortal beings are said to emerge : Gaea (Mother Earth), Tartarus, who ruled the deepest, darkest region of the Underworld, and Eros (Love), whose great beauty inspired the creation of many of the deathless gods. Then Gaea, without any partner, gave birth to Uranus (Father Sky). She made him her equal so that he would surround her on all sides and would provide a home for the immortal beings. Gaea then married Uranus, and he ruled over all that came into being.

6. **The Genesis Account for Creation** : The account represents the ancient Hebrews' creation story. This story is at the root of western understanding of creationism, as distinct from evolutionism of the same intellectual culture. Since Creation studied in this dissertation refers to the fundamental tenets of the Hebrew account as represented in the *Genesis*, I will dwell upon this account at some length. Among the many creation stories from all over the world, the most well known, and possibly the most majestic account of creation, is to be found in the ancient Hebrew Scriptures, also called the *Bible*. What are its salient features? The *Genesis* records that in the beginning, the Almighty God created the heaven and the earth out of nothing. Closely following the narrative of the story, the major events in the order of creation took place vividly in a matter of six days. Moreover, God is said to have created

man in His own image, distinct from all other creatures.

As distinct from other creation stories, here, in the Biblical account, what stands out is the religious truth of the relationship between God and His universe, in general, and man, in particular. There is also the suggestion of the metaphysical truth of God's independence from the material universe. He is the active agent, who not only calls all things into being but also organizes and orders them. The creator is also the designer. The Genesis shows God as one, who plans and establishes a complex but stable universe; who makes moral and aesthetic value judgements about his creation, and actively involves himself in the final shaping of all things. The God, who is metaphysically distinct from the universe, paradoxically shows himself completely involved in its order and functions.[3] It may be concluded that the very idea of creation has its roots in the pre-scientific and pre-philosophic thinking of antiquity. Hence, the distinctive literary genre of 'myth' communicate a fundamental religious truth.

(a) **Scriptural Foundation of Creation** : Since creation is founded on the Biblical scriptures, what has been the hermeneutics here? "In the beginning, God created the heavens and the earth" (Genesis 1:1) serves as the opening verse of the Bible. The statement is the foundation of the doctrine of creation. Though there are a number of subsequent references to creation in the Bible, this opening verse has preeminently introduced God as the preexistent, who brought the whole cosmos into existence at 'time zero', captured in the phrase, 'in the beginning'. It implies that the universe had not existed forever in the past, but that it had a definite beginning. Time indeed is the essence of a beginning. It is impossible, it is suggested, for our time-bound minds to conceive of anything before time began. God is an eternal Being, one who had existed before the beginning of time. Needless to say, what a person believes about the origins, according to the Biblical revelation, will surely influence his belief about meanings and purposes in life.

Apart from the assumption of God's preexistence before creation, yet another assumption of the biblical revelation is that creation does not seem to be a continuing process, but a completed event in the past. The assumption pointedly runs counter to an evolutionary cosmogony, be it rooted in the Big Bang theory or the Steady State theory. The latter cosmogony states that the process, that existed at the beginning are still continuing, so that stars, galaxies, life etc. are continually being generated by evolutionary processes.

To the Bible, however, the creation is completed in the beginning, and the initial creative actions are no longer operative now.

Thus, creation is conceived as an instantaneous act, manifestly running counter to evolutionary processes of extremely long periods of time. If a reference is made to 'six days' in the account, it is not in the service of any evolutionary theory; the focus is not on the geological periods of time, but on the power of God's creative word to be assassinated by a human mind. There may be some Christian thinkers, who consider evolution as God's *method* of creation, suggesting thereby that the entire evolutionary cosmologic history is somehow equivalent to creation. The Bible, however, places its emphasis neither on the method nor on the time-scale of creation, but on the omnipotence of the creator that summons the world out of nothing into existence. Hence it is a creation understood in the sense of a production *ex nihilo*. This precludes the possibility of fashioning the world not of any preexisting materials, since, by definition, no such materials could be thought of as existing before creation of anything. This truth is beautifully captured in the following words :

> By the word of the LORD were the heavens made; and all the host of them by the breath of his mouth. He gathered the waters of the sea together as an heap: he layeth up the depth in storehouses. Let all the earth fear the LORD; let all the inhabitants of the world stand in awe of him. For he spake, and it was done; he commanded, and it stood fast.[4]

Henry Morris comments, "The biblical creationists' cosmology reveals that God is not a part of the cosmos, but antecedent and trancendent to it, that the creation was accomplished not by process but by fiat, that it was completed in the past, and that it was produced ex nihilo".[5]

The phrase, *ex nihilo* calls for some explanation in the Christian context. The *nihil* means that there is nothing of any kind out of which God fashions the universe. There is neither the uncreated matter nor a 'chaos', as something, which God works upon to produce the cosmos. "The belief that there is an independently existing substance out of which God made the world is known as *dualism* since it posits two eternal beings."[6] The dualistic position that posits the existence of two co-eval principles is clearly rejected. There are some who tend to believe that, if nothing existed before creation but God, God may be said to create the universe out of himself. This is done usually by invoking the principle, "Nothing can come from nothing'. Some systems of Indian thought relate God to the universe in a pantheistic manner : God is all

that exists; or the universe itself is identical with God. Some scholars point out that pantheism implies that God is as much dependent on the universe as the universe is on him, in so far as God and the universe represent the causal and effected states of the same substance. Biblical idea of creation precludes such pantheistic ideas as well.

In the Biblical parlance, a clear distinction is made between God and the universe, between the creator and the creatures. The world is not a part of the divine nature. Although God is the sole source of the world, the latter is unmistakably different from him. The existence of evil, imperfection and degeneration in created things suggest that God is totally independent of the world. A doctrine of Biblical creation must avoid the ideas of pantheistically identifying the world with God, and of supposing the world to exist deistically independent of God. While pantheism makes everything god, deism asserts that, though God originally created the world, he now allows it to continue on its own and that God does not intervene with the process of nature. Creationism, therefore, has nothing to do either with pantheism or deism. Speaking ontologically, the dependence is one-sided, viz; of the creation on the creator, not *vice versa*. Speaking religiously, however, Bible teaches that God upholds the universe even after its creation.

(b) **Creation and Time** : An inseparable concept from that of creation is time. It raises many philosophical problems both at the theoretical and practical level. Both philosophers and theoretical physicists have applied themselves to the analysis of time. It is sufficient for my purpose here to observe that it is the concept of time that makes us understand things and events successively. The sense of a relation between the antecedent and the consequent is time. We can say that creation introduces time. This also implies that God, the creator, should be 'outside time', in the sense that he is not subject to the limitation of knowing things and events one after the other in their occurrence. This is what is captured by religious philosophers in stating that God is eternal. Creation is perceived as a past event, and the preservation of the universe as a continuing process, by the Biblical creationists. Marshall rightly points out,

> What the doctrine of creation asserts is that the world of space and time depends completely on the *eternal* God, who is *beyond time* (who) enters into relation with the temporal order by creating it..... Creation is not merely an act at the

beginning of time but a relation of dependence between God and the world at all times [7]

Time becomes meaningless apart from things and events. Augustine, who had dealt in his works on creation, says, 'God did not create the universe in time, but that he created time with the universe.'[8] This, in fact, implies that there was no time before creation.

(c) **Doctrine of Creation in the History of Dogmatics** : Cutting across the cultures of the world, we have seen how the creation stories, in particular, of Greece and India, sought the explanation of the world in a dualism, which involves the eternity of matter; or in an emanationism, which makes the world an outward manifestation of God. But the explanation, upheld by the vast majority of the Christians, is the *Biblical Creationism*. This doctrine is one of the pillars of the Biblical Christianity in the history of the Christian dogmatics.

The Christian church from the very beginning taught the doctrine of creation *ex nihilo* as a free act of God. This was both religiously accepted and philosophically elaborated by the patristic thinkers, among whom are Justin the Martyr, Ireneus, Tertullian, Clement of Alexandria and Origen. The *Genesis* account of the six-day creation was taken in a literal sense by some, though Clement and Origen thought of creation as having been accomplished in a single indivisible moment. They interpret the description of creation in six days merely as a literary device to ascribe the origin of things to a logical order that appeared to them rational. Hence, Augustine found it difficult to elaborate on the nature of the Biblical days in the *Genesis*. He is inclined to think that God created all things in a moment; he believes that the concept of days was merely introduced to aid the finite intelligence. Yet, the idea of an eternal creation sought to be taught by Origen was commonly rejected, though it did not disappear altogether.

During the Middle Ages, the Scholastics debated a great deal about the possibility of an eternal creation. While Thomas Aquinas, Duns Scotus, Durandus and Biel did not find any logical contradiction in it, others like Alexander of Hales, Bonaventure, Albert the Great, Henry of Ghent, indeed, the great majority of the Scholastics, denied it. So, the doctrine of creation in time came to be gradually accepted, specially with the Reformers in the

sixteenth century.

The Reformers held firmly to the doctrine of creation out of nothing by a free act of God in time. This made them regard the days of creation as six literal days. This position was largely maintained in the post-Reformation period as well. However, since the eighteenth century, under the influence of rationalism and materialism, the positivists started launching an attack on the traditional doctrine of creation. With the advent of Darwinism in the nineteenth century, in particular, the idea of evolution gained a rapid ascendancy in direct opposition to a fiat creation. With it, the origin of the world was pushed back millions of years into an unknown past. As the idea of evolution gained respectability amongst scientists, theologians did not lag behind. They soon engaged in various attempts to harmonize the doctrine of creation with that of evolution without abandoning the concept of the six creation days, as the days could be interpreted as geological periods of time. This gave rise to what may be treated as the Scientific Creationism. This is primarily a doctrine of creation, but it relies mainly on scientific data. Whereas Biblical creationism relies on the Biblical revelation for its evidence, scientific creationism relies on the scientific data to support and expound creationism of the Bible.

Scientific Creationism upholds, first of all, that the universe was supernaturally created by a transcendent and personal God at a specific point in the past. Secondly, life on earth did not develop by natural processes from inanimate systems, but was specially created by the Creator. Therefore, all major kinds of plants and animals may be treated as created functionally complete from the beginning; they did not evolve from some other kinds of organisms. Changes in basic kinds, since their first creation, are limited. They admit horizontal variation, that is, within the kinds, or downward and degenerative changes with harmful mutations. Thirdly, human beings, in particular, it is stated, did not evolve from an animal ancestry, but were specially created in fully human form from the beginning. It is believed that only this way it is possible to uphold the spiritual nature of man. His sense of self, moral consciousness, abstract reasoning, language, will, religious nature etc. are supernaturally created.

Fourthly, such a view would treat earth's prehistory, as preserved in rocks and fossil deposits, as primarily a record of catastrophic intensities of natural processes. Thus, it is suggested that the universe and life were cre-

ated perfect for their purposes from the beginning. They may have somehow been impaired so that imperfections in structure, disease, aging, extinctions in such phenomena are seen as the result of negative changes in properties. Teleological considerations, therefore, may not be ignored in scientific studies, whenever they are consistent with the actual data of observation. It is reasonable to assume that the creation presently awaits the consummation of the creator's purpose as presupposed by the Christian world view. All this finally makes for the recognition that, although man is finite and scientific data concerning the origins are always circumstantial and incomplete, the human mind, if open to the possibility of creation, is able to explore something of the manifestation of the creator rationally and scientifically; likewise to reach an intelligent decision regarding one's place in the creator's plan. If it is now contended that all the genuine and empirical facts of science support the scientific creationism, the contention must be evaluated for its philosophical worth.

EVOLUTION

The other concept, making for the alternative theory for explicating the universe, is evolution. Evolution has been the most potent single factor to undermine the age-old popular belief in the existence of God and his creation. The theory is so pervasive to the thinking and the philosophy of modern man, inasmuch as creation is considered by religious people as synonymous with the origin of the world, that the great majority of secular scientists and the educated class of people from all walks of life regard evolution as an unquestionable dogma towards the scientific explanation for the origin of the universe. The theory of evolution, closely associated with Darwin, as laid down in his *Origin of Species*, however, has had its ancient roots. These may first be considered, before we lay bare the underlying reasons for the unprecedented success and influence it enjoys.

Ancient Roots of Evolution

Evolution was not an altogether new concept invented by the modern scientific thinking. Its roots go deep in the ancient religious beliefs. The modern form of the theory of evolution is supposedly only a relic of the 'ancient rebellion of men against their creator.'[9] History shows that evolution, not exactly after the modern evolutionism, was taught several centuries before

Christ. The ancient Egyptians, the Sumerians, the Chinese, the Hindus, and the Greeks believed it in some form or the other. Thus, the old Egyptian myth narrated that all things evolved from a 'mundane egg.' Other variants of their belief was that the earth had hatched out from a 'winged egg', which flew around in space until the process of mitosis was completed, and the earth emerged from that flying void.[10] Likewise, some of the great ancient Greek philosophers had developed their evolutionary cosmologies.

Thales of Miletus (654-546 B.C) held the view that water was the first cause, and from it, the plants evolved; then animals. The evolution was always from simple to complex forms. Anaximander of Ionia (611-547 B.C.) believed that there had been a primordial mass which gave off shapes of matter. These, in turn, evolved into plants, and the plants into animals. Anaximenes, (6th century B.C.) a pupil of Anaximander taught that the 'primordial mass' was the 'all generating air'. He thought that, because air expanded and contracted, it was animate, and that it served as the immediate stuff of all evolutionary forms. Empedocles (490-430 B.C.) expanded this theory to four basic elements, viz. earth, fire, water and air. These are said to form masses underground, which were cast out on the ground in lumps; these were drawn together to form bodies. Chance alone was the guiding principle in this process. Plato (427-347 B.C.), as if to substantiate his theory of the 'spirituality' of pure forms, held that living forms were degenerate. This explains his bias that woman is a degenerate man, even as fish too is a degenerate form of its original form that could no longer breathe pure air. Finally, Aristotle (384-322 B.C.) believed in a 'purposive force' that created a primordial mass of living matter from which all forms of life evolved.

The elements of Greek philosophical ideas on evolutionism made their entry into western thinking through the Arab philosophers, who spoke of an evolution of the universe from atoms and germs. A theory of evolution was to move gradually along this line from the Medieval philosophy to Modern philosophy, with Gregory of Nyssa (331-396 A.D.) and Francisco Saurez. Similar theories were advocated by Professor Pierre Gassendi in 1640 A.D., De Maillet in 1748, Count de Buffon in 1780, Lord Monboddo in 1778, Erasmus Darwin in 1785, the French Zoologist Jean Baptiste de Lamarck in 1809, William Herbert in 1813, the German scientist Hugo Von Mohl and Max Schultze in 1852, and last of all, Charles Darwin in 1859.

It is, therefore, noteworthy to mention that the theory of evolution, no

less than that of creation has its roots from the pre-scientific and primeval thinking. Both are deeply rooted in the philosophies of 'primitive' man of remote antiquity. We cannot, however, ignore the fact that a scientific evolutionism is a gradual development.

Early Evolutionists

Ever since ancient thinkers had asked the questions of the origins, the idea of evolution had found favour among not a few leading thinkers, who expressed them with varying degrees of scientific evidence. Even among the Church Fathers, St. Augustine (354-430 A.D.) interpreted the Biblical account of creation as symbolic rather than literal, and admitted the possibility of the organism, created at the beginning, to have evolved since.[11] Among the early evolutionists before Darwin, the theory was advocated by some French philosophers like Montesquieu in 1721. He wrote,

> This would seem to corroborate my feeling that the differences between animal species can daily increase and similarly decrease; in the beginning, there were very few species and they have multiplied since.[12]

The acceptance of the possibility, that some species might change into other species, was the kernel of the concept of *transformisme*, later translated as 'evolution'.

Studies of abnormal, or monstrous births and transformation of striking hereditary traits, especially polydactyly, led the French Mathematician, Pierre-Louis de Maupertuis in 1751 to envisage the multiplication of species as being due to fortuitous recombinations of elementary particles of organisms, that could lead to offspring deviating from its ancestral forms. This was not only an acceptance of evolution but also a crude attempt to explain it. The French philosopher Denis Diderot in 1753 thought that there was one primeval animal to start with, the prototype of all others, while nature only lengthened, shortened, transformed, multiplied, or obliterated some of its organs. George Buffon, one of the leading naturalists of the 18th century, raised a question of the relation of the ass to the horse with which it can breed. He asked if these two species might not have been descended from a common ancestor. The question of common ancestry is indeed a significant question. He went on to consider the possibility that all animals, including ape and man, could be regarded as related in virtue of a common ancestry.

Erasmus Darwin, the grandfather of Charles Darwin, by 1794 had concluded, on the basis of changes undergone by animals during development (e.g. chrysalis into moth, tadpole into frogs), that the presence of vestigial organs, monstrous births and resemblances in comparative anatomy proved that evolution had occurred.

The most well-known proponent of evolution before Darwin was Jean Baptiste de Lamarck, the French naturalist, who expounded the theory of evolution in his *Philosophy of Zoology* (1809). Lamarck was the first to draw up an evolutionary tree, from unicellular organisms to man in a rudimentary fashion, with branches indicating community of ancestry between different species. To explain evolution, Lamarck counted on the supposed tendency of an organism to complexity and perfection, which meant that complex organisms must have arisen recently by 'spontaneous generation'. The supposition of an imagined *sentiment* interieur, which supposedly caused movements and introduced habits in the organism to produce new organs and thus to satisfy animal's needs, was to remain a mere unfounded speculation without any evidence. Nonetheless, there is one notable theory in which Lamarck's name has since been associated : the supposed heritable effects of use and disuse of organs, popularly known as the 'inheritance of acquired characteristics'.

The man who opposed Lamarck's theory was George Cuvier, yet another great French Naturalist but a still greater Palaeontologist. He had an astounding knowledge of fossils, although he knew of no fossil forms that suggested evolutionary evidence yet. Even the 5000 year old mummified animals found by Napoleon's expedition in Egyptian pyramids were found to be identical with the existing forms. Cuvier's opposition to evolution contributed paradoxically to sow the seeds of its later success. He believed that there had been several catastrophes of flood, of which the Genesis narrative was the most recent. Belief in the universal flood, as recorded in the Bible, however had already declined. Coming as it did, Cuvier's suggestion at such critical times eventually helped Darwin's view to gain ascendence.

The groundwork for the success of Darwin's evolutionary theory was laid by James Hutton (1726-1797), called by some as 'the Father of Geology', who in 1795 propounded the theory of *Uniformitarianism*.[13] This is the theory that geological process have always been as they are now, and that the present earth-form was not shaped by major catastrophes such as a worldwise

flood. Sir Charles Lyell, a very competent Geologist, took up Hutton's ideas and enlarged upon them in his *Principles of Geology* (3 Vols.) published in 1830-33. In 1844, yet again, an anonymous book, *The Vestiges of the Natural History of Creation*, extended the idea of evolution from Geology to the whole of animal kingdom, discarding the belief in the special act of creation. By the middle of the nineteenth century, Lyellian Uniformitarianism had triumphed over Cuverian Catastrophism, and the way was smoothly prepared for the Darwinian evolution.[14] Since evolutionism today is greatly linked with the name of Darwin, I shall dwell on him at some length.

After an initial stint with medicine and theology, Darwin turned to be a naturalist under the influence of J.S. Henslow, a distinguished botanist of the day. In 1831, the Admiralty asked for a naturalist to accompany the captain Robert Fitzroy of the Royal Navy on a voyage in *HMS Beagle* to survey the coasts of South America and some Pacific islands, and to establish a chain of chronometrical stations around the world. Darwin fitted into the slot for five years. His observations and numerous collections of data on the natural world during the long voyage, coupled with his indefatigable curiosities, furnished him with the basic materials for his theory of evolution. Thus, the stray ideas of evolutionism prevalent in the historical past congealed in the hands of Darwin into the triumphal culmination of evolutionism in direct opposition to all religious theories of creationism.

The Origin of Species

After an initial hesitation, Darwin, prompted by his friend A.R. Wallace, finally published his *Origin of Species by Means of Natural Selection* on November 24, 1859. The book was known not so much for new truths as for stating the old truths with much supporting evidence. It is the force of evidence that ignited a furious debate both in scientific and religious circles. Harvard's great zoologist systematist, Ernst Mayr, acclaimed Darwin's work as 'perhaps the most fundamental of all intellectual revolutions in the history of mankind'.[15] While the *Origin* gave rise to much debate, it would be wrong to suggest that it also commanded widespread agreement. The reactions ranged from agreement to mild disagreement to outright condemnation. A great deal of the responsibility for the *Origin's* success must be attributed to the well-known evolutionist-scientist, Thomas Henry Huxley.[16] Darwin's own agnosticism came into the open. In 1871 he published *The Descent of Man*, advocating the evolution of man from apes. This sought to give all scientific

respectability to the *Origin*. A quick survey of the *Origin* may be of some importance.

The first two chapters deal with the variations in domestic animals and plants, especially pigeons; and with the process of artificial selection, employed by breeders on such variants, and also with similar varieties observed as occurring in nature. Chapter 3 discusses the assumed 'struggle for existence' in nature, in which the favourable varieties would be preserved at the cost of the unfavourable ones. The central theme of book, 'natural selection or survival of the fittest', is dealt in chapter 4. The fifth chapter, 'Laws of Variation', proposes sexual selection and acquired characteristics as the two likely explanations for many cases of variation. Chapters 6 and 7 discuss difficulties in the theory of evolution, natural selection and the speculations as to why there are no transitional species, if all species have descended from a common ancestor. Chapter 8 deals with instincts, where he admits his ignorance of the origin of the remarkable instinctive behavior in animals. His treatment of hybrids and hybrid sterility in chapter 9 relates essentially to problems in 'microevolution'. Chapters 10 and 11 deal with the imperfections of the geological record, acknowledging the ubiquitous absence of transitional fossils. But he tries to solve this problem by stressing the incompleteness of geological record; he hopes that the missing link would eventually be found. Chapters 12 and 13 deal with the evidence from geographical distribution, stressing the related varieties and species that are found in now-separated geographical regions. Chapter 14 deals with assumed evidence of evolution like classification, comparative morphology, embryology and vestigial organs. The last chapter is a recapitulation of the arguments for evolution and natural selection with some philosophical and religious defence.

Neo-Darwinism

Following the publication of the *Origin of Species*, and later, of the *Descent of Man*, the theory of evolution witnessed unprecedented popularity. Supportive explanations were developed, whenever it was found necessary to encounter the difficulties biologists subsequently faced. These have given rise to Neo-Darwinism. The basic difficulty was the lack of understanding of the source of hereditary variation on which Darwinian natural selection depended. The Dutch biologist, Hugo de Vries, gave us his Mutation Theory (1901). In it, he sought to explain how new species evolved by mutation, though this contrasted with the Darwinism selection. De Vries believed that, though

mutations are almost always harmful, occasionally favourable ones, the kind of which appeared in the laboratory experiments with primrose, could account for evolution. For example, in the case of giraffes, mutants appeared to contribute towards their better survival than those of the short-necked ones. The mutant giraffes produced offsprings with long necks, supposedly accounting for this bit of evolution. This discovery was considered a major step in evolution. Thus, Darwin's theory of evolution based on natural selection and De Vries' theory of mutation together have been combined to form the modern theory of evolution. Since it includes a substantial part of Darwin's belief in natural selection, it is often referred to as 'Neo-Darwinism'.

Pervasiveness of Evolution in Modern Thought

Some may regard evolution as a mere biological theory with no serious consequence to their lives. But they may not have had an idea of its tremendous importance as an underlying philosophy of much of our modern thinking. The theory seems to dominate the modern thought, both theoretically and practically. In fact, it has already transformed into a veritable world view. Sir Julian Huxley, one of the leading evolutionists of the 20th century observes its paradigmatic power :

> The concept of evolution was soon extended into other than biological fields. Inorganic objects such as the life-history of stars and formation of the chemical elements on the one hand , and on the other hand, subjects like linguistic, social anthropology, and comparative law and religion began to be studied from an evolutionary angle, until today we are enabled to see evolution as a universal and all-pervading process.[17]

Theodosius Dobzhansky, a geneticist, believed that evolution comprised all the stages of development of the universe, the cosmic, biological and the cultural.[18] Ernst Mayr, the Harvard evolutionist, corroborated that the long history of the universe was thoroughly programmed on an evolutionary scale.[19] Thus was born the 'dogma' of Darwin, as viewed by Rene Dubos:

> Most enlightened persons now accept as a fact that everything in the cosmos - from heavenly bodies to human beings has developed and continues to develop through evolutionary processes. The great religions of the West have come to accept a historical view of creation. Evolutionary concepts are applied also to social institutions and to the arts. Indeed, most political parties as well as schools of theology, sociology, history or arts teach these concepts and make them the basis of their doctrines.[20]

Evolutionism has thus grown into a new religion and philosophy of the modern man. Pierre Teilhard de Chardin, the French Roman Catholic theologian, was unequivocal in his praise: "Evolution is a light which illuminates all facts, a trajectory which all lines of thought must follow."[21] Thus, today, the vast majority of those who influence the thinking of other people, without excluding religious thinkers, accept evolution as a fact. The initial opposition of the clergy and the churches has largely petered out. The latest in the proclamation is the one that has come to us through the Roman Catholic Pontiff, who remarkably blends evolution and creation to give us a 'Theistic Evolution'.

Reasons for the Pervasiveness of Evolution

We may now take note of some of the reasons for this pervasiveness of evolution. It in fact needs a closer analysis.

1. **Conflict of Science with Religion** : Till the early part of the nineteenth century, religion and science enjoyed a fairly amicable relationship. Just two years before the publication of the *Origin of Species*, the Harvard biologist, Louis Agassiz, taught that the purpose of natural history was the analysis of 'the thought of the creator of the universe'. In this spirit, discoveries of science were often perceived as evidence for a grand creator. A subtle rift, however, was developing gradually between religion and science.[22] The conflict broke out in the first half of the 19th century over Geology, resulting in the virtual triumph of Uniformitarianism over Catastrophism. The triumph meant the complete abandonment of the idea that a catastrophe(s), like the *Genesis* Flood, had ever happened. The processes in operation at present, such as river erosion and weathering, are quite adequate to explain the state of the earth. The various rock strata have been laid down over long periods of time, with the oldest levels at the bottom. This meant that earth is millions of years older than what the Christians had come to believe on the basis of a Biblical chronology. It appeared, there was no way of a reconciliation between science and religion.

2. **Industrial Revolution and Belief in Science**. The Origin of Species came at an opportune time for those, who stood at the threshold of the Industrial Revolution. A belief in science was soon to take hold of human intellect for years to come. A romance, as it were, was blossoming between man and science. Industrialism, the fruit of the application of science to the

practical problems of life, was shattering the relics of the old feudal and agricultural systems in Europe. Science showered man with innovative gifts, - the telescope, the microscope, steam-engine and later, electricity, telephone and the automobile. Technology had already put the power of science in the hands of man. Little wonder then that the common man felt himself to be the shaper of his destiny. In contrast, religion was perceived as a road block to progress. Some even felt that it held people in a stupor, unable to keep up with the rapid advances of science. Richard Dawkins wrote, 'Darwin made it possible to be an intellectually fulfilled atheist'.[23] Science was becoming mankind's new hope of salvation.

3. **Indoctrination**. One of the underlying reasons for the universal acceptance of the theory of evolution is the manner of its presentation as the unquestioned scientific fact. Students are often taught evolution in schools and colleges as if it were 'the fact'. Textbooks nearly always promote the evolutionary viewpoint without exposing the students to opposite viewpoints. In fact, arguments against evolution are usually prevented from appearing in the textbooks almost everywhere. Moreover, the student is not presented with evolution as a theory, but as a reality. If a student were to hold views opposed to evolution, he is subjected to ridicule, and often risks the academic respectability. This prejudice has goaded some to launch upon a 'creation movement' in the West, especially in USA, with the pendulum swinging now in the opposite direction. The casualty seems to be a dispassionate study of the matter philosophically. I shall come back to this issue in my concluding chapter.

The uncritical acceptance of evolution is sometimes imposed on the ignorant and ill informed by the leading educators and scientists. The weight of authority, that is brought to bear on behalf of evolution, is yet another reason for its acceptance by a large number of people. The dubious method of imparting science is deplored by a British teacher of science, not a creationist necessarily anyhow :

> For some time, it has seemed to me that our current method of teaching Darwinism are suspiciously similar to indoctrination.[24]

This caution seems almost warranted against the absolute certainly, displayed by Richard Dawkins and of his ilk: "Darwin's theory is now supported by all the available relevant evidence and its truth is not doubted

by any serious modern biologist".[25] This kind of sweeping statements seems to be the typical attempts to stall even the semblance of any opposition. It is not unlikely that a great many professionals have unwittingly fallen in line behind those who promote evolution 'for fear of not being declared serious scholars or of being rejected from serious academic circles'.[26] It is rightly commented, 'You either believe the concept or you will inevitably be branded as a heretic'.[27]

4. **Failure of the Christian Church**. The popularity enjoyed by Darwinism was partly due to the dismal failure of the Christian church to put up an effective and scientific challenge. The truth is that the church initially was ill-equipped to oppose it. When however it did challenge, it was in a very old-fashioned manner solely for safeguarding the Biblical foundation of faith. The general tendency of the churches everywhere was to be conservative, both in thought and politics, which made them out of tune with the new thinking outside.

The response from the Christian churches was divided. One group welcomed the new idea in such a way as to reconcile the Bible with evolution by trying to fit the Genesis record of creation, or the order of creation, according to the theory of evolution. This is the Theistic Evolution of the liberal Christians. This stand only diluted the Bible's credibility and paved the way for a widespread scepticism in the Bible. Another group of Christians opposed Darwinism as the Conservatives. Besides not understanding much of Darwinism, it also failed to appreciate the Genesis record of the 'kind', which it regarded as the same as Darwin's 'species'. With this mistaken notion, it insisted that species could not change. The conservatives did not realize that they were fighting for a tradition rather than what the Bible actually says. They could not come out with either a better scientific or a Biblical explanation of the new ideas; they merely clung to a conservative tradition in religion, viewing all innovations with suspicion. So, this rigid conservatism fostered an obscurantism in thought, both religious and political. The famous 'Creation/Evolution Debate of 1860' between the Bishop of Oxford, Samuel Wilberforce, and the chief proponent of Darwinism, Thomas Henry Huxley, had signalled the growing controversy which ended tamely in a 'truce between religion and science'. The debate of attribution ended in a draw, as Charles Raven of Cambridge University observed, 'each keeping to its own field.... but with exaggerated claims of science to provide an explanation of the world, in which no place would be left for religion'.[28]

Thus, the theory of evolution was introduced, not only at an opportune moment that sounded a death-knell of religion in favour of science, but also at a time when Christianity was least prepared intellectually to offer any viable alternative. So the theory has remained without any serious and systematic challenge for over a hundred years.

5. **Support from Modern Disciplines**. Unlike creation, evolution has received the support of many new disciplines. This has significantly contributed to its being universally accepted as a fact, not only in all natural sciences but also in great many social sciences. I shall cite a single example here that indicates the direction of the support. Psychology's field of study and application is greatly saturated with evolutionary thinking. Under the impact of evolutionary ideas, psychologists have come to assume that man is merely an evolved animal and, therefore, to be evaluated in his behavioral problems on an animalistic basis. The leading modern psychologists tend to regard Biblical Christianity with such of its doctrines as Creationism as a form of mental disorder. In fact, adherence to any form of religion is considered by many evolutionists to be an unhealthy vestige of the fear of the unknown in human consciousness in the process of the evolution of human societies.[29] Reiterating this spirit, a clinical psychiatrist writes:

> I want you to entertain the hypothesis that Christian doctrine, the existential soother par excellence, is incompatible with the principles of sound mental health and contributes more to the genesis of human suffering than its allevia tion.... In my view, all religions are inhuman anachronisms...[30]

Thus, the prevalence of evolutionism has been so endemic in academic circle that even the liberal Christian institutions are not entirely free from it. Increasing proportions of seminary and theological students, committed as they are to evolution, reinterpret the Bible and Theology to fit it. Departments of Philosophy and Religion in universities have largely become humanistic, if not also either atheistic or agnostic. Such is its pervasiness that 'Evolutionary theory has been enshrined as the centerpiece of our educational system, and elaborate walls have been erected around it to protect it from unnecessary abuse', as it were.

To sum up, creation and evolution are two philosophical concepts meant to achieve the same goal of explicating the origin of everything of the world that we live in. Creation is a theory of divine causation with a scope for

a creator in an explanatory scheme. Evolution is also a theory of the developmental causation of all that is, if not strictly of their origin. Both have their antecedents and developmental stages. Both have served as significant explanatory hypotheses in an intellectual query. They would appear to me to be two parallel belief systems, with more or less evidence, depending on the worldview adopted by us. ❐

CHAPTER - 3

EVIDENCE FOR EVOLUTION

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In this chapter, I propose to present and examine in detail the two most fundamental evidences for evolution. They are (a) fossil records and (b) the vestigial organs. The latter is also associated with the theory of embryonic recapitulation. The purport of the chapter is to indicate that so-called evidence is far from being conclusive. On the contray, the same evidence may suggest a philosophical plausibility for a creationist model.

It is imperative for my purpose to begin with the two models and contrast their predictions:

Fig - 1. Comparative models of Creation and Evolution
(Courtesy Gish's *Evolution:Challenge of Fossil Record*)

Evolution Model	Creation Model
1. Origin of all living beings is traced to a single living source, it arose by chance	1. It is attributed to the acts of a Creator.
2. Simpler life-forms appear first.	2 Complex life-forms suddenly appear in a great variety
3 A gradual change of simple forms into complex forms	3 Basic plant and animal types, complete with characteristics, appear
4 Unlimited variation All forms genetically related	4 Variation and 'speciation' limited within each kind
5 Many transitional 'links' between different kinds.	5. No transitional 'links' between different biological families.

This characterizations of the two models are to serve as my canvass, on which I shall paint my picture of the evidence for evolution, and then carefully subject it to a philosophical critique.

(A) EVIDENCE OF FOSSILS

The best evidence for evolution so far has come from the study of fossils:

> The most important evidence for the theory of evolution is that obtained from the study of palaeontology Though the study of other branches of zoology might lead one to suspect that animals are all inter-related, it was the discovery of various fossils and their correct placing in relative strata and age that provided the main factual basis for the modern view of evolution [1]

The Encyclopedia Brittanica attests palaeontology to have given us an evidence for 'the course taken by living organisms in their evolutionary history or phylogeny'.[2] Given the characterizations of creation and evolutionary models, what predictions should we expect from the fossil records?

1) **Evolutionary Model**. (a) If evolution were a fact, we would expect that, at the bottom of the geological column, in the oldest rocks, the most primitive forms of life, at least in fossilized forms, should be found. As we progress through the various rock strata towards the younger rock strata, we would expect to see the gradual transition of these simple forms of life into more and more complex forms. We would also expect transition of one form, or species, into another. Negatively, we would not expect new species to appear suddenly in the fossil record.

(b) "Link Fossils" would be expected if evolution were a fact. Link fossils are the alleged fossils, linking groups of animals that today are widely separated, - such as the fish and the amphibia, or the reptiles and the mammals. As we reach fairly recent rocks, we should expect to find clear evidence of ape-like men. Link fossil predicts 'that a complete fossil record would consist of lineages of organism showing gradual changes continuously over long periods of time'.[3] Darwin himself asserted, 'The number of intermediate varieties which have formerly existed (must) truely be enormous'.[4] We should, of course, expect to find the rock strata themselves in the order given by the geological column, with the oldest at the bottom, and the most recent at the top, as shown below :

Evolutionary Geological Column

MAIN DIVISION OF GEOLOGICAL TIME

ERAS	PERIODS	ESTIMATED YEARS AGO
	Quaternary	
	Holocene Epoch	10,000
	Pleistocene Epoch	1 800 000
CENOZOIC	**Tertiary**	
	Pliocene Epoch	5,000,000
	Miocene Epoch	25,000,000
	Oligocene Epoch	35,000,000
	Eocene Epoch	60,000,000
	Paleocene Epoch	70,000,000
	Cretaceous	70,000 000
MESOZOIC	Jurassic	to
	Triassic	200,000,000
	Permian	
	Pennsylvanian	
	Mississippian	200,000,000
PALEOZOIC	Devonian	to
	Silurian	600,000,000
	Ordovician	
	Cambrian	
PROTEROZOIC		600,000,000 to 1,000,000,000
ARCHEOZOIC		1,000,000,000 to 1,800,000,000

Fig - 2. (Adapted from Gish's *Evolution The Challenge of Fossil Records*)

2) **Creation Model**. On the contrary, if creation were a fact, we would predict an explosive appearance in the fossil records of a highly complex forms of life without an evidence of ancestral forms. We would expect that all the major types of life, that is, the basic plant and animal forms, would appear abruptly in the fossil record without the evidence of transitional forms linking one basic kind to another. For example, we would expect to find the fossilized remains of cats, dogs, horses, dinosaurs, crocodiles, monkeys,

apes and men without any evidence of common ancestors. Darwin himself admitted, "If numerous species have really started into life at once, the fact would be fatal to the theory of evolution" [5]

Uniformitarianism versus Catastrophism

Since fossils are found in the geological strata, we have to take into consideration the two main approaches to the interpretation of geologic history, namely, uniformitarianism and catastrophism.

(i) **Uniformitarianism**. Originally formulated by James Hutton (1795) and later, by Charles Lyell (1830), and now accepted by almost all evolutionists, the uniformitarian concept of historical Geology interprets that the history of the earth, with all the existing physical processes, has been taking place at imperceptibly and uniformly slow rate, as at present. They professed their methodology with the dictum, 'the present is the key to the past' for the study of the earth. Any appeal to the concept of catastrophes for the explanation of geologic phenomena is rejected. Since the process is working at uniformly slow rate, the formation of sedimentary deposits, hundreds of feet thick, would have required many millions of years. Accordingly, the age of the earth as estimated by evolutionary geologists was pushed back to millions of years. The application of certain assumptions with radiometric dating methods finally has allowed the present-day geologists to estimate the age of the earth around 4.6 billion years.

(ii) **Catastrophism**. Catastrophism is the concept provided by the creationists in the interpretation of earth's history. According to this interpretation, the geologic phenomena like sedimentary deposits, formation of mountains and fossilization are the results of such catastrophes as the Noachian Flood with its inevitable attendant earth movements, volcanic eruptions etc. on a global scale.

Creation scientists maintain that it is impossible to account for most of the important geological formations in terms of the principles of uniformitarianism. Numerous examples are given. The Tibetan Plateau, 750,000 square miles wide and at a height of three miles from sea level, is formed by sedimentary deposits, many thousands of feet thick. How is this formation possible unless some earth-shaking catastrophe is posited? The uniformitarian concept cannot explain mountain formation of such vast lava beds as the

Columbian Plateau in North America; the lava bed is several thousand feet thick covering 200,000 square miles. The vast Deccan Plateau is also formed in the same manner. Similarly, the fossil record, far from being a record of gradual transformation, is rather a record of geological mass destruction like eruptions, inundations and earthquakes.

The reinterpretation of geologic data in terms of catastrophism may call for a re-evaluation of all dating methods, including the radio-metric dating methods. The pertinent question then is : Which theory of geological strata fits in with the fossil records ?

What Does the Fossil Record Show ?

After well over a century of extensive excavations all over the world, ever since Darwin's time, a vast number of fossils have been unearthed. In his book *Processes of Organic Evolution* (1971) G.Ledyard Stebbing observes, "The records of past forms of life is now extensive and is constantly increasing in richness as palaeontologists find, describe and compare new fossils".[6] Porter Kier of the Smithsonian Institution adds, "There are a hundred million fossils, all catalogued and identified in museums around the world."[7] Richard Carrington confidently declares, "By the aid of fossils, palaeontologists can now give an excellent picture of the life of past ages."[8] After the assembling of millions of all possible varieties of fossils, how does the record now speak to the scholars?

In conflicting voices! The famous evolutionist Stanely states that 'fossils reveal new and surprising things about our biological origins'.[9] Stephen Jay Gould, one of the world's most leading palaeontologists, and one of the three authors of *A View of Life*,[10] strikes the cautious note that 'the fossil record is full of trends that palaeontologists have been unable to explain'.[11] There are many who share his scholarly scepticism. What is it that these committed evolutionary scientists have found 'unable to explain'? What has confounded these scientists is the shocking fact that the massive fossil evidence now available suggests the opposite of what evolutionary theory should predict.[12] The record reveals what was always suspected even during Darwin's day, namely, the basic kinds of living things appeared suddenly and did not radically change thereafter. No evidence of transitional links between one major kind of living being and another has ever been found. Darwin himself had attempted to explain the problems, saying that this was due to the imperfect

geological record.[13] It was assumed by him and his immediate followers that a time would come when these 'missing links' would be found.

Aprupt Appearance of Life

The theory of evolution assumes that life first appeared on earth in the form of a simple, microscopic, unicellular organism which then diverged into many complex organisms. The evidence for this event is what we would expect to find in the fossil record, if evolution were true. But the one evidence is now-here near us. Highly complex multi-cellular creatures with specialized organs, fully formed, abruptly appear in the fossil record. There are no intermediary organisms in the fossil records to link the single-celled organisms to the complex invertebrates that supposedly arose from them. The first abundant fossil record of complex invertebrates appear in rocks of the Cambrian Period, assumed to be 600 million years old. Below this level, in the Pre-Cambrian rocks, hardly any fossils are found.

While the evolutionary catch-word is 'from simple to complex', the oldest fossil bearing rocks contain organisms, which are already highly complex and fully developed. Two well-known evolutionists, Fred Hoyle and Chandra Wickramasinghe of the Cambridge University, commenting on the above fact, observe :

> Going back in time to the age of the oldest rocks, fossil residues of ancient life forms discovered in the rocks do not reveal a simple beginning Although we may care to think of fossil bacteria and fossil algae and microfungi as being simple compared to a dog or horse, the information standard remains enormously high Most of the biochemical complexity of life was present already at the time the oldest surface rocks of the earth were formed [14]

Robert Jastrow, in his *Red Giants and White Dwarfs* (1979) admits, in the face of the lack of evidence, that 'The fossil record contains no trace of these preliminary stages in the development of many-celled organism'.[15]

Thus, at the start of what is called the Cambrian Period, the fossil record takes an unexplained dramatic turn. A great variety of complex and fully developed sea creatures, many with hard outer shells, appear so suddenly that the period is said to be characterized by the 'Cambrian Explosion' of living things.[16] Evolutionists used to claim that the reason for the sudden

appearance of complex creatures in the Cambrian, with no fossil precursors, was that their ancestors were soft-bodied and thus left no hard parts to be fossilized. This argument however does not hold much water. Many fossils of the soft-bodied animals have not only been found in the Cambrian, but also in the later rocks. There is no good reason why soft-bodied creatures could not have been fossilized in the Pre-Cambrian, if they existed at all. Henry Morris, President, Institute for Creation Research writes, "It is especially noteworthy that all of the great phyla have been found in the rocks of the Cambrian, supposedly the oldest of the fossil-bearing rock system."[17] As stated earlier, Darwin himself was aware of this problem of the sudden appearance of all known forms of life without any precursor. Perplexed, he had to admit, 'as by this theory, innumerable transitional forms must have existed'.[18] The question, why we do not find rich fossiliferous deposits of the transitional forms in the Pre-Cambrian periods, drew only a frank admission, 'I can give no satisfactory answer'.[19]

Has the situation changed today? The 130 years of intensive fossil-hunting since Darwin, according to the palaeontologist A.S. Romer, has drawn a blank on this.[20] Building on Darwin's 'abrupt manner in which whole groups of species suddenly appear', he goes to conclude,

> Below this (Cambrian rocks) there are vast thickness of sediments in which the progenitors of the Cambrian forms would be expected But we do not find them, these older beds are almost barren evidence of life, and the general picture could reasonably be said to be consistent with the idea of special creation at the beginning of Cambrian times.[21]

Some arguments have been advanced by some evolutionists to explain this. Imperfections of our understanding of the geological column, as evidenced by Darwin in 1859, continue to remain so till date. The Pre-Cambrian rocks were too altered by heat and pressure to retain within them any fossil links. No rock deposit in shallow seas could be expected to retain fossils. These are however naive arguments that do not lend support to even evolutionists like Stephen Jay Gould, Salvador E. Luria and Sam Singer. They acknowledge that 'geologists have discovered many unaltered Precambrian sediments and they contain no fossils of complex organisms'.[22]

One is then constrained to note that the fossil records do not fit the predictions of evolutionary model. On the other hand, the evidence from fossils

may appear to fit exactly with the creation predictions. The biochemist, D.B. Gower was prompted to comment :

> The creation account in Genesis and the theory of evolution could not be reconciled One must be right and the other wrong. The story of the fossils agreed with the account of Genesis. In the oldest rocks we did not find a series of fossils covering the gradual changes from the most primitive creatures to developed forms, but rather in the oldest rocks, developed species suddenly appeared Between every specis there was a complete absence of intermediate fossils [23]

Scientific creationists therefore ask what greater evidence for creation could the rocks give than this abrupt appearance of a great variety of complex creatures without a trace of ancestors.

Absence of Transitional Fossil Links

Since living things evolved from simple to complex ones, according to the evolutionists, there ought to be numerous intermediate fossils which could form links between species in their march of transformation from one species into another. If these transitional forms are found in large numbers embedded in the earth, it could provide the best incontrovertible evidence for evolution. If, on the contrary, the predicted fossil links are absent, as Darwin observed, it could prove a 'fatal objection to the belief in the transmutation of species', and thereby to the theory of evolution itself.

(i) **Do Intermediate Fossil Links Exist** ? One of the most serious difficulties for the theory of evolution is the total absence transitional forms. Fossils of partially formed bones, or organs, are invariably taken for the beginnings of a new species. Do we have any fossil of animals with necks two-thirds or three quarters long in comparison with those of the giraffes as we know them at present ? Are there any fossils of birds, evolving a beak from a reptile jaw ? Is there any fossil evidence of fish fins, turning into amphibian legs, feet and toes ? A student of Philosophy would readily ask such questions, but remain stranded at what A. Brower admits, "One of the most surprising negative results of palaeontological research in the last century is that... transitional forms seem to be inordinately scarce".[24] We would further say that, in Darwin's time, some excuse would be acceptable, but, with the enormous number of fossil species discovered since then, other causes may well be adduced for the almost complete absence of transitional forms.

This would be philosophically warranted

Fossils of cockroaches may be taken for a case study. Dr. Betty Faber, an entomologist with the American Museum of Natural History, states, "several cockroach fossils... from the Carboniferous Period of Earth's history make one thing clear. Even back then, about 350 million years ago, the cockroach looked disgusting. It has not changed much since".[25] Some cockroaches may have been larger in the past, as their fossils indicate. But, even after evolving these millions of years, their size did not increase, but rather decrease. Again, at the 1983 annual meeting of the American Association for the Advancement of Science, a fascinating report was given of the discovery of remarkably well-preserved fossils of insects like centipedes, a mite, and spiderlike creatures. The fossils were said to be 380 million years old, some of the oldest ever found, by their discoverers, Drs. Patricia Bonamo and J.D. Grierson of the University of New York. It was reported that 'these creatures were already highly evolved', and that they bore a 'close resemblance to living creatures', indeed, to fossil analysts, 'they looked like they might have died yesterday'. These observations at once suggest that the fossilized creatures were already fully-formed and that they may not have changed much to this day from their supposed 380 million years march. Could facts then be a step towards creationism rather than evolutionism? Steven M. Stanley, writing in his *The Evolutionary Timetable*, acknowledges that the "fossil record does not convincingly document a single transition from one species to another. Furthermore, species lasted for astoundingly long periods of time".[26] The perception agrees with the extensive study made by the Geological Society of London and the Palaeontological Association of England.[27]

These findings and observations have been made by none other than the leading evolution scientists themselves. All these goad me to adhere to the views of scientific creationism. The sudden outburst of highly complex forms of life is a pointer to creation. It may be said that 'the rocks cry out 'Creation!'.[28]

(ii) **Evolution of the Horse Series**. Over the years, among the hundreds of thousands of fossils of many species, only one or two fossils have been hailed as the much sought-for transitional forms, or 'missing link'. It is important for me to analyse philosophically their claims to be what they are said to be. One frequently quoted example of gradual development is the evo-

lution of the horse; it is among the best-documented examples of evolutionary development.[29] This is the most commonly given example in the textbooks on evolution. The fossil record is said to show a small four-toed creature, known as *Eohippus* (Hyracotherium), a dog-sized 'horse', in the early rock layer, known as Eocene, about 60 million years old. From the four-toed Hyracotherium evolved the three-toed *Miohippus*, or sometimes another three-toed *Merychippus*, equipped with high-crowned grazing teeth. Finally, the one-toed grazer, Equus, the modern horse, appeared, as one progresses towards the surface layers. Evolutionists claim that *Eohippus* is the ancestor of the modern horse, *Equus*. As one progresses towards the surface layers, fossils, with features more like those of the modern day horses are found. But does the fossil evidence really support this claim?

I am afraid, it does not. Careful analysis of fossil records done by evolutionists themselves may not substantiate the theory. A leading evolution scientist, George Gaylord Simpson, bemoans that several generations of students have been misinformed about the real meaning of the evolution of the horse.[30] The Encyclopedia Brittanica, too, cautiously comments, 'The evolution of the horse was never in a straight line'.[31] Hitching says:

> Once portrayed as simple and direct, it is now so complicated that accepting one version rather than another is a matter of faith than rational choice. Eohippus, supposedly the earliest horse, and said by experts to be long extinct and known only to us through fossils, may in fact be alive and well, not a horse at all - a shy, fox-sized animal called a daman that darts about in the African bush [32]

Sylvia Baker draws our attention to a generally not realized fact that Eohippus has a skeleton, that is very similar to that of the present day hyrax (cony, daman): that hyrax, like Eohippus Hyracotherium, also has four toes on the front and three on the hind feet. Having recognized the similarity, she goes on to assert that Eohippus is not a horse, but only a variant form of hyrax.[33]

The late Professor H. Enoch, a well-known zoologist, cautions the evolutionists not to treat the pedigree, or succession of fossils, as though they were dug out in successive layers as arranged in the New York Museum. The bones of the pedigree 'horses' were gathered from different parts of the world and arranged in an evolutionary sequence, as if they were to exhibit the proofs of evolution. Many casual observers held this as an irrefutable

proof for evolution. In fact, in no place on earth can these 'ancestors of the horse' be found in the order depicted in the evolutionary sequence. Professor Enoch exposes the fallacy :

> The only reason, for arranging the fossils in this order from the 'Down Horse' (Eohippus) to the modern horse, is the assumption that evolution has taken place. Thus, after artificially arranging the fossils to tell the story of evolution, evolutionist turn round and offer the same as proof of evolution! It is this that made Charles Duperett, one of the greatest of French paleontologists, call this particular kind of proof 'a deceitful delusion.[34]

To a student of philosophy, it is a clear case of an argument in circularity, (if not also a case of literally putting the evolutionary cart before the horse!). Prof Enoch is of the opinion that it is equally reasonable to assume that all these so-called evolutionary horse ancestors existed on earth along with the modern horse. A hoof of the modern horse discovered in Colorado in older strata of the rocks, where the evolutionists would expect the fossils of *Eohippus*, lends Enoch further support that the modern horse existed prior to its supposed ancestor *Eohippus*.

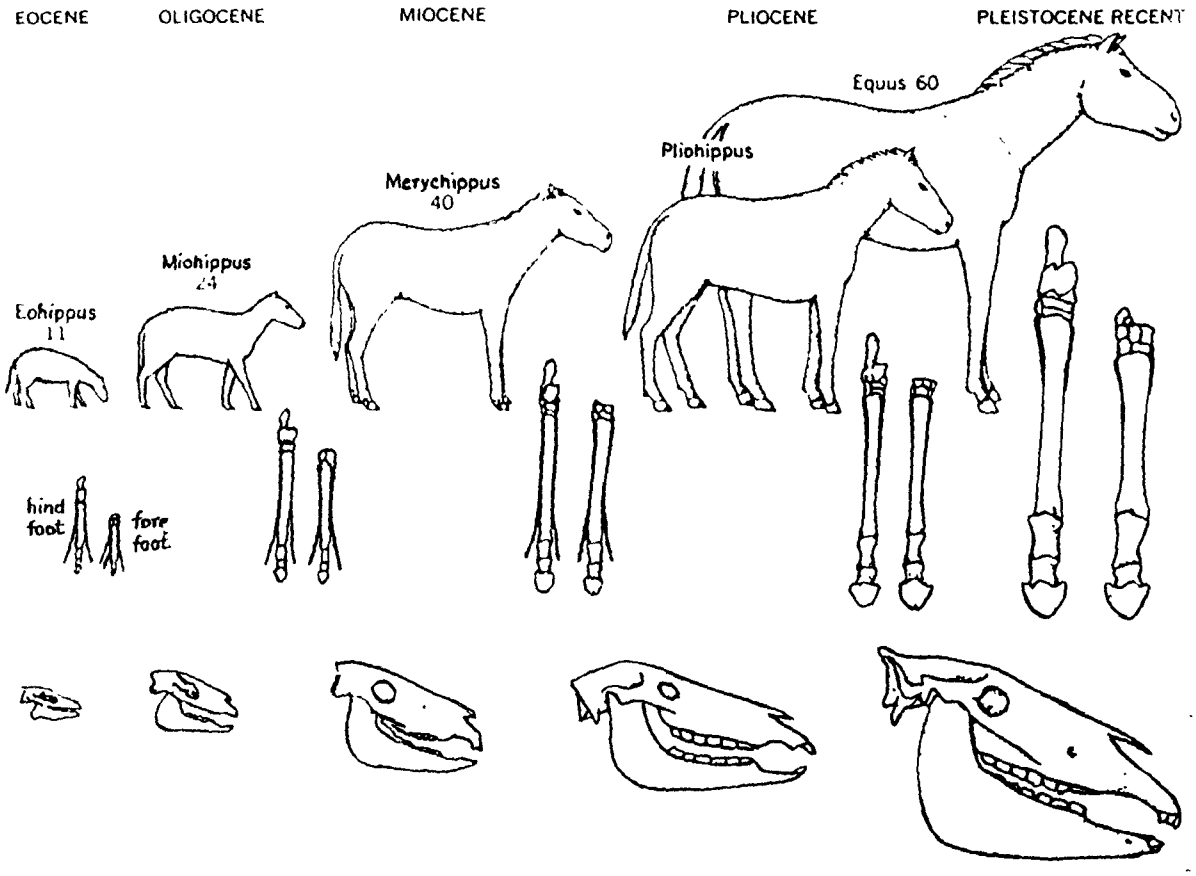

Fig - 3. The Evolution of the Horse. *From the dog-sized Eohippus of the Eocene era to the modern horse of today, showing the changes in limb and skull structure.* (from Storer, Usinger, Mybakken and Stebbins).

Some scientists like Kerkut wonder, if Hyracotherium could be treated as the pedigree for the equid group at all. Arguably it could be equally held to be related to a tapir or a rhinoceros. It could have justifiably been chosen to be the ancestral rhinoceros or tapir as much as of the horse. This could again render the objectivity of the phylogenetic tree of the horse questionable from the very start. Perplexed by the questionable evidence, Duane Gish thinks that the 'horse evolution' is both chaotic and patchy, 'without real merit'. On the contrary, the sudden appearance of equus, on the fossil record, quite separately and without any known intermediate stage, 'neatly' fits the creation model'.[35] Let me now turn to the other often quoted case of archaeopteryx.

After the horse series, perhaps the most famous link fossil in the vocabulary of the theory of evolution is the Archaeopteryx, believed to be the earliest known bird. As such, it is generally considered an intermediate form between reptiles and birds. Six fossils were found in 1860, all from the Solenhofen limestone quarry in Germany. The age of the limestones is traced back to the late Jurassic period about 150 million years ago. When evolutionists cite their evidence, they almost always point to this alleged transition from the reptiles to mammal kingdom. Flying creatures allegedly evolved from the non-flying reptiles, the transition, however, requiring millions of years. If this were the case, vast number of intermediate stages in each transition may be expected to have existed and excavated everywhere around the world. However, we have been favoured with the fossils of a single creature, the archaeopteryx, in a single place.[36]

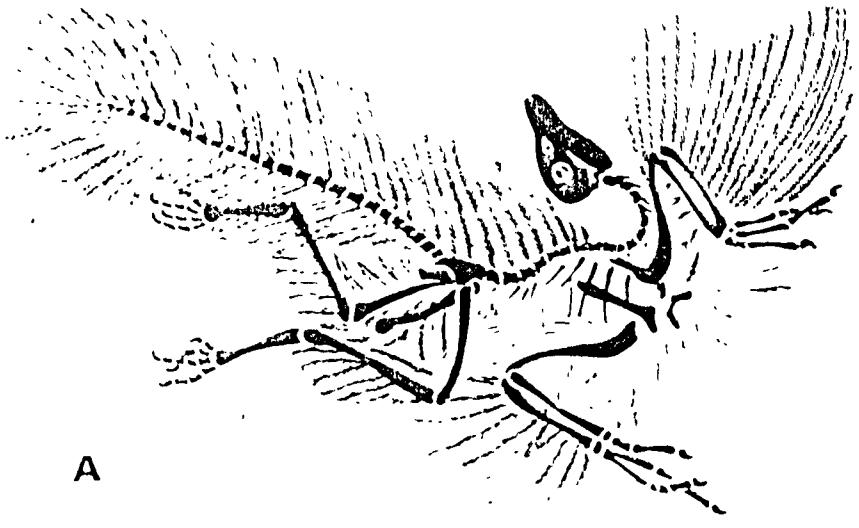

Fig - 4 Archaeopteryx (From Huse's) The fossil imprint from the Jurassic Solnhofen limestone in Germany

Archaeopteryx had an impressive array of features that immediately identify it as a bird. It had perching feet. Several of its fossils bear the impression of its being endowed with feathers which were identical to those of modern birds. While the primary feathers of non-flying birds are distinctly different from those of flying birds, archaeopteryx had the feathers of flying bird, the basic pattern and proportions of the avian wing and a robust furcula or wishbone. No other animal except birds possesses feathers and a furcula. All available evidence indicate that Archaeopteryx was a feathered creature. a bird that flew.[37]

However, evolutionists, while admitting the close resemblance of archaeopteryx with bird, with its aerofoil wings equipped with flight feathers, point out that it betrayed its reptilian ancestry as well from its toothed beak. wing claws and the long tails with many vertebrae. Since the discovery of the fossils of archaeopteryx more than a century ago, evolutionists have treated it as an intermediate between reptiles and birds; since then, it has appeared to the eyes of the beholders more and more reptile-like. Now, in the absence of any other competing link fossils, it has become fashionable to declare that archaeopteryx was hardly more than a feathered reptile. Beddard, taking note of the biased perception, declared, "So emphatically were all these creature birds that the actual origin of Aves is barely hinted at in the structure of these remarkable remains".[38] It was implied to suggest that archaeopteryx was a perfectly, or fully-formed, bird, showing no trace of its ancestry. However, the transformation of archaeopteryx from a creature, so emphatically birdlike, to its reptilian ancestry, barely hinted at, has been phenomenal. At least some evolutionists declare it now to be nothing more than a reptile with feathers, so that it somehow turns out to be a missing link.

This necessitates me to examine its alleged reptilian features more closely. There are three views on the ancestry of Archaeopteryx, that are strongly held by evolutionists today.[39] Some suggest that archaeopteryx is related to crocodiles, some believe that it is related to thecodont reptiles, and others suggest that it was derived from theropod dinosaurs. Though no conclusive evidence has been forthcoming in favour of any of the three views, the dinosaurian origin of archaeopteryx commands a degree of authenticity. It has been asserted that archaeopteryx shares 21 specialized characters with coelurosaurian dinosaurs.[40] The authenticity however has not gone unchallenged. Extensive research of Dr. Gish, on the various anatomical features of archaeopteryx in the last ten years, has shown conclusively that the charac-

teristics in question make it more birdlike, and not at all reptile-like.[41] The studies of the cranium of the London specimen has further corroborated the conclusion.

Evolutionists imagine that feathers have developed from scales of the reptiles. For instance, Philip Regal presents a series of hypothetical events, whereby the elongation to body scales on reptiles, as an adaptive response to excessive solar heat, eventually may have produced feathers.[42] What we are left to believe is that a series of genetic mutations happened somehow. They resulted in a sequence of incredible events, that not only converted a simple horny plate into the tremendously complex and marvellously engineered structure of a feather, but completely reorganized the simple method of development of a scale into the highly complex process necessary to produce a feather. But this hypothetical evolutionary scenario is completely devoid of empirical support; and it may not fall short of a pure fantasy. Scales and feathers develop in an entirely different manner, and arise from different layers of the skin. Feathers, like hairs develop from fossicles; scales however do not develop from fossicles. Hair is a much simpler structure than feather. The developing feather is protected by a horny sheath, and forms around a bloody, conical, inductive dermal core. Development of the cells, that grow into the mature feather, involves complex processes. Cells migrate and split apart in highly specific patterns to form the complex arrangement of barbs and barbules with tiny hooks which lock onto the barbs and bind the feather surface into a flat, strong, flexible vane.

Even so, the pressure of claws on the wings of archaeopteryx is often cited as an evidence of its reptilian ancestry. Against this, it is pointed out that there are at least three extant birds today that possess claws on the wings. But this would not give any one of them the status of an intermediate link between reptile and bird. I will cite the single example. The hoatzin, a South American bird, possesses two claws both on their wings. Far from being reptiles, they are birds in every zoological sense. If so, what hinders us from considering archaeopteryx a bird? Yet another alleged reptilian feature of archaeopteryx is its possession of teeth. The prevailing notion in evolutionary hypothesis is that toothed birds gradually evolved into toothless birds. If this were to be true, we would expect the fossil records to produce at least some intermediate forms, documenting the gradual loss of teeth in birds. However, not a single intermediate form has ever been discovered. What the fossil record attests to is that some fossil birds had teeth and some did not, without suggest-

ing thereby any evolutionary transition from the one to the other. Moreover, if absence of teeth denotes a more advanced stage of development on evolutionary ladder, then the duck-billed platypus and the spiny anteater, mammals that do not have teeth, would have to be considered more advanced and more evolved than ape and man. The possession or absence of teeth as such does not prove anything about ultimate ancestry.

Recent findings cast even further doubt on archaeopteryx as a transitional form. Scientists at Texas Tech University found two crow-sized fossils of a bird near Post, Texas, in rocks supposedly 225 million years old. Its age makes it some 75 million years older than archaeopteryx, and as old as the oldest dinosaurs. They claim that this bird is even more birdlike than archaeopteryx, totally contrary to what evolutionists would expect to see.[43] If evolutionary assumptions are correct, this fossil bird should have been much more primitive, therefore, more reptile like than archaeopteryx. Furthermore, if one is to believe the claims of Sir Fred Hoyle and his fellow astronomer, the archaeoopteryx is a fraud, based on detailed photographic evidence. They allege that an artificial matrix was placed on a reptilian fossil, and that feathers were used to impress the matrix to leave a likeness of fossil feathers.[44] If this allegation is correct, it would mean a devastating blow to evolutionists.

I am not competent either to verify the construction or falsify the reconstruction of the scientific data; I leave it to the scientists themselves. But, as a student of philosophy, without subscribing to the charge of forgery, I tend to acknowledge the pitifully slender evidence for evolution from the scientific debates. If over the years, species have evolved into another species, our museums should be overflowing with vast numbers of unquestionably transitional forms. Instead, the case for evolution rests on doubtful examples, one of which is the alleged transition of a reptile to a bird. Archaeopteryx was a true bird, remarkably isolated by large gaps from any alleged reptilian progenitor. Here, too, the data overwhelmingly fits the creation rather than evolution model.

(B) VESTIGIAL ORGANS AND EMBRYONIC RECAPITULATION

The next most important and long-cited evidence for evolution, that I have selected for examination, is the vestigial organs from the ancestral species, having no present function; and also their embryonic recapitulation.

Evolutionists at one time claimed a list of about 180 such vestigial organs in man, including pituitary, pineal and lachrymal glands.

(i) **Vestigial Organs**. Wiedersheim's list, since the days of incomplete physiological knowledge, has been thoroughly investigated. The general conclusion reads, "On the basis of this analysis, I would suggest that Wiedersheim was largely in error in compiling his long list of vestigial organs. Most of them do have at least a minor function at some point in life".[45]

Even if the function of a so-called vestigial organ is not fully known to science today, the attempt itself towards the Wiedersheim's list bespeaks of a blind faith of evolutionists in their earnestness to hold a brief for the theory of evolution. As our knowledge of physiology grows, it is becoming increasingly evident that there are no vestigial organs in an organism. Some of the so-called vestigial organs, like the thymus gland and the tonsils, are necessary in defence against diseases. The appendix contains tissues, similar to that found in the tonsils, and is active in the fight against foreign invaders. The coccyx is not a useless vestige of a tail, but it serves an important function as the anchor for certain pelvic muscles. One cannot sit comfortably, if the coccyx were surgically removed.[46] Biology text-book insightfully suggests that the term 'vestigial' is really a word biologists use in place of admitting their ignorance of the function of some organs.[47] Such evidence then can no longer be offered to support evolution.[48] Even though some biology textbooks still speak of vestigial organs, modern medical knowledge has made it clear that human body does not contain any useless parts, or vestigial organs.

(ii) **Embryonic Recapitulation**. "Ontology recapitulates phylogeny" is the much quoted evolutionary cliche. It is the popular version of the 'biogenetic law'. Ontogeny is the development of the embryo, and phylogeny is the supposed evolutionary development of the kind of animal. In simple words, the caption, 'embryonic recapitulation', means that an embryo, human or otherwise, develops through developmental phases, wherein the stages of its supposed evolution as a species are recapitulated. The recapitulation theory was developed by such philosophers as Goette and Robert Chambers, before it came to be popularized in Darwin's day by Ernst Haeckel (1834-1917). The theory has been cited by evolutionists for over a hundred years as one of the main 'proofs' of evolution. Darwin himself made great use of it in his monumental works. Though the theory may have lost much of its lustre,[49] it still finds credence in some biology text-books and standard reference books.[50]

Hence I find it worthwhile to examine it.

Different stages of embryonic development. According to Haeckel, who is identified with the theory, embryonic recapitulation proves evolution without a shadow of a doubt. The development of an embryo through its various phases is a mirror to its many ancestral forms. Thus a fertilised human egg passes through a protozoan, through a multicellular stage, through a fish stage with gill slits, then through an amphibian or a reptile stage, through a mammalian stage with tail and finally, into a human being.

Among the various stages through which an embryo passes, as it develops from a single cell to a complex organism, perhaps the most well-known and oft-quoted evidence is that of the fish-stage. It is contended by evolutionists that the embryos of high vertebrates, like pigs, cats, cows, chicken and man, have gill-slits at an early stage of their development; and these gill-slits are relics of the past, when man was a fish in an evolutionary march. But, on closer examination by embryologists, the claim is rejected outright. The so-called gill-slits are not gills at all, and they cannot be used for breathing as is the case with fish. The folds of skin of human embryo at this stage, which resemble gill-slits, are formed due to unequal rate of growth of the central nervous system, and the arterial system causes the month-old embryo to bow itself over the heart bulge. The resulting folds develop into the lower jaw, the tongue and other organs such as the eustachian tubes that connect the throat and the middle ear. Hence, the supposed recapitulation is entirely superficial. If subscribed to, it only shows a complete lack of understanding of the present embryonic development.

Modern studies in embryology have shown that there are many omissions, additions, and inversions in the embryonic sequences. It may be true that the human embryo develops pharyngeal pouches, as does the fish embryo. In the fish, the latter become the gills, whereas, in human, they become the eustachian tubes, the thymus and parathyroid glands. In their development, they serve as essential guides for developing blood vessels, and are thus definitely not useless vestiges at all. The same applies to the developing kidneys, heart and other features. A great deal of understanding on the embryonic growth of each species is today available to us, that is inconsonant with the theory of the redundant vestigial organs of the former ancestors of the species.

Apart from the fish stage, some imaginative evolutionists fancy a mammalian or a simian stage. They claim to notice a caudal stage, when the embryo reaches the size of a pea. However, this claim, too, does not stand close scrutiny. The so-called tail of a human embryo is in no way comparable to the tail of lower animals. For the intestines extend into the taillike structure,- a phenomenon which has no parallel in any tailed vertebrate. Embryologists point out that this so-called tail is only the coccyx, the end of the vertebral column. On further growth, the coccyx is covered with muscles, enabling a sitting posture for human beings.

Malcolm Bowden [51] and Francis Hitching [52] carried out a threadbare examination of Haeckel's 'biogenetic law'. It was found out that the embryo of man and the ape, the dog and the rabbit, do not look the same, as claimed by Haeckel. Haeckel had doctored his drawings: he chopped off bits here and there, and added bits elsewhere to suit his theory. "Such forgeries and falsifications "are welldocumented".[53] In order to illustrate the wormlike stage of embryonic development, Haeckel published three identical drawings, labelled as dog, chicken and turtle respectively. But it was found out that the drawings were identical, for he had used the same woodcut of the embryo of a dog three times. The forgery was exposed in 1868 by L. Rutimeyer at the University of Basel. Other forgeries were exposed in quick succession: To illustrate the embryo of a gibbon in the fish stage, Haeckel used the embryo of a different kind of monkey, and then sliced off those parts of the anatomy, inconvenient to his theory. He was also found to alter the shape of embryological drawings to make the braincases of fishes, frogs, tortoises and chickens look alike.[54] He showed a remarkable ingenuity in the art of fabricating the elusive missing links.[55] But he was eventually charged with fraud at the University Court of Jena. He himself admitted the charge. Surprisingly enough, he was never publicly disgraced.

This only suggests how evolution had become a persuasive power in the thinking of man. There perhaps is more to it than meets our eyes. Haeckel's own confession includes that not a few observers and biologists lie under the same charge. Bowden cautions that a great many morphological, anatomical, historical, and embryological diagrams may not be true to nature, but more or less doctored, schematized and reconstructed.[56] Haeckel's confession in 1908 to a Berlin Newspaper lends admirable support to Bowden's caution:

> To cut short this unsavoury dispute, I begin at once with the contrite confession that a small fraction of my numerous drawings of embryos (perhaps six to eight percent) are in a sense falsified - all those, namely, for which the present material of observation is so incomplete or insufficient as to compel us, when we come to prepare a continuous chain of evolutionary stages to fill up the gaps by hypotheses and to reconstruct the missing links by comparative synthesis... After this compromising confession of "forgery", I should be obliged to consider myself "condemned and annihilated" if I had not the consolation of seeing side by side with me in the prisoners' dock hundreds of fellow culprits, among many of the most trusted observers and most esteemed biologists. The great majority of all of the diagrams in the best biological textbooks, treaties and journals would incur in the same degree the charge of "forgery", for all of them are inexact and are more or less doctored, schematised and constructed.[57]

If this passage should appear unduly long, it is clearly intended in as much as it spares me of a conclusion for this debate on the evidence for evolution. Today, as a consequence of the unscientific and inglorious history, not many modern embryologists risk their confidence in the theory of embryonic recapitulation. But not a few evolutionists still continue to persist with the evidence for evolution. But neither the fossil records nor the theory of vestigial organs, along with its subsidiary theory of the embryonic recapitulation, is an adequate evidence for evolution. ❐

CHAPTER - 4

MECHANISM OF EVOLUTION

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In this chapter, I will address myself to the problems associated with the mechanism of evolution. How is evolution assumed to operate? What is the basic mechanism for one type of living being to evolve into another? Four main methods,[1] out of the many suggested, engage my attention: a) Inheritance of acquired characteristics, (b) Natural Selection, (c) Hybridization and, (d) Mutation. I shall examine each of these claims, however, with a particular emphasis on natural selection and mutation, as they have an immense impact on the theory of evolution in its old and new forms alike. Besides these, I shall also examine a few other suggested mechanisms before making a case for creationism.

I. FOUR MAIN METHODS

(A) INHERITANCE OF ACQUIRED CHARACTERISTICS

Though it is no longer fashionable, even among evolutionists, to refer to the inheritance of acquired characteristics as the usual mechanism of evolution, yet, it is still discussed in standard reference works like the *Encyclopedia Americana*.[2] It had a tremendous influence among early evolutionists during the formative period of the 19th century. Darwin himself conceded more and more to this supposed factor. A brief analysis hence will be in order.

The theory of inheritance of acquired characteristics has been associated with the French naturalist, Jean Baptiste de Lamarck (1744-1829). His reputation as the first thorough-going evolutionist is high.[3] His *Philosophy of Zoology* (1809) advocated the thesis that traits, acquired during the life-time of an individual, can be inherited by the progeny. As the animals strive to hunt their prey or to escape from their predators or seek their mates, they exercise the exceptional abilities of their organs. Organs persistently exercised grow more skilful, larger and stronger, whereas those little used organs tend to be atrophied. Lamarck assumed that such skills, strengths and

weaknesses, acquired during a life-time, are transmitted to the offspring, so that the changes will accumulate from generation to generation, thus serving as a mechanism for evolution.

The idea, however, did not originate with Lamarck. Erasmus Darwin, the grandfather of Charles Darwin, and the French scientist, Comte de Buffon, in the 18th century had already propounded the theory. They maintained that, when a plant or an animal acquired a new characteristic from its environment, it could pass it on to its offspring, resulting in changes that accounted for evolution. They contended that the thick armour-like skin in some animals developed from the repeated blows. The distinctive contribution of Lamarck however was the view that the needs of organisms gave the driving force to evolution. Giraffes were believed to have evolved long necks, because they ran out of vegetation and had to stretch their necks up to a considerable height to obtain foliage on the trees, inaccessible to animals with shorter necks. The theory, that the acquired results of the use or disuse of organs could be inherited, came to be known as *Lamarckism*.

The theory enjoyed in the early 19th century a great deal of popularity. De Beer observes that 'Nobody would have thought of doubting it till the close of the nineteenth century',[4] very few rejected it then. However, its untenability was largely conceded by the close of the 19th century. German scientist, August Weismann discredited the Lamarckian theory by showing the impossibility of obtaining a tailless offspring of a mouse from its parents, whose tails were previously cut off. This experiment had only hastened the demise of the theory.[5] Likewise, the centuries old custom of foot-binding among Chinese women, though artificially deformed their feet from infancy, did not lead to any inherited deformity of the foot to their offsprings.

The discovery of the micro-technique methods in the early 20th century, and the subsequent establishment of the science of genetics have proved that the true seat of inheritance is in the genes, and not in the acquired characters. The Nobel laureate geneticist, H.J. Muller, remarks,

> Despite the strong influence of the environment in modifying the body as a whole, and even the protoplasm of its cells, the genes within the germ-cells of that body retain their original structure without specific alterations caused by the modification of the body, so that when the modified-individual reproduces, it transmits to its offsprings genes unaffected by its own acquired characters.[6]

T.H. Morgan agrees that this 'new work in genetics has struck a fatal blow at the old doctrine of the inheritance of acquired characters'.[7]

(B) NATURAL SELECTION

Evolution by means of natural selection brings us to the very essence of Darwinism. When Charles Darwin first published his theory of the origin of species by natural selection, he believed that variations between individuals of a species, observed in nature, would confer differing degrees of advantage or disadvantage in the 'struggle for existence'.[8] The struggle for existence was believed to be caused mainly by population outrunning the food supply, resulting in different mortality rates for differing genotypes, or genetic endowment. Death removed the excess progeny. The mortality extirpated the weak, and led to the survival of the fittest.[9] The other side of the theory of natural selection is the theory of the survival of the fittest. Considered either way, it speaks of 'adaptation'. Those with significant advantages would be favoured by natural selection to survive longer, and to perpetuate their descendants. Vigour, strength, longevity and other factors enhance Darwinian fitness, provided the concerned individuals contribute to the reproductive success. Thus, gradually, completely new and higher types of organisms would emerge. Therefore, natural selection is regarded as the one agent responsible for controlling the speed, direction and intensity of evolution. As such, a careful examination of the mechanism concerned is warranted here.

Types of Selection. Two types of selections are acknowledged :

(a) **Normalising**. A normalising natural selection means that, in course of slow genetic changes in species, there will naturally be bad ones, or mutants, which are deleterious to their carriers; but that, once the natural selection is normalised, the frequency of the appearance of mutant genes will be kept down. It is also assumed that, unless the mutant is a dominant lethal, some generations may elapse between the origin and the elimination of a mutant gene. Eventually, a genetic equilibrium will be established, when the number of new deleterious mutations of a given kind on the average is equal to their numbers eliminated in every generation by selection, thus preventing the genetic burden from increasing.

(b) **Directional**. A directional natural selection means that a genetic variant, or a new mutation, present in the population for many generations, may

become advantageous in a changed environment. Thus, a particular genotype may survive more often, or produce more progeny, or is more successful in the competition for mates than other given genotypes. No matter how small the advantage, given enough time and the number of generations, a directional selection would begin to operate to ultimately produce a different kind of species. It admits both variation and adaptation.

(i) **Variation**. The process of natural selection leads to new varieties of creatures or variations within a given family. The matter of variation within a species influenced Darwin's original thinking on evolution. In Galapagos Islands, Darwin observed a type of bird, called '*finch*'. This finch was of the same type, as its parent-kind on the Southern continent, from where it apparently had migrated. But they had physical variations in the shape of their beaks. Darwin interpreted the variation as evolution in progress, though it was nothing more than an example of a variety within a kind, allowed for by a creature's genetic make-up. The finches were still finches; they were not turning into something else; they remained birds and will continue to be birds. However, the variation within a kind became the ground for the claim that evolution of species occurred, and is still occurring. Thus, Darwin's 'evolution in progress' was nothing but a speculation without any reasonable evidence. However, such evidences as the variation in the peppered moth are sought to be proffered.

The Peppered Moth

A classic example of evolution in progress adduced is that of the peppered moth (*Biston betularia*) of England. The *Encyclopedia Britannica* (1978) states that this is 'one of the most striking examples of observable evolution': the phenomenon is called 'industrial melanism'. *The International Wildlife Encyclopedia* also states, 'this is the most striking evolutionary change ever to have been witnessed by man'.[10] The peppered moth was so long known to have only grey colour, admirably adapted by its colouration and habits to escape detection by birds on the bark of trees till the middle of the 19th century. Then, the Industrial Revolution had brought marked changes in the environment, notably in the manufacturing districts of England, where air pollution by smoke blackened the tree trunks and branches. Along with this change, a remarkable change in the colour of the peppered moth was also noticed: the moths were said to have evolved from the grey to the dark colour in order to be better camouflaged against a dark background, and be protected from their

predators. In other words, the light colour moths died out, whereas the dark varieties survived in the struggle for existence over a few decades.

Unfortunately for evolutionists, the phenomenon was not evolution in the true sense at all, but simply a variation. Did the moth change into something else? Did it evolve into a higher form of insect? The answer is that it is unmistakably a peppered moth. L. Harrison Matthews observes,

> The (peppered moth) experiments beautifully demonstrate natural selection - or survival of the fittest - in action, but they do not show evolution in progress, for however, the population may alter in their content of light, intermediate or dark forms, all the moths remain from beginning to end *Biston betularia*.[11]

The phenomenon of the industrial melanism could then hardly demonstrate evolution. An English medical journal referred to the attempt here of the evolutionists as 'notorious', and declared,

> This is an excellent demonstration of the function of camouflage, but since it begins and ends with moths and no new species is formed, it is quite irrelevant as evidence for evolution.[12]

Speaking philosophically, it can be asked if the peppered moth does not rather explain the creation model. Henry Morris, one of the foremost creation scientists-cum-philosopher, does precisely this. The phenomenon of variation and natural selection may be taken to be a marvellous example of the creationist's principle of conservation in operation. A fundamental prediction from the creation model is that the creator institutes a system to ensure every creature's genetic integrity and its survival in nature. The genetic system allows both the maintenance of its identity as a specific kind and the adjustment of its characteristics, within limits, to changes in environment. If this were not the case, slight changes in its habitat, food supply etc. would cause its extinction. All these are the corollaries of a teleological creationistic model; every creature has a purpose in divine scheme.[13]

(ii) **Adaptation**. It is a common experience that various species of plants and animals have the ability to adapt to such different circumstances, as climatic changes or colour changes for camouflage, as does the peppered moth. This is not due to evolution. Rather they already have within their organisms the possibility for a lesser or a greater adaptation.

Evolutionists claim that polar bears evolve to become a cold weather animal. But this is no evolution, since polar bears can survive in the zoos in the non-polar regions too. They remain bears wherever they be. They possess the genetic potentialities, implicit in the DNA structure, for their own particular kind which could act on local conditions. Likewise, 'The English sparrow introduced in the United States from Europe has changed detectably in its new home; the average size of the birds has increased, and they became differentiated into incipient local races'.[14] Similarly, insects like mosquitoes can become immune to poisons like DDT. Initially, the insecticides may have proved effective but, gradually, mosquitoes may have so adapted to the poison as to withstand it. They survived and reproduced offsprings that were equally resistant to poisons. Such immunity is due to a genetic factor that appears in some insects but not in others. Their greater resistance, or immunity to a particular poison, does not make them a new species of insects.

Any number of such examples only demonstrates the genetic potentialities inherent in the living things in the environment. The change perceived and the immunity acquired is potentially present in it. Natural selection, thus, cannot produce any new species of organisms, either in its variation or adaptation. However, natural selection, acting upon the variational and adaptational potential, designed into the genetic code for each organism, can be a powerful device for permitting horizontal changes to enable it to adapt to the environment, and thus to survive. But it cannot generate a vertical change, leading to the evolution of new and higher species. Hence, natural selection totally fails to provide the mechanism for evolution.

(C) **HYBRIDIZATION**

Hybridization is yet another mechanism of evolution. It is the process whereby two different species of the same genus are crossed in order to combine the good qualities of both. The new hybrid is always stronger than either parent. It is commonplace that a number of superior varieties of a certain species result from careful cultivation, selective breeding and intelligent cross-pollination. In fact, the modern method of agriculture and animal husbandry has recourse to hybridization to produce improved varieties of seeds and cattle. By and large, hybrids between plants, or animals of the same species are artificially produced. However, many of the hybrids are sterile; in the free state, they usually do not even breed. Left to themselves, superior varieties will not improve themselves further, but instead will revert to the

original strain. This is 'reversion to type'. Neglected, they all revert to the wild. They, therefore, require constant hybridizing. Hybridizing naturally tends to reach a final limit.

This tendency of hybrid varieties to return to its original, or primitive, type is the exact opposite of what is supposed to happen in evolution. M.R. Dehaan observes:

> It has been proved that all the varieties of tame pigeons, pouters, carriers, fautails etc., when left alone to interbreed on an isolated island, reverted to the original slate-coloured wild pigeon, even regaining the two dark rings about the legs. In the same way, the same odd four thousand varieties of roses, in the absence of cultivation soon revert back to the simple single wild rose. The naturalist knows that all the different breeds of dogs from the tiny toy Pekingese to the giant Mastiff can be led back to the original type - the wolf, fox or jackals.[15]

It may be noted that even hybrids of plants and animals have not changed into some other kind. Originating from the closely related species, they continue to remain the same kind. Efforts to change them indefinitely will invariably prove futile, as they soon reach the boundary of sterility.

It is equally important to note that, even though a hybrid of the same kind can be produced by artificial methods, hybrids between the basic kinds can never be produced. Creationists want us to specially note it. A hybrid between a cat and dog, or a hybrid between a man and an ape, is never obtained, as though the boundary set by the Creator keeps the basic kinds always separate. Therefore, hybridization too, does not, and cannot, serve as the mechanism of evolution. But hybridization has been beneficial to man economically in his agriculture and animal husbandry. It is scientifically feasible and explicable within the matrix of molecular biology, without however being any proof for evolution.

Modern Molecular Biology

The scientific explanations for the variations have now been found in the science of genetics, or the 'Mendelian Laws of Inheritance'. Whether the variations are called natural selection or survival of the fittest, mutation or inheritance of acquired characteristics, or adaptation or even hybridization, they all have been by and large satisfactorily explained by the empirical sciences with the help of molecular biology. I shall restrict myself to the bare

outlines.

Mendelian Laws. The Mendelian laws of inheritance, so named after the Czechoslovakian Gregor Mendal, explains that variations noticed within a particular species of plants or animals are not abnormal. Variations can be found in all species in varying degrees without ever leading to the evolution of any new species. They are only characters already latent, or inbuilt, within the genetic system. Mendel was fascinated by the way in which the plants handed down their characteristics to the next generation. What would happen if a white-flowered plant were to be crossed with a red-flowered plant? Would the next generation have red or white flowers? Likewise, what would happen if a tall plant were to be crossed with a short one? What height would the offspring be of? By actually performing the experiments and carefully analysing the result, Mendel formulated his fundamental laws concerning the inheritance of new characteristics in the offspring. These laws are the beginning of the science of genetics which have taken today gigantic strides in its development.

Mendel's findings and their publication in the late 1860, however, coincided with the time, when Darwin's theory was immensely popular among the then scientific community. It was only after the initial enthusiasm for evolution subsided that, somehow, the importance of Mendel's work came to the fore. Looking back in retrospect, it is quite understandable today as to why Mendel's important discovery was then ignored: one of the most important assumptions of Darwin stood disproved by the experimental findings of Mendel. Mendel's laws caused a temporary eclipse of evolution. But the theory of evolution soon re-emerged in a modified from, purportedly consistent with Mendel's genetics.

What Mendel disproved in Darwin's evolution theory can best be brought out by considering what he actually accomplished. Mendel crossed the various 'races' of edible peas. When a red-flowered plant was crossed with a white-flowered one, the offspring was found to be red-flowered. Mendel then crossed the red offspring with each other, and found that they produced offspring of their own in the ration of 3 reds:1 white. The experiments had clearly shown the genetic factors in the determination of a particular characteristic, in this case, the colour of the flowers. Whether the particular gene plays a dominant role or a passive role is what matters in determining the colour, or for that matter, any other characteristic. Although both possess their respective

genes for red and white colour, if the offspring had the red colour, it showed that the red gene was dominant over the white. But when these red plants were bred with each other, it was possible for two white genes to come together to make offspring white. The chance, that the offspring would receive at least one red gene, is 3:1, as indicated in the diagram :

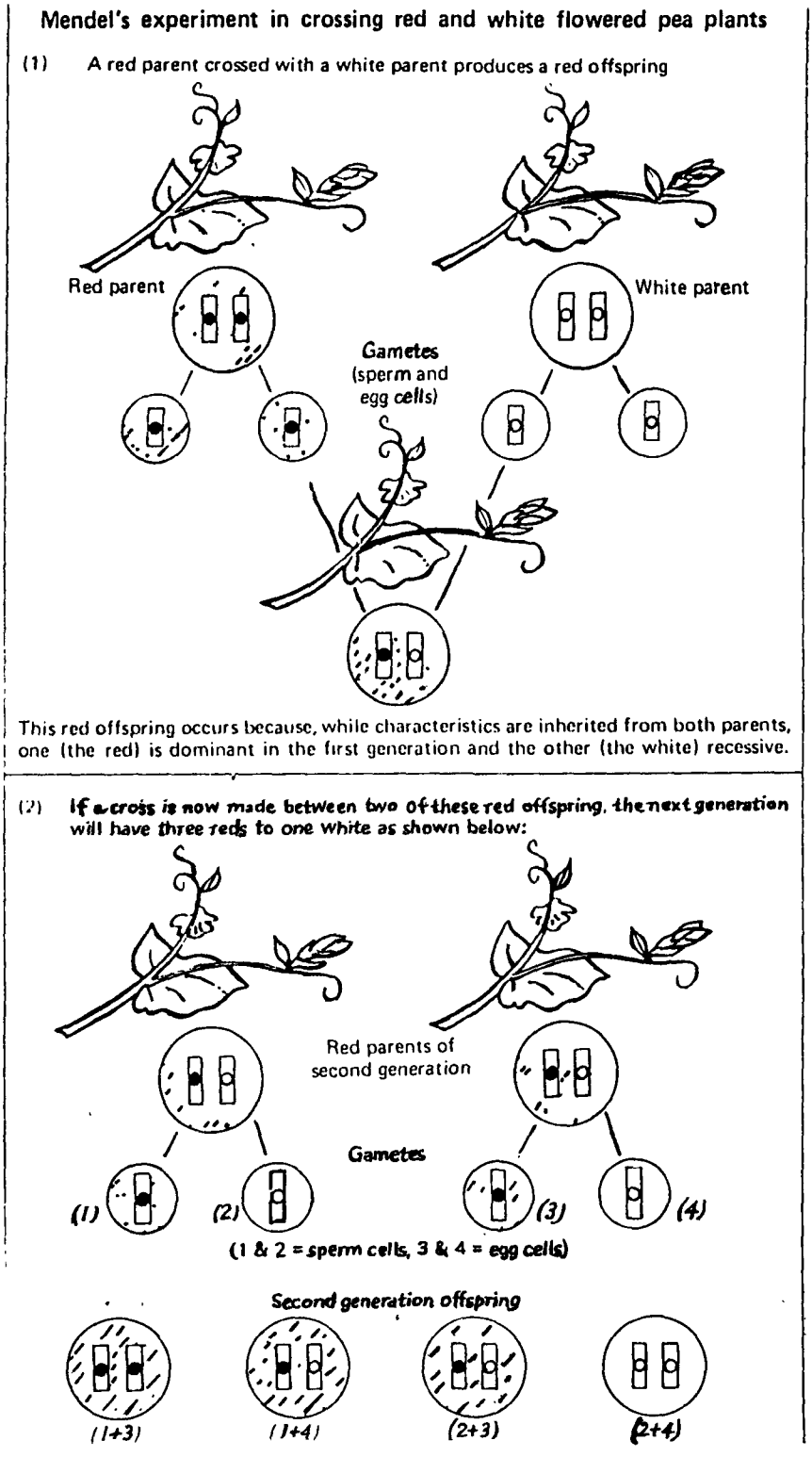

FIG-5. Mendel's Law (From Baker's)

Mendel also found that, when two red-flowered plants obtained from the offspring of the original cross breeding were interbred, he obtained flowers both white and red. Darwin's theory rested on the assumption that, in such a case as this, the white colour had not been acquired, since it was already present in the parent's generation and could not get the chance of expression because of the presence of a more dominant gene. This assumption, however, was called into question by Mendel by his experiments.

It is thus reiterated that the Mendelian law of inheritance, operative at the root of the science of genetics, has conclusively established that no new species is really produced, but that only characteristics already latent within the genetic system may manifest under certain circumstances. Modern molecular biology with its penetrating insight into the remarkable genetic code, implanted in the DNA system, has further confirmed that normal variations may operate only within the range, specified by the DNA for the particular type of organism. It is the normal variation of this sort which is still commonly and mistakenly offered as an evidence for evolution. The discovery of the true nature of the laws of inheritance thus shook the very foundation of Darwin's theory of the origin of species by Natural Selection. The theory, however, once again came out of its eclipse by the emergence of a new genetic theory. The new theory advocated that genes could sometimes change to completely new forms. This radical change in the gene is known as mutation. Seeking a new foundation in mutation, the rudderless classical Darwinism emerged into a *Neo-Darwinism*, which is the form in which Darwin's theory of evolution is believed today. Does mutation salvage the theory of evolution?

(D) M U T A T I O N

Mutation is today the universally accepted mechanism of evolutionary changes. 'Mutation' comes from the Latin root mutare,literally, meaning 'to change'. In genetic parlance, mutation is defined as 'a genetic change that can be transmitted to offspring as an inheritable divergence from ancestral type'.[16] The definition is generally accepted by the evolutionists.

There are two main types of changes occurring in organisms, namely, environmental modifications and modifications brought about in the nucleic material of the germ cells, or genes. The environmental modifications, already treated by us as the Lamarckian 'use and disuse' of organs and other

adaptations, including hybridization, are of little consequence in producing permanent changes of evolutionary significance. On the other hand, changes produced in the genes are of greater consequence, as they are not merely heritable but can bring about changes in a group. This change is mutation; it merits our critical enquiry, since evolution is supposed to operate by way of mutation.

The modern synthetic theory of evolution is called neo-Darwinism. The mechanism universally adopted by it is mutation which was unknown to Darwin. How does mutation come about?

> The genes are ordinarily very stable. A particular gene may exist many thousands of years without alteration in its structure. Very rarely, however, the chemical structure of a gene does undergo a change, that also, rather accidentally. Such a change called mutation may be caused by chemicals, X-rays, ultraviolet light, cosmic rays and others. Some may occur during cell reproduction due to copying errors.[17]

Mutation is said to be the mechanism responsible for producing the required upward progress in complexity, implicit in the evolutionary model. The basic evolution model would predict therefore that mutation must be beneficial, if it is to generate a vertical change towards higher degrees of order and perfection on the side of evolution. The mutational change must be positively helpful in the environment for natural selection both to preserve the species and also to contribute towards evolutionary progress. These assumptions seem to be borne out by the status ascribed to mutations by the evolutionists. They are said to be 'the basis of evolution',[18] 'the raw materials'[19] for evolution. There is a certain optimism seeping through the words of evolutionists: The environment selects those few mutations that enhance survival, resulting in a series of slow transformations of one life form into another, the origin of new species .[20]

What are the experimental facts on mutations? Does mutation effect vertical changes to produce new and higher species? Firstly, mutations are clearly random, they are not controlled. J.H. Muller and his team of scientists, during the last half of a century, carried out experiments, inducing changes in the genes by artificial means, to record their effects on the organism, in general, and to see, in particular, if new species could be produced. While a series of effects were studied, experiments to produce new species were not successful. No new species have been produced even today. Despite the much talk on the promises of genetic engineering, Henry Morris, the noted creation-

ist, injects a sense of realism in the euphoria: "There is no way to control mutations to make them produce characteristics which might be needed. Natural selection simply takes what comes."[21] Some evolutionists too admit the fact and they 'know of no way other than random mutation by which new hereditary variation comes into being'.[22]

Secondly, mutations are rare, they are by no means common. Francisco J. Ayala estimates that the frequency of a mutation in higher organisms is a mere 1 in 10,000, and 1 in 1,000,000 per gene per generation.[23] Ayala and other philosophers of science may be said to wonder at the oddity of making such rare exception the fundamental rule of evolutionary progress.

Thirdly, mutations are generally harmful. Harmless mutations are extremely rare. If mutations are a basis of evolution, what proportion of them are beneficial, so that the vertical progress can be obtained? Muller, who devoted his time to experimental mutations, came to the conclusion that ' the great majority of mutations, certainly well over 99%, are harmful in some way, as is to be expected of the effects of accidental occurrences'.[24] Julian Huxley reiterates the conclusion:

> A proportion of favourable mutations of one in a thousand does not sound much, but is probably generous, since so many mutations are lethal, preventing the organisms living at all, and the great majority of the rest throw the machinery slightly out of gear.[25]

> ***The Encyclopedia Americana*** sum up the results : The fact that most mutations are damaging to the organism seems hard to reconcile with the view that mutation is the source of raw materials for evolution. Indeed, mutants illustrated in biology text books are a collection of freaks and monstrosities, and mutation seems to be a destructive rather than a constructive process.[26]

Far from heralding a march of progress, mutants are sadly weaklings. They have very little chance of survival, and can never become progenitors of a new and better species. 'Creatures with shrivelled-up wings and defective vision, or no eyes, offer poor material for evolutionary progress.' Even if they can be reared under laboratory conditions, the chances of their survival in the natural state are practically nil.

Finally, the above experimental facts prove that mutations produce no new species. At its best, mutation could result in a variation of a trait that is already there. At its worst, it simply destroys the organism. It may provide

variety, but does not produce anything new. Mutation may change the colour, or the texture, of a person's hair, but the hair cannot turn into feathers, much less a snake into a bird.

At this juncture, we may consider the results of the extensive mutation experiments conducted on Drosophilia, a fruit fly. Since the early 20th century, scientists have exposed millions of these flies to X-rays, increasing the frequency of mutations to a hundred times more than what would otherwise be normal. After three decades of experiments, a leading American evolutionist observed, "The clear-cut mutants of Drosophilia, with which so much of the classical research in genetics was done, are almost without exception inferior to wild-type flies in viability, fertility and longevity".[27]

Another zoologist wrote in the same vein :

> Even granting that advantageous mutations are occasionally produced, it will be another great problem to establish them in population. Though 26 generations of Drosphilia can be observed in one year, and since 1910 to the present date, more than a thousand generations have been observed, so far,no accumulation has been observed.[28]

Haldane goes further to add that, when two mutually sterile offsprings had been bred from a common ancestor, as was done in the case of Drosophilia, it could not be claimed that these were new species. He concluded that the geneticists have not yet succeeded in breeding a new species of Drosophilia.[29] Finally, the results of thousands of induced mutations in fruit flies was so disappointing, as no accumulation of mutations had been observed, that some geneticists lamented the hopelessly negligible changes; they were compelled to admit that, even if a thousand mutations were combined in one specimen, there would still be no new species.

Cloning of Mammal

Embryologists at Scotland's Roslin Institute, headed by Dr. Ian Wilmut, announced on February 22, 1997 that they had successfully cloned an adult sheep. In as much as the cloned "Dolly" is a carbon copy of a 6 year old ewe from a single udder cell of the ewe, it has been a sensational news of the century in genetics. Following this news, announcement of similar cloning of other mammals has been made from other parts of the world too. Obviously this is an amazing scientific break-through in the global race for genetic engineering. This scientific feat has opened up the possibilities, it is claimed,

of creating human life out of the genetically-manipulated single human cell, though such prospects of human cloning has raised global concern on social, ethical and medical grounds.

It may be admitted that cloning involves an induced mutation by way of the modification of the nucleic material of the non generative cell. The technique of cloning involved the separation of the cells taken from the udder of a Finn Dorset ewe. It was placed inside the unfertilised egg taken from a Blackface ewe, after the latter's nucleus including DNA had been 'emptied'. The udder cell thus placed inside the egg cell, emptied of the nucleus, fused together when electric pulse was given. The resulting embryo was planted in the womb of another Blackface ewe. After the gestation period, the Blackface ewe gave birth to Dolly, the lamb, that is genetically identical to the donor Finn Dorset ewe. The novelty of the cloning consists here in having no recourse to the specialised generative cells of the male and the Female in the formation of the embryo.

Does this new mutation serve as a proof for evolution? The answer is an emphatic no. For the animal cloning is achieved by skilful genetic manipulation by way of certain scientific techniques. While it is a fundamental departure from the random mutation in as much as it is humanly induced, what is obtained thereby is neither a new creation of life nor the transformation of one species into another. It is a new revolution in embryology that makes possible the perpetuation of cloning rather than the normal union of the generative cells. Far from proving any evolution, it would be an assertion of the creationism. From the above discussion, one may be led to conclude that not a single new species of plant or animal is known to have evolved on earth during its recorded history. Recent researches on mutation, either the lethally random or scientifically induced, have only led the biologists to a *cul-de-sac*, so far as evolutionary progress is concerned. The varieties, if any, produced by them cannot represent even an incipient species. The products of the random mutations are mostly degenerations, that only lower the viability and competitive power of the species. Likewise the product of cloning with its focus on commercial benefits may be a great threat to our biodiversity of the earth. Therefore, the mechanism of mutation does not account for evolution. I now turn to some other related mechanisms and their scrutiny.

II. OTHER SUGGESTED MECHANISMS

A) **Goldschmidt's Hopeful Monsters**

Frustrated with the absence of intermediate forms and with the difficulty of gradual functional transitions, the search to find an alternative to the traditional gradualism continues. In this direction, the concept of evolution by 'saltation' has been entertained. Saltation is the evolutionary belief that new organs and types emerge suddenly rather than gradually. It was first suggested in 1940 by Richard Goldschmidt. He introduced the notion of the 'hopeful monster', as a means of obtaining one species from another, in one sudden jump:

> A monstrosity appearing in a single genetic step might permit the occupation of a new environment niche and thus produce a new type in one step. A Manx cat with a heredity concrescence of the tail vertebrae, or a comparable mouse or rat mutant, is just a monster.[30]

Though the idea of the sudden emergence of new organs and types, following some sort of a massive *macro-mutation*, to form the hopeful monsters, may look rather bizarre, yet, it received growing acceptance among evolutionists, desperately looking for alternative mechanism of evolution. Darwin would perhaps have considered such a sudden appearance of a new adoptive structure of organ a miracle. This precisely has been the position of not a few biologists in recent times.

I wonder if the tendency may not be an indication of the bankruptcy of the theory of evolution. For the emergence of the macro-mutational genetic monstrosities "are such evident freaks that these monsters can be designed only as 'hopeless'. They are so utterly unbalanced that they would not have the slightest chance of escaping elimination through selection. Giving a thrust the wings of a falcon does not make it a better flyer. Indeed, having all the other equipment of a thrust, it would probably hardly be able to fly at all... To believe that such a drastic mutation would produce a viable new type, capable of occupying a new adaptive zone, is equivalent to believing in miracles".[31] The concept of saltation then may be theoretically exciting, if we are bent on avoiding the impasse of gradualism, but it would seem practically unlikely that purely random processes would ever throw together suddenly such quantum changes to form viable new species. Mutations are manifestly harmful to produce viable offsprings and to make for vertical progress.

B) **Punctuated Equilibrium**

'Punctuated Equilibrium' is yet another model of evolution, proposed by two American paleontologists, Niles Eldredge and Stephen Jay Gould. Gould, professor of Geology at Harvard University, and Eldredge of the American Museum of Natural History, introduced the phrase in 1972 for the first time to gain world-wide current usage for it overnight. The model is presented as 'an alternative to phyletic gradualism'. Evolution now moves, not by gradual development, but by jerks. Long periods of changelessness, or stasis or equilibrium, is interrupted by sudden and dramatic brief periods of rapid change - 'punctuations'; such brief periods of change may account for evolution.

According to the model, instead of the original dogma of slow and gradual change, advocated by the classical Darwinism, new species are said to emerge rapidly in small isolated populations. Once a new species has developed, it proliferates into large population, and persists relatively unchanged for a few millions of years. Then, for some unknown reasons, a relatively small number of the individuals of the population become isolated, and by some equally unknown mechanism rapidly evolve into a new species. Rapidity here may mean something of the order of tens of thousands of years. When the new species has evolved, it either becomes rapidly extinct or extant into large population, persisting for millions of years. Hence the term 'equilibrium', but sooner or later, it will be modified by an evolutionary punctuation.

The theory is purported to solve the problem of how new species evolve rapidly without leaving behind the fossils of transitional forms. The large population that persists for millions of years may be expected to provide adequate opportunity for the deposition of fossils. But the period of rapid evolution, on the other hand, especially since it involves a relatively small and localized population, does not provide an opportunity for fossilization. Thus, no transitional forms between species are found in the fossils. Gould writes,

> Thus, our model of 'punctuated equilibria' holds that evolution is concentrated in events of speciation and that successful speciation is an infrequent event punctuating the stasis of large populations that do not alter in fundamental ways during the millions of years that they endure.[32]

But this punctuated equilibrium, hailed by many as the solution to the problem posed by gaps in fossil record, I am afraid, cannot be any solution. Firstly, punctuated equilibrium is not a mechanism at all, for no one knows

why or how a species remains in a stasis for sometime and then rapidly evolves into new species. The very notion is contrary to our knowledge of the science of genetics. Worse still, the theory is without empirically observable scientific evidence. Molecular biologists are sarcastically critical of the theory :

> The advent of the theory of punctuated equilibrium... meant that for the first time biologists, with little knowledge of palaeontology, have become aware of the absence of transitional forms... it seems unlikely that we will see any return in the future to the old comfortable notion that the fossils provide evidence of gradual evolutionary change.[33]

Secondly, while the idea of punctuated equilibrium was invented to explain the absence of transitional forms between species, it, however, does not address itself to, let alone solve, the problem of the big gaps in the fossil record. Nor does the known genetic evidence lend credence to the idea. Gish concludes that the punctuated equilibrium 'is just another indication of the bankruptcy of evolution theory'.[34] The mechanism of evolution, if ever it were true, is still a 'central mystery'.[35]

III. A CASE FOR CREATIONISM

Difficulties then for evolution are insurmountable. We cannot discountenance the scientific data around us. Our theories on the origin of species will have to be consistent with the data. The creationists believe that God is the Creator of all things, both living and non-living; that all different kinds of birds, plants and everything represent the effects of separate creative acts of God. The creatures were all established in distinctive groupings, the 'kinds' in the Biblical language. Hence, there are permanent and clear-cut gaps between these kinds, despite much potential variation within the kinds. Each of these different kinds is equipped with the complex replicating chemical systems to reproduce itself 'after its kind', to use once again the Biblical language. The kinds are set apart from one another, without the possibility of one kind changing itself into another. The insightful phrase, 'after its kind', is found no less than ten times in the creation account. The perpetuation of everything is to be after its own kind, 'the grasses, herbs and trees', 'fishes of the water', the 'birds of air', the 'beasts of the forests' and so on. Is the insight consonant with the scientific data?

To begin with, that no evolution from one species to another is ever possible is already a well-known fact. The test of a species, as admitted by scientists, is the fertility of its offspring. If the offspring is able to reproduce,

it is a positive proof that the parents and the offsprings constitute the same species. Individuals of different species cannot usually interbreed; where an interbreeding between the two closely related species takes place, the offspring is invariably sterile as is the case with mule. The process of reproduction stops right there. The implication then are clear: there can be no evolution without a change in species; and again, without fertility, there can be no perpetuation of the species. Empirical evidence is obviously against evolution. Creationism then may not be opposed to the scientific data, to say the least.

While it is admitted that species could not change into one another, in transmutation, the potential varieties within a specific species however are limitless. This potentiality is inbuilt within the divinely designed system without any transgression of the natural law. An impressive variety of dogs, ranging in size from the 4 pound Chihuahua to the 180 pound Great Dane, is only a single example. This does not imply evolution, but rather demonstrate only a variation within the kind.[36] Selective hybridization by scientific means is employed to obtain many varieties of plants and animals within the same species.

If evolution is not happening today, neither did it happen in the past. Many fossils of plants and animals are found in the oldest rocks. When compared with their living counterparts, they are found to be essentially the same. In spite of the presumed millions of years of evolution, the present starfish, the cockroach, bacteria and so on, are found to be no different from their remote ancestors fossilized in the older geological strata. Darwin was constrained to concede: 'Not one change of species into another is on record... We cannot prove that a single species has been changed'.[37] Much to the embarrassment of the evolutionists, it may be said, the fossil records seems to uphold the Biblical principle of reproduction after its own kind. The Biblical fixity of the kind is not only verified by the paleontological record, but also confirmed by modern scientific observation and experimentation, in particular, the genetic engineering.

A student of philosophy however is alive to the conceptual problem of defining exactly the Biblical 'kind'. Many scientists identify species with the *Genesis* 'kind'.Carolus Linnaeus thus defined species as a natural, stable, interbreeding unit, identical with the *Genesis* kind. Later on, he widened his definition to include the genus as more or less equivalent to the kind. This is a conceptual muddle. On the other hand, creationists, too, have grappled with

the problem. Gish defines the kind:

> A generally interfertile group of organisms that possesses variant genes for a common set of traits but that does not interbreed with other groups of organisms under normal circumstances.[38]

This too suggests the struggle of the creationists to incorporate the discoveries of molecular biologists in a manner that creationism is not a literal Biblicism but scientific.

To conclude, the generally adduced mechanisms of evolution, in particular, natural selection and mutation fail to explain the 'how' of evolution. The alternative theories of Neo-Darwinism fare no better. With this failure, evolution itself, as a theory of the origins, falls short of an adequate explanation. This leaves creationism as an alternative to the origin of species, yet, not by default, but as sufficiently grounded in the scientific evidences available to us, today. ❐

CHAPTER - 5

THE EVOLUTION OF MAN

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The theory of evolution, from the origin of species to that of man, encounters the most critical stage. According to it, man, too, evolved from a non-human ancestor, in common with the apes, somewhere between four to ten million years ago. This chapter is a critical examination of the claim. Despite the debatable fossil evidence for evolution, in general, the specific claim that humans have evolved from the ape-like ancestors, is made. The belief is sought to be substantiated through many models, drawings of the ape-man occupying respectable place in our museums, text books, science fictions and films. We have grown up with the belief that the models and pictures of the ape-man truly represent the supposed once existent ancestors. Is our belief in the ape-man theory justified scientifically and philosophically?

I. COMMON ANCESTOR OF MAN AND APE

Before delving into the imaginary world of the ape-man, we must first familiarize ourselves with a field of art called 'Anthro Art'. It is the art of reconstructing a complete figure, human or animal, from fossilized remains. Specialists in this field claim the ability to reconstruct the whole body of the organism concerned to the exact size, even from a single piece of tooth or a jaw bone or a footprint, by way of comparing them with those of the living creatures. This is how we are provided with the life-size models of prehistoric animals and ape-men; they are prominently displayed in museums and text-books. The evidence for man's descent from ape-man is adduced from the anthro-artefacts, reconstructed from the fossils.

The birth of the ape-man theory, at least in its present form, can be traced to Professor Ernst Haeckel. Haeckel was so convinced about the existence of ape-men, the missing links in the evolution of man, that he commissioned a drawing of such a half-ape half-man creature. This fired the imagination of not a few scientists of the day. He gave this hypothetical creature the generic name *Pithecanthropus Alanthus*, literally, the 'speechless ape-man'.

Since the modern education and popular literature are thoroughly permeated with the theory of man's descent from apes, it is imperative for me to critically evaluate one by one some of the important fossil pieces, reconstructed into the *Pithecanthropus*.

It is assumed by the evolutionists that, some ten million years ago, ape and man had a common ancestor, from whom they later branched off on the tree of evolution. There, however, is no conclusive evidence for the hypothetical ancestor in the geological records; it is simply an evolutionary inference. The common ancestor 'has not yet been found and we may have some difficulty in recognizing it'; 'Investigators... have yet to trace the origin of the human line'; 'Unfortunately, the early stages of man's evolutionary progress along his individual line remains a total mystery'.[1] But, even when the particular 'missing link' is elusively still missing, the evidence from their fabricated models must be critically examined. Let us consider some of these apemen.

A. AUSTRALOPITHECUS

Australopithecus is the generic name, meaning 'the Southern Ape' (*australo* = southern; *pithecus* = ape). The name has been assigned to a number of different fossils, found mostly in East Africa. The group includes *Zinjanthropus*, *Paranthropus*, *Plesianthropus*, *Telanthropus* and *Homo habilis*.

In 1924, Raymond Dart discovered in Africa some fossil skulls and other bones. He recognised the ape-like features of the skull, but with the man-like features of the teeth. He named the fossils as *Australopithecus Africanus*, and declared it to be man's hominid ancestor. More finds of *Australopithecus* were made in later years by Robert Broom, John T. Robinson and by Dart himself. This was the beginning of new ventures of Darwinism for the evolution of man. In the 1960s, a considerable stir was created by the finds in Tanzania made by Louis Leakey and his wife. They discovered a supposed hominid fossil. They gave it the name *Zinjanthropus* bosei, meaning 'the East African Man'. However, their find was later proved to be not different from that of Dart earlier. Thus, *Zinjanthropus bosei* was classified under the Australopithecus. Presently, australopithecines have been classified into two species: the one having smaller jaws and teeth, designated as *Australopithecus Africanus*, and the other having more massive teeth and jaws with bony ridges like those of gorilla and Orangutan designated as

Australopithecus robustus. The age assigned to this species is about two to three million years (henceforth, m.y.). He was supposed to have walked erect, and also to have used primitive tools. His brain size was a mere 500 c.c., roughly the same as that of some living apes, about 1/3rd that of modern man.

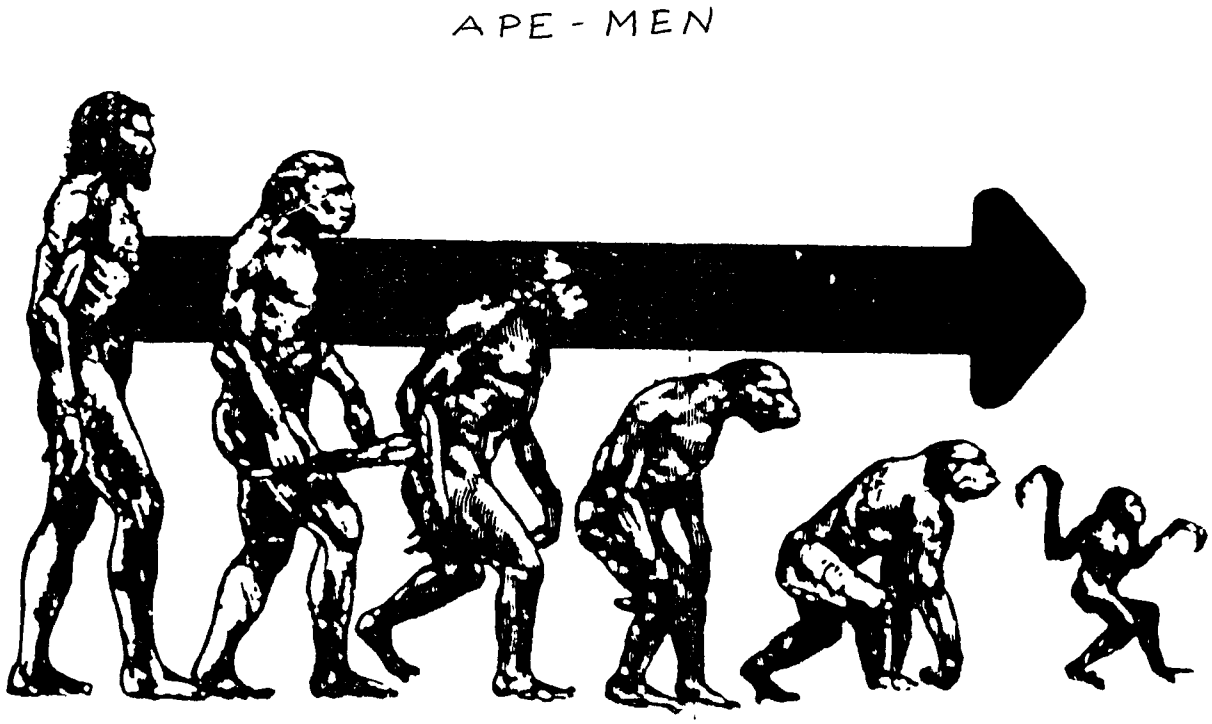


Fig - 6. Did man evolved from apes, or apes from man (From Gish's)

(a) Findings of Lord Zuckerman and Charles Oxnard

A research team headed by Lord Zuckerman, the famous British anatomist, studied for over 15 years the comparative anatomical features of man, monkeys, apes and the *Australopithecus* fossils. All available fossil fragments of *Australopithecus*, along with the anatomical specimens of hundreds of monkeys, apes and humans were compared. His findings were disappointing to evolutionists like Leakeys, Le Gros Clark and others, who saw in the *Australopithecus* their hope of a missing link in human evolution from ancestor-ape. He wrote,

> Almost always when I have tried to check the anatomical claims on which the status of Australopithecus is based, I have ended in failure.[2]

For Lord Zuckerman, the *Australopithecus* turned out to be nothing more than

an ape, in no way related to the origin of man.[3]

Charles Oxnard, another anatomist from the California Medical School, after his thorough research on the fossils, declared,

> Although most studies emphasize the similarity of the australopithecines to modern man... a series of multivariate statistical studies of various post cranial fragments suggests other conclusions.[4]

Oxnard, rejecting the claim that Australopithecus walked upright in human manner, concluded:

> Most of the fossil fragments are in fact uniquely different from both man and man's nearest living genetic relatives, the chimpanzee and goilla... they tend to be with the Orang utan.[5]

Therefore, on the testimony of the leading anatomists, *Australopithecus* was neither ancestral to man nor an intermediate between ape and man. Leakey's son, who continued his father's work, may be said to aptly sum up the study: "They (limb bones) portray Australopithecus as long-armed and short-legged. He was probably a knuckle-walker, not an erect walker, as many archaeologists presently believe".[6]

(b) '**Lucy**'

By far the most publicised single piece of fossil find is undoubtedly Donald Johanson's Lucy. It is the ape-(wo)man, reconstructed out of bone fragments representing about 40 per cent of skeleton of a single individual. Donald Johanson, an obscure anthropologist-cum-curator, became famous overnight, following his sensational claim to the discovery of remains of alleged human ancestor. While working in the fall of 1973 near Hadar in the Afar Triangle with the Ethiopian Antiquities Administration, Johanson discovered the knee joint of a small primate. After fitting the parts together, and after noting the angle, the joint appeared to form, he declared that it was of a creature intermediate between ape and man. Fossils of animals in the same area earlier were already given a certain antiquity. On its basis, Johanson declared the knee joint, too, to be of a three million years old human ancestor. Within a year, more fossils in the same area, 'a bit of a hominid arm, vertebrae, ribs, and parts of a skull and pelvis, were reported to have been excavated. All these put together represented about 40 per cent of a fossilized skeletion. Since there was no bone duplication, it was believed to belong to

a single individual species. The partial skeleton was found to be of a female, and was named 'Lucy'. Johanson calculated her to have stood about 3' 6" tall, and weighed about 50 pounds; but to have had a small brain of 380 to 450 c.c. only. Lucy thus came to be three and a half million year old hominid that walked upright.

In the report of this finding, published in the prestigious British science journal *Nature* (260:293, March 1976), Johanson and Taieb tentatively assigned their find as belonging to the genus *Homo*. They suggested that Lucy showed considerable affinities to *Australopithecus Africanus*, while some bone fragments bore affinities to *Australopithecus robustus*. Thus the Hadar fossils, in which Lucy has been included, were assigned the name *Australopithecus Afarensis*. Other discoveries at Hadar followed in quick succession.

Johanson's team discovered a group of fossils, that included fragments from at least thirteen individuals, including four juveniles and nine adults. The discovery of so many fossilized 'primates' of any kind in a small area was unprecedented. Johanson declared all of them to be hominids, ascribing them to the genus Homo.[7] Various anthropomorphic terms like the 'first family', 'human', 'Lucy' and 'child' were freely employed to convey the humanlike status of these fossils. Can this evidence be accepted?

(c) Challenges to Johanson

It would appear to anyone that Johanson is chanced with an unusual luck and an extraordinary gift of discernment for the remote human ancestors, 3 m.y. old, in the scattered fragments of dry bones at Hadar. John D. Morris however is cautious in his assessment:

> Many in the anthropological community have yet to be so convinced. Indeed, it is impossible to make snap judgements like this, while a number of sophisticated studies have shown that the australopithecines, in general, and 'Lucy', in particular, were not ape-human intermediates, but rather, an extinct species of ape which probably spent most of its time in the trees.[8]

Let us look at some of the specific features of Lucy. According to Johanson and his co-worker Tim White, Lucy and the members of her 'family' had smallish powerful humanlike bodies, walked upright in the human manner, although they were essentially ape-like from the neck up.[9] From the

neck up, Lucy was gorilla-like, and her brain size was about 1/4th of the human brain; her jaw was U-shaped, typical of gorillas; her teeth were far larger than those in humans.[10] So, Lucy, with her assigned age of 3.5 m.y, qualified to be the oldest candidate for human ancestor, from where the family tree, constructed by Johanson, branched off: from *Australopithecus afarensis* to *Australopithecus Africanus* and *Australopithecus robustus* in one branch; and to *Homo habilis*, *Homo erectus*, and finally *Homo sapiens*, successively, in another branch.

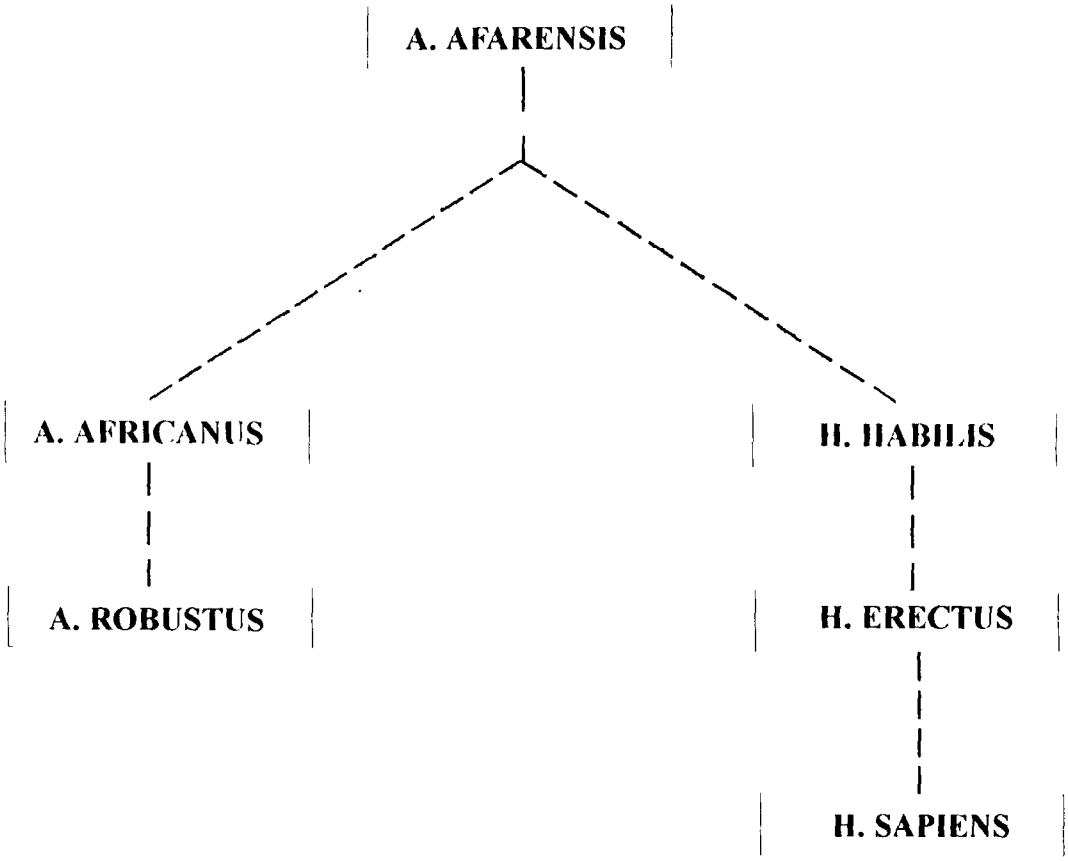


Fig - 7 The family tree of Man as suggested by Johanson and White

The Johanson-White interpretation of the Hadar fossils, forming the root of human tree, has not gone unchallenged, to begin with, by the evolutionists themselves. Firstly, it flies directly in the face of the conclusions of Lord Zuckerman and Charles Oxnard concerning the status of the australopithecines. Zuckerman and Oxnard, specialists on fossils of australopithecines, supposed them to be 2 m.y. younger than the 3.5 m.y. old Lucy and other Hadar fossils of Johanson. Their young fossils, to be consistent with the evolutionary development, should be more advanced, more manlike than Lucy and her family fossils. But the two specialists had conclusively proved that the australopithecines studied by them did not walk erect in a human manner.

By implication Hadar fossils cannot be older than those they studied. John Morris takes the argument to its logical end:

> From the neck down, nearly every feature was likewise non-human. Australopithecus fossils, including those which are thought to be much more recent and therefore should be more human-like, have long, curved fingers and long-curved toes, - well adapted to swinging from tree to tree Limb.[11]

Secondly, the features, which suggest upright posture to Johanson, are primarily of the hip and knee joints, but numerous studies on these joints have drawn conclusions very different. Oxnard observes,

> These fossils clearly differ more from both humans and African apes than do these living groups from each other. The australopithecines are unique.[12]

John Morris remarks that, even if the somewhat upright walk, after the manner of pygmy chimps of today, were to be conceded, australopithecines did not walk like the humans. Thirdly, Johanson seldom reminds us that he found the knee joint, the strongest evidence for upright stance, in a location some two to three kilometers away from the place the rest of the bones were found; and there again, in a layer of rock some 200 feet lower. If so, the knee-joint, it is not unprobable, does not belong to the rest. It is pointed out that, even if they are all placed together, the knee is not diagnostically upright; rather it is more suggestive of the abilities for climbing trees, argues Oxnard. Oxnard is ably supported by Jack Stern and Randall Susman in calling into question the hominid character of the knee joint:

> The knee of the smaller Hadar hominid shares with other australopithecines a marked obliquity of the femoral shaft relative to the bicondylar plane, but, in all other respects, it falls outside the range of modern human variation.... the overall structure of the knee is compatible with a significant degree of arboreal locomotion.[13]

Morris therefore concludes that two, or perhaps three, species have wrongly been combined in the reconstruction of Lucy; that she may not be a human ancestor at all. At best, she was a form of extinct ape; at worse, she was a mosaic. It is regrettable that 'she is still touted as the best "evidence" for human evolution'.[14]

The case history of Lucy in anthropology is a type. For a number of palaeontologists have their own 'Lucy', today, in the pigmy chimpanzee, the *bonabo*, an inhabitant of the Zaire, as it is 'almost identical in body size, in stature and in brain size' with Lucy, the oldest fossil hominid.[15] The few

differences are exactly what many think would characterize the common ancestor of the Australopithecines as well as modern apes and man. Such leading anthropologists as Vincent Sarich, Adrienne Zihlman and Douglas Cranmer have become the champion of the bonabo model. But, to the extent that they base their studies on the anatomy of living apes and fossilized hominids,[16] their claim is open to the objections cited above. Lucy attained a lofty status on the family tree of man because of the absence of a better candidate. But she has already slipped down from the family tree to suffer the same fate as have the numerous other missing links.

B. RAMAPITHECUS

Ramapithecus, literally ' the ape-man of Rama' is another of the evolutionists' fossil reconstruction. The fossil was found in India in 1932; it consisted of several teeth and jaw fragments; the incisors and canines, although ape-like, are smaller than those of modern apes. Its age is said to be about 14 m.y. With these features, it qualified to be hominid.[17] The proponents of *Ramapithecus* are David Pilbeam of Harvard University and Elwyn Simons of Duke University. Its hominid status is asserted as a creature in the direct line leading to man.[18]

Challenges to the status of Ramapithecus as the hominid, however, were not long in coming. Robert Eckhardt was the earliest critic. His critique has universal appeal:

> Amid the bewildering array of early fossil hominids, is there one whose morphology marks it as man's hominid ancestor ? If the factor of genetic variability is considered, the answer appears to be No.[19]

Gish carries forward the appeal in that, 'nowhere among the fossil apes or ape-like creatures can be found what could be judged to be a proper ancestor for Man'.[20] What was the fossil evidence for the hominid *Ramapithecus*? In absolute terms, 'it remains tantalisingly small fragments of upper and lower jaws, plus a collection of teeth'.[21] Was this evidence conclusive enough to reconstruct a hominid ancestor of humans? It is said that this mostly hypothetical creature was drawn by artists as an 'ape-man' and pictures of it flooded evolutionary literature - all on the basis of jawbone fragments and teeth! *The New York Times* reported, for decades *Ramapithecus* 'sat as securely as anything can at the base of the human evolutionary tree'.[22] Recent and more complete fossils finds revealed that Ramapithecus closely resembled the present

day ape family. It is now established that *Ramapithecus* was a pongid, and not a hominid. Even an element of surprise at its having acquired the character of a hominid is expressed:

> How did Ramapithecus... reconstructed only from teeth and jaws - without a known pelvis, limb bones and skull - sneak into this manward-marching procession? [23]

The last nail on the coffin was hit by David Pilbeam himself in his admission that he had come to believe that *Ramapithecus* walked bipedally, solely on the basis of fragments of the jaws and teeth. He acknowledged that his earlier conclusion was based on his preconceived ideas than the actual data.[24] There is a great deal of wishful thinking that makes 'the evidence say what it does not say'.[25]

C. HOMO ERECTUS

Homo erectus is the generic name assigned to a group of fossil men, including *Java Man*, *Peking Man*, *Heidelberg Man* and *Meganthropus*. These are believed to have walked upright, to have lived about 500,000 years ago, to have had enlarged brain of 1000 c.c. and to have some kind of material culture evidenced from the simple implements and weapons. The story of *Homo erectus* begins with the studies of Eugene Dubois.

(a) **Java Man**. In 1887, a Dutch doctor, Eugene Dubois went to the Dutch East Indies for his field work. In the Island of Java, along the banks of the Solo River, he chanced upon a skull cap. A year later, he found a femur some fifty feet away. Dubois subsequently added three teeth to his collection. He believed that, though the fossil specimens were separated by a distance of 50 feet, the fragments were from a single individual. He reconstructed out of them his missing link between ape and man, named the species *Pithecanthropus erectus*, literally 'the erect ape-man'. This find ingratiated his former professor Ernest Haeckel. A life-size model of the fossils, under the name of 'Java Man', was commissioned to be exhibited in museums throughout Europe. The pictures of the slouching hairy brute had become so common-place in England that it compelled even literary figures like G.K. Chesterson to ridicule the depictions of Java Man:

> Popular histories published portraits of him like the portraits of Charles I or George IV. A detailed drawing was reproduced, carefully shaded, to show the very hairs of his head were all numbered. No uninformed persons looking at its

carefully lined face would imagine for a moment that this was the portrait of a thigh bone, and a few teeth and a fragment of a cranium [26]

The ridicule of the non-anthropologist was a mirror to the prevalence of doubts among the scholars. Dubois had not disclosed that he had also found the bones and teeth in separate places. This would have questioned the feasibility of a reconstruction of the Java Man. More serious charge against Dubois was that he had also withheld the information that he had also discovered, at nearby Wadjak, at approximately the same level, two human skulls with a cranial capacity of about 1550-1650 c.c. The capacity obviously is more than the present human average. To have revealed this fact at that time would surely have rendered his Java Man unfit to be the missing link. However, when a similar discovery was announced in 1922 by others, Dubois was forced to admit the possession of the Wadjak skulls for over thirty years. About fifteen years before his death, when most evolutionists were convinced of the man-like status of the *Homo Erectus*, Dubois desperately declared his Java Man to be a giant gibbon.[27]

As if Dubois' own admission was not bold enough, bolder revelations on the Java Man were made by Marcellin Boule and H.V. Vallois, who confirmed the gibbon character of the Java Man. Further, Von Koenigwald, a German palaeontologist, after his discovery of additional material in Java Man, attributed the molars and a pre-molar, that Dubois had discovered, to Orangutan and man respectively.[28] Boule and Vallois found the femur of the Java Man to be indistinguishable from that of a human. Thus the skull and the teeth are said to be closely allied to the Anthropoids, but the femur to man.[29] Gish opines that Dubois naturally jumped to the conclusion that the femur and skull cap belonged to the same individual and that this individual was thus an ape-man who walked erect, - a true missing link. As noted earlier, the three teeth that Dubois also associated with the skull cap did not belong to the owner of the skull cap, and there appears little justification in attributing the femur to the owner of that skull cap.[30]

(b) **Peking Man**. During the 1920s and 1930s, some fragments from thirty skulls, eleven lower jaws and about 147 teeth, were found at Choukoutien, about 25 miles from Peking, China. Practically, nothing of limb bones was found. In fact, one of the initial finds was a single tooth. On its strength alone, Davidson Black, Professor of Anatomy at Union Medical College, Peking, declared the evidence for the existence of an ancient hominid in

China. The hominid was designated as *Sinanthropus pekinesis*, the Peking Man.

Surprisingly, while the models and pictures of Peking Man continue to adorn the museums and text-books, there is nothing that could be investigated about the Peking Man since all of these fragments, except two teeth, were allegedly lost during the World War II. Stories concerning the disappearance of the fossils lack authenticity, making it even more difficult to recover the fossils. The models and descriptions of the lost material come to us from the advocates, who were totally committed to the idea that man evolved from animal ancestors. This therefore is of little help for a critical evaluation.

(c) **Nebraska Man**. The fossil find of a tooth in 1922 by the geologist Harold J. Cook, in the Snake Creek fossil beds in the Pliocene deposits in Nebraska, USA, has given us a species of *Homo Erectus*, named Nebraska Man. Henry Fairfield Osborn, the Head of the American Museum of Natural History, recognized in the tooth fossil, human, chimpanzee and ape-man characteristics. The reconstructed hominid was named *Hesperopithecus Haroldcooki*, literally, 'Harold Cook's ape-man from the land of the setting sun'.[31]

The reconstruction was carried out to ridiculous extent in the University of Manchester in that the painting of Nebraska Man was set in the exotic prehistoric surroundings, complete with prehistoric horses and camels. Nebraska Man was even used in the famous Tennessee Trial of 1925 as an evidence to human descent from ape-like ancestors.[32]

Critical investigations into Nebraska Man were quick and aplenty. Thompson of the American Museum of Natural History visited in 1927 the place, where Harold Cook had found the *Hesperopithecus*. He found several similar teeth, and identified them, far from being human or ape-like, with those of an extinct pig; Gish was led to ironically exclaim, 'This is a case in which a scientist made a man out of a pig and the pig made a monkey out of the scientist!'.[33] One may chuckle at the human gullibility and the readiness to jump to a quick but dubious conclusions. But even today, a great majority of scientists and non-scientists alike tend to see evidence where none exists. Refutations are pouring in. The recent charge that Noel Boaz has mistaken a dolphin's rib for the shoulder bone of a hominid still holds good.[34] A skull fragment, hailed as the oldest human fossil ever found in Europe, turned out to be from a donkey.[35]

The fossil has been dubbed '*Orce Man*', after the southern Spanish town of Orce. But the French experts revealed that the Orce Man was most likely a skull fragment from a 4 month old donkey, forcing the abrupt cancellation of a proposed symposium on the subject. I may sum up in Zuckerman's words:

> An ape's jaw in 1912 [36], a pig's tooth in 1922, a dolphin's rib and donkey's skull in the 1980s - the script is the same, only the actors and props have changed... It is doubtful whether there is any science at all in the search for Man's fossil ancestry".[37]

Nor is there any philosophy in it considering the logic in the arguments.

D. NEANDERTHAL MAN

Neanderthal Man was reconstructed from the bones discovered in 1857 at the Neander Valley in Germany. In the process of clearing mud and debris out of a cave, some bones in the debris caught the attention of Johann Carl Fuhlrott, a teacher from the nearby Elberfeld. The bones consisted of a skull cap and limb bones. These were studied carefully by the anatomist professor Hermann Schaaffhausen of Bonn. Thus was born the Neanderthal Man. Since then, remains of other Neanderthal people have been reported from other parts of Europe, North Africa and Asia. Initially called *Homo Neanderthalensis*, Neanderthal Man was pictured with heavy brow ridges. He was shown to be ape-like in appearance, but with bones greatly shrunken.

Since 1950s extensive research on Neanderthal Man has proved that it was truly human, *homo sapiens*, no different from the modern man. But the Neanderthal people were said to have suffered severely from osteomolacia, caused by a deficiency in Vitamin D. The condition results in the softening of bones and the consequent malformation of the stooped skeletal structure. Flesh models of Neanderthal man unwittingly covered these physiological blemish of the malformed specimen. 'The cranial capacity of the Neanderthal race of *Homo sapiens* was, on the average, equal to or even greater than that in modern man'.[38] It is not unlikely that the Neanderthal Man, if we go by the fossils of cave paintings, flowers cultivated, tools fashioned, possibly practised some kind of religion; he buried the dead; possibly, he had a form of writing.[39]

Having examined the claims of each of these ape-men, supposedly serving as a missing link, I would now turn to some philosophical reflections on the

theory of the origin of man from the ape-man.

To begin with, first, some methodological problems. It is important to remind ourselves that these missing links are invariably reconstructed from the extremely scantly fossil remains, often no more than a jaw bone or a tooth. Such reconstructions are always based on preconceived ideas, liable to error. The bones of fossil animals tell us practically nothing about the fleshy fittings on the bones, much less of the nose, lips and ears. It would be impossible to reconstruct from the skeletal cage of an elephant,its nostrils at the tip of a long flexible trunk; nor anything about the size and shape of its ears; nor, for that matter, the colour of its skin. Yet, the evolutionists, by way of their models and drawings of the ape-man, perpetuate the myth with a claim on scientific accuracy. There is much in their practice that goes against science; even more in their theory that goes against philosophy. The general public are liable to be fed on a non-scientific and non-philosophical staple. One tends to forget that a great deal of the ape-man theory is no more than the figment of preconceived ideas. Every reconstruction is shown to be extremely fragile. Evolution scientists, I am aware, are prone to dismiss the above methodological flaw in the name of scientifically acknowledged methods of determining the age of the fossils. But this too does not seem to carry conviction even within their own discipline.

How do scientists date fossils? Before Johanson, *Zinjanthropus bosei*, the oldest fossil find by Louis and Mary Leakey was claimed to be 1.75 to 2 m.y. old. Since the older the fossil the greater its value, Johanson assigned his Lucy to 3.6 m.y. The irksome question of the basis of determining the date was not even entertained in the early years of the evolution studies. It is shocking that the one-upmanship over the fellow evolutionists seems to be the methodological principle in those early years. The methodology of dating was to evolve gradually towards degrees of perfection. Hence the controversies were aplenty, thanks to scholars from other related disciplines. Challenges to Johanson's date of 3.6 m.y. for Lucy came from Francis Brown, a geologist. Brown saw a correlation between the volcanic tuffs at Hadar and those at Lake Turkana, which he had petrologically determined to be 3 m.y. So, Lucy cannot be older than the Turkanian tuffs.[40] He did not care to question the construction itself of Lucy. Noel Boaz brought this co-relation even closer, in so far as he compared Lucy with the animal fossils of Hadar to reduce her age. But the tendency to lay claim to the discovery of the oldest known fossils grew unabated.

Leakey sought to supply a basis in potassium-argon dating for the determination of the age of his fossil find. He ended up adding another 0.6 m.y. to the skull (ER 1470), already dated to be 2.6 m.y. old. Curiously enough, the efforts to assign the older dates by their discoverers were only matched by those of reducing the age by others. Thus, J.E. Cronin, N.T. Boaz, C.B. Stringer and Y. Rak cited faunal studies, potassium-argon dating, and fission-track dating to reduce the age of Leakey's find to 1.8 m.y.[41] Heavy mineralization is generally expected of fossils of antiquity. But Leakey's specimens were found to be poorly mineralized. The kind of flexibility in fixing the dates of the fossils, exhibited above, is highly suggestive of the fact that the dates assigned to the fossils is anything but exact. They are adjusted to fit the current conventional wisdom, and not to be taken in absolute terms. This applies to the radio-carbon dating, potassium-argon method and uranium method, presently in vogue. They are largely assumptions to fit the hypothesis of slow evolutionary development. In the process, forgeries are not infrequently passed on to the gullible scientists and public alike. The story of the Piltdown forgery is a classic case. It tarnishes both the content and the methodology of the theory of evolution.

The desperate need for finding the missing fossil link of common ancestor has induced some unscrupulous evolutionists to fabricate their fossils. Haeckel, discussed in chapter three, was not the only one in the chain. The infamous Piltdown Man is perhaps a blot on the study of the history of evolution. Charles Dawson, an English archaeologist, stumbled upon some bone fragments in a gravel pit near Piltdown in 1912. Further searches in the area produced portions of a skull and jaw bone. The antiquity of the bones was verified; the skull had human characteristics, the jaw bone however was ape-like. As the point of attachment was missing, the fitting of the jaw with the skull could not be ascertained. All the finds were put together to reconstruct the *Eanthropus Dawsoni*, 'Dawn Man', more popularly known as the Piltdown Man, 500,000 years old. His claim to be the human ancestor went unchallenged for over 40 years.[42]

However, by 1950, a new method became availabale for assigning the relative age to fossil bones; it was based on the amount of fluoride absorption by bones from the soil. The Piltdown bones under the scrutiny alarmed the scientists: The jaw bone contained practically no fluoride, thus at once belying its fossil status. It was judged to be not older than the year it was found. The

skull, on the other hand, had a significant amount of fluoride, but was estimated to be a few thousand years old, far from its claim to 500,000 years.[43] As the evidence against the Piltdown Man was mounting, the authorities of the British museum allowed tests to be carried out on the original finds, rather than the casts. Monty White reported the unpleasant facts:

> First of all, X-rays showed that the roots were not human. Then it was shown that the fluorine content of the jaw and teeth was different from the cranium; this meant that the jaw and cranium could not belong to the same individual. Further tests showed that the cranium had been stained with potassium dichromate and the jaw with Van Dyke brown, a colour containing iron. According to Woodward, Dawson had applied the potassium dichromate to harden the fossils.[44]

Further, the teeth were filed down to produce the effect of a wear-out. The Piltdown Man had bitten more than he could chew!

Thus, the Piltdown Man was exposed as a forgery. The final finding was that a human skull and Orang-utan's jaw had been deliberately fashioned to reconstruct a missing link; that they were deliberately planted in the excavated cave. The British government, outraged over the forgery undetected for so long, tabled a motion in the House of Commons 'That the House had no confidence in the Trustees of the British Museum'. The role of the academic community was not any glorious either, when roughly 500 doctoral dissertations were written on Piltdown Man 'with intense scientific scrutiny' that failed to expose the fake'.[45] This is no credit to the uncritical tendency of the scholars to find what is not there, but what is looked for. 'Time and again, fossils are lined up to make the casual observer conclude that they came from one another.... Truly, the fossil evidence and corresponding reconstructions presented for man's evolution is the shabbiest excuse for 'science'.[46] This is not to denigrate science, but to highlight the power of bias in science. On the contrary, true scientific facts may speak for the theory of creation without serious contradictions. What has creation theory to say on the origin of man?

II. ANTIQUITY OF MAN

Contrary to the popular belief of man's ancestry from lower animals, there, however, is much evidence that modern man existed contemporaneously with all these hypothetical ape-like ancestors, extinct or extant. *Science News*[47] of November, 1972 reported that "man's unique bipedal locomotion was developed at least 2.5 million years ago". The same news also

reported that Leakey and his co-workers found in 1971 three jaws bones, leg bones and more than 400 man-made stone tools attributed to the genus *Homo*, dated at 2.6 m.y. This would, for all practical purposes, mean that modern man was living prior to Neanderthal Man dated about 35,000 years old, and *Homo erectus*, aged 1.75 m.y. Taking these evidences at face value as was done by evolutionists, would mean complete elimination of his imagined evolutionary ancestry.

Since man's origin is recognized to be more ancient than what the evolutionists believed, anthropologists should have a new look at their old data, in particular, the irksome fossils ignored by them previously.[48] The Castenedolo and Olmo skulls, found in Italy in 1860 and 1863 respectively, ignored by the evolutionists as misfits into their theory, are as good as modern skulls, and yet, were found in undisturbed Pliocene strata, around 5 m.y. old. The Calaveras skull, found in 1886 in California in the Pliocene deposits, is a fully developed modern skull.[49] Not that these fossils were not well documented, if they did not receive our attention, but that they did not fit in with the accepted theory of evolution.

The 'Laetoli Footprints' are also cited as evidences for the antiquity or of the contemporaneity of man with his supposed remote ancestors. They are said to be the genuine human footprints, found in rocks 3.5 m.y. old at Laetoli in Tanzania. There, the human tracks, along with those of many such animals as hares, antelope, pig, elephant, rhinoceros, were found in a cement-like volcanic tuff rock. The people and the animals may have walked on freshly deposited volcanic ash, still wet; and as the ash was high in carbonates, it quickly hardened, fossilising the tracks.[50] 'The uneroded footprints show a total morphological pattern like that seen in modern humans'.[51] The tracks could quite easily have been made by a couple of pygmies.[52] If the evolutionists were perplexed, and impelled to ignore the Laetoli footprints, 3.5 m.y. old, it is because the latter exposed the fragility of their theory that homo sapiens did not exist before 2 m.y. On the other hand, the footprints of elephants, hares and pigs are recognized as such, but, when it comes to human footprints, they could not believe them as such; they rather become ape-man's. Creationists, on the contrary, have no difficulty with these and similar scientific evidences.

To conclude. A careful analysis of the classical evidence for man's evolution from ape-like ancestors, such as the *Australopithecus*, *Ramapithecus*,

Lucy, *Homo erectus* like *Java Man*, *Peking Man*, *Nebraska Man* and *Neanderthal Man*, reveal the theory to be both philosophically and scientifically lacking. Despite its presentation in textbooks as incontrovertible fact, it turns out to be, on closer scrutiny, merely imaginations, thanks to preconceived commitments, fed on the fabrications of the anthro artists. The evolutionists, at least a few of them, have often indulged in the not so credible activity of positively misleading the public, by way of their fake fossil - model for parading them as proof, even in the courts of law, for evolution, as is the case of the Piltdown forgery. On the contrary, the more remarkable and scientific findings clearly show that modern man was actually contemporaneous with his presumed ape-man ancestors, if not also older. All this only suggests that man's origin has a direct line of his own, - a fundamental tenet of a creationistic theory, that attributes the origin of all things to the creative act of the Supreme. ❐

CHAPTER - 6

EVIDENCES FOR CREATION

CHAPTER-6

EVIDENCES FOR CREATION

I propose to present and analyse in this chapter some evidences, both scientific and philosophical, for special creation. I will mainly confine myself to the argument from design, not in the hackneyed fashion that is usually done by a great many philosophers. Since my subject matter bears on both evolution and creation, I will have to address myself both to scientific and philosophical evidence. Nonetheless the philosophical argument that a design requires a designer, a creator God to the believer, remains central to the discussion. Belief in a creator God, far from waning in the face of scientific discoveries, is waxing, if only one is open to the inconceivably marvellous design around him. The argument as such is as old as philosophy, but the modern science has made it much more plausible. I will first present a brief historical development of the argument. This will be followed by an analysis of the complexities of living organism, photosynthesis, the planet earth, and the animal kingdom to argue for a scientific creationism.

A. THE DEVELOPMENT OF ARGUMENT FROM DESIGN

An argument for the existence of an intelligent and all-powerful, often personal, creative principle is an ancient legacy of philosophy everywhere. Greek philosophy, in particular, laid the foundation for such a principle in a number of such philosophical concepts as *Demiurge*, *Nous*, *Actus purus* and *logos*. Taking a cue from the Aristotelian metaphysics, Aquinas formulated his celebrated five arguments for the existence of God. The force of these arguments over the years has been such that, when an argument is philosophically challenged, it is once again equally philosophically reinstated. Of all the arguments, it is contended that the argument from design is the weakest, since the advent of modern science is said to have challenged it conclusively. My concern here is a limited one. Does the scientific evidence in the evolutionary matrix force us to abandon the argument from design? In my

considered opinion, quite the contrary seems to be the case.

Man's observation and contemplation of nature have exerted a profound influence upon human thought since the dawn of history. The idea that the universe was designed by God (or gods) is found in all pre-philosophical mythologies, out of which grew cosmogonic theories to be refined by philosophical reflections. Among the Hebrews, we find its expression repeatedly. Their scriptures begin with the perception, 'In the beginning, God created the heavens and the earth'. Later a Christian philosophy was to make of creation a manifest proof for 'the eternal power and Godhead of its Creator' (Romans 1:20).

If, as the Psalmist proclaims, 'the heavens declare the glory of God and the skies the work of his hands' (19:1), the creator may not be said to have left for mankind everywhere without a witness for his existence. Aristotle was profoundly convinced that the world had been intelligently designed. Belief in a Providence was central to the teachings of the Stoics. Cicero believed that it would be as sensible to suppose that the world has come into existence by chance as to suppose that the alphabets, thrown upon the ground, would fall into a legible order to form the *Annals of Ennus*.[1] Pliny the Younger was greatly impressed by the design in nature.

The dominant spirit of the Medieval philosophy, represented by the Christian apologists, is permeated by the conviction for the evidences of God in nature, occasioning a natural, as distinct from a revealed, theology. Galen's work on the human anatomy already reflects, in the second century, the divine design of every part of human body. Job of Edessa, the great encyclopedist of the early ninth century, is eloquent of design in nature, as he summarizes the scientific knowledge of the day in respect of plants, animals, rivers, mountains, waters, metals and everything, and thus of the Designer's wisdom. Neither Alexander Neckam nor Roger Bacon, while heralding the advent of a scientific enquiry into nature, was prepared to reject the handiwork of god in it.

The Reformation brought with it a renewed interest in the subject of design in nature. The early Puritans, while introducing an element of anthropocentrism of creation, held firmly to the design argument. The beginning of modern science in the 17th century was, in a large measure, initiated by scientists, who believed in God's handiwork in nature. Scientific search for the marvels of his creation was viewed as seeking God's glory. Hence a

lack of interest in 'science' was considered a 'sinful' state of mind, when man is endowed with the divine gift of understanding. The invention of telescope and microscope had increased man's knowledge for the wonders of creation. The early scientific movement reached its zenith in the work of Newton. He saw in the law of gravitation the handiwork of an intelligent and powerful being. The Royal Society of London considered the great discoveries of science as extolling and magnifying the Creator's marvellous designs, written in God's 'Book of Nature'. Embodying the spirit of the early nineteenth century, was written the best known work of the day, Paley's *Natural Theology*. The work, even when attacked vigorously in our day, is a living testimony for the philosophical power of the argument from design.

The middle of the 19th century however saw a strong reaction against the traditional supernatural explanation of nature, due to the rise of such naturalists as Darwin, Hobbes, Huxley, Haeckel and others. Evolutionary philosophy is only one of the expressions of antisupernaturalism, that sought to attack the doctrine of creation. 'Matter was now proclaimed to be eternal and self evolving (subsisting); its properties were such that universes, suns, and planets would necessarily come into existence of their own accord: philosophical law became the expression of blind, unintelligent necessity, no longer did it require a Creator or Law-giver'.[2] The new school of Biology considered the design in animals a superficial appearance, to be explained away by Natural Selection. The contention of the naturalists, that there is much disharmony, ugliness, parasitism, useless organs and needless suffering in nature, cannot be easily brushed aside. Even in Astronomy, where order was said to be the guiding rule, the new school saw a state of disorder: the heavens are ruled by blind mechanics.

The new view of nature, subjected to the powers of blind mechanistic forces, became firmly entrenched within science, finally to undermine the old design argument in philosophy and religion. The naturalistic thinking has become the dominant philosophy of the day. But a naturalistic interpretation perhaps has to encounter its own nemesis, as I proceed to analyse the evidences from science itself in favour of the design and creationism.

B. DESIGN IN LIVING ORGANISMS

Let me begin with the world of living organisms in my search for design to substantiate creation.

(i) **The Incredible Living Cell**. Modern science has clearly shown that living organisms are composed of innumerable and enormously complex cells, all working in highly specialized manner. The human body is composed of approximately 100,000,000,000,000 microscopic living cells. Within each cell is an intricately complex of specialized protein molecules. Each protein molecule is a particularly organized structure, composed of about twenty different amino acids, and each amino acid is made up of the four elements of hydrogen, oxygen, nitrogen and carbon.

One is baffled at the level of intelligence that would be necessary to create such a complicated living machine, yet so microscopic, no larger than a single strand of a hair. Each cell functions like a walled city. Power plants generate the cell's energy, factories produce proteins, vital units of chemical commerce, complex transportation systems guide specific chemicals from point to point within the cell and beyond. Sentries at the barricade control the export and import markets, and monitor the outside world for signs of danger. Disciplined biological armies stand ready to grapple with invaders. A centralised genetic government maintains order. The chromosomes contain the cell's DNA, which is the genetic master plan of the cell; and the nucleus, the most important part of the cell, is located in the centre, and is the central control that directs the cell's activities. The cell is a living, complicated and highly advanced workshop. The average cell carries out hundreds of chemical reactions every second, and can reproduce itself every twenty minutes or so. Yet all this occurs on such a tiny scale one can easily miss its significance.

Lest one should find fault with the type of language used here, it is used by scientists themselves. Biologist Francois Jacob marvels at the 'minute laboratory of the bacterial cell', which carries out some two thousand distinct reactions with 'incomparable skill', in the smallest space imaginable, without ever being tangled.[3] 'Just a single cell could make weapons, catch food, digest it, get rid of wastes, move around, build houses, engage in sexual activity straightforward or bizarre. These creatures are still around.[4] Richard Dawkins, one of the best known evolutionists of our times, comments, 'There is enough storage capacity in the DNA of a single lily seed or a single salamander sperm to store the *Encyclopedia Brittanica* 60 times over'.[5]

Molecular biologist Michael Denton writes that the bacterial cells, the simplest of all living systems on earth today, are exceedingly complex; that,

weighing less than one trillionth of a gram, each is a 'veritable micro-miniaturized factory', with thousands of exquisitely designed pieces of intricate molecular machinery; that they are 'absolutely without any parallel in the non-living world'.[6] The human body is composed of a whopping 100 trillion cells. Each cell is a world, brimming with as many as two hundred trillion tiny molecules. The basic design of the cell system, namely, the size and the structure of the protein synthetic machinery, is practically the same in all cells so that no living systems can be thought of as being primitive with respect to any other system. Nor is there the slightest empirical hint of an evolutionary sequence among all the incredibly diverse cells on earth.

(ii) **The Genetic Code**. We may here focus our attention to a part of the cell, the nucleotides, where DNA (deoxyribonucleic acid) and RNA (ribonucleic acid) reside. The lives of all living things on earth are thought to be kept alive by coded messages from the genes, transmitted from the DNA via its messenger RNA to synthesize the proteins, that form the chemical basis of life. The design here is astounding:

> All proteins of living materials are made up of the same 20 amino acids in differing proportions, and all life is structured from cells of about the same size, which divide and renew themselves in a remarkably similar way The spiral structure of DNA, with its links consisting of four nucleotide acids, is also common to everything alive?[7]

Evolutionists maintain that the every presence of these common chemical properties, especially the universality of the genetic code, prove that all living creatures on earth have evolved from a common ancestor, the first cell replicating system with DNA, together with the genetic code, as a result of chance. It implies that the living systems have evolved from non-living inorganic compounds . The first living cell somehow evolved from non-living thing, which somehow was able to replicate and reproduce itself through DNA and RNA. There is no need for a supernatural designer, as it is an accident, a chance combination of natural forces working at random.

But the creationists object that there is no scientific explanation for the evolution of the living from the non-living things. The origin of the genetic code, the basic building block of life, poses a scientific mystery. The five histones, responsible for governing the activity of genes, are involved in the DNA. The chance of forming even the simplest of these histones is said to be 1 in 20^{100}, reducing the formation of histones to zero possibility.[8] Even far

more difficult for evolutionary theory is to explain the origin of the complete genetic code, which is a basic requirement for cell reproduction. 'Proteins depend on DNA for their formation. But DNA cannot form without pre-existing protein'[9] Both DNA and protein are interdependent, which gives rise to the paradox, after the proverbial 'chicken-egg' procession.[10] The existence of the genetic code is 'the most baffling aspect of the problem of the origin of life'.[11] Therefore, it is admitted, 'Inspite of the genetic code being almost universal, the mechanism necessary to embody it is far too complex to have arisen in one blow'.[12]

The origin of such complex cells, with its incredibly complex and efficient functioning of DNA with its genetic code, is one of the greatest challenges for evolutionists. The theory of chance has a mere speculation. Hence, the admission: 'The evolution of the genetic machinery is the step for which there are no laboratory models; hence one can speculate endlessly unfettered by inconvenient facts'.[13] It is therefore highly improbable that a complex system of the DNA molecule could ever arise by chance. The creation model, however simple it may look, can at least face the complexity without serious contradictions. The creationist may further have a philosophy to justify the claims of creation.

(iii) **Photosynthesis**. Photosynthesis may be considered to be a key evidence for design, making for a special creation. It is the process by which plants manufacture their food, using the energy of sunlight, carbon dioxide from the air, water and minerals from the soil. In the process, they use the carbon dioxide and give out oxygen essential for the animal kingdom. Without photosynthesis there could be no life on earth, as the animal kingdom takes in oxygen from the atmosphere, and breathes out carbon dioxide, whereas plant kingdom takes in carbon dioxide and gives out oxygen. The arrangement, far from being a random chance, may be a very strong evidence for design.

Though life on earth depends on a remarkable arrangement, the process of photosynthesis is not yet completely understood by scientists. The advocates of chance occurrence of life have not 'yet been able to reproduce in a test tube".[14] By the remarkable process, sunlight is absorbed by the chlorophyll in the leaf, and water is broken into hydrogen and oxygen. The leaf interacts with carbon dioxide from the air, forming carbohydrates, that become in turn sugar, the plant's food. The world's green plants make an estimated 150 billion tons of sugar a year through photosyn-

thesis, and oxygen, almost 25% of the sugar's weight, to replenish the air. The sugar stored in the plant may be eaten, or burned or buried into a mass to turn into coal or oil.

The remarkable feat about photosynthesis is that the plant achieves something a chemist finds hard to accomplish: the breaking down of water molecule at ordinary temperature. While oxygen and hydrogen readily react to form water, it takes tremendous amount of heat to break down water into hydrogen and oxygen. When heated to 5400° F, twice the temperature needed to melt steel, about 1/4th of the molecules of water splits up, whereas plants accomplish this engineering feat naturally by using the energy from sunlight alone! Plant physiologists and organic chemists are awe-struck most of all by this feat of manufacturing sugar from carbon dioxide and water. 'Not only are scientists unable to duplicate photosynthesis outside the living plant cells, they do not know of any half way efficient method of coverting light energy into chemical energy'.[15]

Yet another amazing feature of photosynthesis is the circulatory system in plants, that many scientists regard as almost miraculous. The system cannot function without the help of tiny roots. The root-hairs absorb water and minerals from the soil, which then travel up the minute channels in the sapwood high up to the leaves. The mechanism of water getting pumped up in this way to three hundred feet above the ground in some tall trees is a mechanical marvel. Excess water evaporates from the leaves by a process of transpiration, so that an enormous quantity of water is recycled into the air, which both cools the air and pours down again as rain. The water cycle, simple though, is a perfect designed system.

It is difficult for an evolutionist to explain how this incredibly and mysterious process of photosynthesis starts operating by self-arrangement through random chance. Scientific creationism would, on the other hand, treat the phenomenon of photosynthesis, not a development by natural processes, but as supernaturally created by an omniscient Creator. If it is in a functionally complete form from the beginning, there is no question of its further evolution. In the face of such designs, at least some scientists have found it hard to believe that these miraculous nature's laboratories happen by chance. Rather they tend to see intelligence in operation in the natural world. The Nobel Laureate physicist, Robert A. Millikan, an evolutionist though, observed:

> There's a Divinity that shapes our ends A purely materialistic philosophy is to me the height of unintelligence Wise men in all the ages have always seen enough to at least make them reverent [10]

Millikan was basing his observations on the words of Einstein, 'Try humbly to comprehend even an infinitesimal part of the intelligence manifest in nature'. The honest scientist then cannot but exclaim with the Psalmist, attesting for creation,

> O Lord, how manifold are thy works In wisdom hast thou made them all The earth is full of thy riches (Psalms 104 24)

C. DESIGN ON THE EARTH

How did the planet earth, with all its complex forms of innumerable living organisms, come into being? Did the earth itself evolve by unguided chance processess? Or should we consider that earth too is a part of a universal design of an everseeing Intelligence that we call creator? The astronauts, who viewed the earth from space, may have practically exclaimed earth to be the wonder of the universe, 'a unique sphere and a rare, beautiful jewel in space'; but there is to it something more than what meets our eyes. Of all the planets in our solar system, only on earth, it is believed, is life found. So far as we know, only on earth, we have a marvellous variety of living things - microscopic organisms, insects, plants, fishes, birds, animals and humans; of a vast wealth of air, water, humus needed for the sustenance of life. All these make the earth a truly unique world. Is this too a chance occurrence? Let the facts speak for themselves.

First of all, the most important factor, affecting the surface temperature of the earth is its ideal distance from the sun. The approximate 93,000,000 miles distance turns out to be ideal. If the earth were much closer to the sun, like the neighboring planets of Venus and Mercury, then the earth's temperature would be too hot for life as we know it to appear. If the earth were farther from the sun, as is the case of Mars or Jupiter, then, too, life as we know it would not be possible, because of extreme cold climate.

Secondly, the earth orbits the sun once a year at the speed of 66,000 miles per hour. It has been estimated that this speed is just right to offset the gravitational pull of the sun, and to keep the earth in an orbit. If the speed were to be decreased, the sun's gravitation would pull the earth towards it and turn it into a scorched wasteland. However, if the orbital speed were to be increased,

it would move further away from the sun to turn into an icy wasteland.

Thirdly, the earth's rotation on its axis every 24 hours regulates the periods of night and day; even so, it also regulates the temperature in such a way that sun's light and heat is distributed more or less equally on the entire globe to make conditions for living possible. Moreover, the earth's tilting $23\frac{1}{2}^{o}$ in relation to the sun makes for delightful climatic changes. Again, the spherical shape of the earth, as against a flat earth, also makes an equitable distribution of sun's light and temperature possible.

Fourthly, earth has an atmosphere. One of the most amazing features of the earth is that it is surrounded by a thick blanket of atmosphere, that contains gases essential for life in the right proportion. No other planet in the solar system may have an atmosphere, not even earth's own satellite, the moon. An important constituent of atmosphere is oxygen, which makes up 21% of air. Nearly all living beings depend on oxygen for their living. Nothing would burn but for oxygen. Yet, a higher percentage of oxygen, or pure oxygen, would be equally dangerous. Too much of oxygen in the air would render all materials combustible and highly flammable. Nature has designed, as if to overcome the danger, the right proportion of the oxygen in the air we breathe in, with 78% of nitrogen in it. The huge amount of nitrogen in the atmosphere, apparently of no specific use in its natural state, is of immeasurable benefit to the enrichment of soil that sustains all growth of life. Lightning causes nitrogen to combine with oxygen, and the compounds so produced are carried down to the earth by rain to become the greatest source of fertiliser for plants. The other important constituent of atmosphere is carbon dioxide, which aids in keeping the earth pleasantly warm and constant. Even though the atmospheric content of CO_2 is 0.035% only, it is exactly the right amount for conditioning the air. Any decrease or increase in the carbon dioxide content would be at once harmful to all living beings. Needless to say, it is a marvellous, precise and self-sustaining atmosphere to make life in its many forms possible.

An equally vital function of atmosphere is that it serves as a protecting shield against harmful radiation from the sun through its ultra violet and the cosmic rays, which otherwise would burn the earth without mercy. The ozone layer, thinly blanketing the earth about 15 miles above, effectively filters the harmful radiation from the sun. Moreover, the atmosphere also acts as an

incredible armour against the debris of cosmic explosion. The debris, largely made up of iron and nickel, shoot out from all the directions towards the earth. While much of it may be minute dust-like bits, at least a good bit of it may be large enough to destroy life on earth. These fragments, or meteors, rain on the earth constantly. However, most of the meteors do not reach the earth's surface, as they burn up in their descent through the thick blanket of atmosphere. In the absence of the atmospheric protection, our earth, like other planets, would be exposed to continuous and deadly meteorite bombardment to make it impossible for life to survive.

Finally, the presence of water on earth makes for a whole range of functions. What mysterious forces operate to store and distribute heat? How are our days sheltered so that we do not burn? How are our nights warmed so that we do not freeze? Why do the seasons vary so little on this most favoured of the planet? Answers to these questions are neither final nor exhaustive, but they are in some way related to the effects of water, the most abundant and the most un-usual compound, on earth's surface. Water is a mysterious substance, indeed, a key to the system of the control of global temperature.

Water, which occupies about 70 per cent of the earth's surface, is the principal substance in moderating earth's temperature from getting too hot or too cold. The capacity of water to exist in all three states, liquid, solid and vapour makes it the source and sustenance of life. Firstly, water acts as an insulation against short-wave radiation from the sun. During the day, vapour shields the planet's surface from the direct rays of the sun; at night, the same vapour reflects back the surface heat toward earth's surface lest it should be lost by radiation. In short, the extremes of temperature are effectively warded off.

Secondly, the capacity of water for absorbing or releasing heat is a significant property. Ice absorbs heat in melting; water absorbs heat in vapouring. Conversely, vapour releases heat in condensation; and water releases heat in freezing. Vast quantities of ice, accumulating on mountain peaks and snow zones, make up a buffer, thus preventing earth from getting too hot in summer. Excess heat, that might have parched the planet, is absorbed by melting ice. Strangely, the reverse process reduces the severity of winter: As water turns to ice, it gives up heat, thus raising earth's temperature. Energy is absorbed when water becomes vapour, and released when it condenses. Consequently, evaporation reduces the heat of warm water, and condensation re-

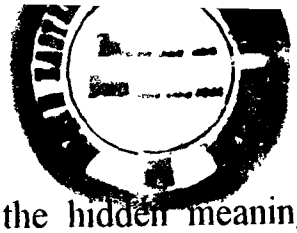
leases the heat gained earlier. Water thus, in all its states, and the resulting changes, distributes earth's heat nearly even between day and night, winter and summer. Without its moderating influences, temperature would soar far higher, and drop much lower, than they actually do. It is doubtful, if most higher organisms could withstand the unimaginable extremes of heat and cold in the absence of a plentiful supply of water.

Thirdly, water is the strangest and the most complex chemicals known. Each of its molecule is an engineering triumph to an observant scientist. The strange but beneficial characteristic of water is that it expands when it freezes, forming ice. Since ice is lighter in density than water, it floats on the surface and forms a protective shield, preventing additional freezing. If solid ice were heavier in density than liquid water, then it would sink to the bottom leaving the top of water free to form more ice. The continual process could turn all water of streams, rivers, lakes and oceans into solid blocks of ice, killing all aquatic life.

Fourthly, the capacity of water to transport itself high up in the upper atmosphere by vaporization, due to its almost unbelievable expanding power, ensures cyclically an abundant supply of water. The vapour gathers itself into great bodies of clouds, holding vast quantities of water in the atmosphere. The vapourized water condenses into forming drops of water which fall down in the form of rain, thus completing the cycle. Also the manner, in which these atmospheric water bodies are transported by the atmospheric streams or currents, we call winds, to distribute rain water on the globe, is equally marvellous.

It is estimated that the amount of rainfall is largely governed by the ratio of ocean to land. If the oceans covered only half of its present area, the earth would receive only a quarter of its present rainfall. On the other hand, if the area of the ocean were increased to a half of the present land area, our land would not be dry land at all, as the rainfall would be increased to four times its present average, turning the earth into vast swamp in which man could not possibly support himself and his works. Thus, the more we investigate the features of water, the more unsolved mysteries we confront. Oxygen and hydrogen, the two components of water, in themselves highly inflammable, when combined, form water, serve not as gunpowder but as fire-extinguisher.

Faced with the above patterns of designs on the earth, that makes life



on earth possible, we ask the question: What is the hidden meanings of these special patterns? I am afraid, science can offer no answers about meanings. Only a Philosophy (of religion) may read meanings in the ideal distance of the earth from the sun, earth's orbital and rotational movements, its atmosphere and the molecular structure of water. It is a witness to the scrupulous design that the divine architect set for the earth in the Universe. While the creationist accepts this design, the evolutionist however sees in the complex system only an evolution by blind chance coincidence over millions of years. It is imperative for us to note the fact that both creation and evolution are then belief-systems. The former is aware of it, even when it seeks scientific and philosophical evidence; the latter, however, is largely unaware of its predicament, in so far as it still parades itself as an irrefutable scientific fact.

D. DESIGN IN ANIMAL WORLD

While the design in the living organism is, in general, microscopic, in the animal kingdom, it strikes us with observable patterns as the guiding principles of animal life. I shall restrict myself to only a few examples.

Biologists, committed to creationism, are generally fond of citing the examples of the feeding habits of shore-bird on the Pacific coast and the ruminating animals. I shall however cite the more challenging example of the bese. It is challenging, because the evolutionary idea, that particular organs evolve in response to a particular need, seems to be refuted by the bee. The Mendelian law of heredity accounts for the inheritance of characteristics in the offspring of its two immediate ancestors, either recessive or dominant. But the worker bee has characteristics and physiological equipments, that are found neither in the immediate parents nor 'grand parents'. The worker bee is not only equipped for the collection of honey, but it also has the wax apparatus, essential to the building of the hive cells. Neither the drone nor the queen, the progenitors of the worker bee is thus equipped. Does evolution break down here, making room for Creation?

If it is argued by the evolutionists, that a specific need results in a particular organ, thus making for the arrival of a new species, the argument still does not hold much water. The need here is not one of the species, but of the particular bee. As the busy worker bee crawls down into the flower in search of nectar, its breathing device is plugged tightly with pollen, and it is in danger of perishing. To overcome asphyxiation, it cleans out its breathing ap-

paratus with brushes made of clusters of stiff hairs on the knees. Now, it is able to draw a full breath, and go back into the pollen-laden tunnel, again, for more load. It can be safely concluded that the special provision for the bee is an endowment of creation rather than an acquisition by evolution. This made a biologist to exclaim, 'Evolution Goes to Pieces on a Bee's Knees'.[17]

Symbiosis in the animal world is a fascinating example of design. Symbiosis means 'living together' among living things. We know that living things depend on one another for their existence and survival. Certain figs and wasps need each other in order to reproduce. Termites eat wood but need the protozoa in their bodies to digest it. Similarly, cattle, goats and camels cannot digest the cellulose in grass without the help of bacteria and protozoa living inside them. Algae and fungi team up and become lichens; only then can they grow on bare rock, capable of breaking down rock into soil.

Cooperation between insects and flowers is well-known. Insects pollinate flowers and, in return, are fed with pollen and nectar. This close partnership ensures the survival of both. Many flowers have special markings and smells to guide insects to the nectar. Some flowers have waxed slides to trap insects so that pollination is ensured. Some types of Ophyr orchids have their petals in the form of a female wasp, complete with eyes, antennae and wings, even giving off the odour of female pheromones. The male wasp attracted by it pollinates the flower. The bucket orchid has fermented nectar, that makes the bee wobbly on its feet; it slips into the 'bucket', and the only way out is to wriggle under the rod that dusts the bee with pollen. One cannot but wonder at these marvels in nature without also at the same time entertaining the idea of an intelligent design.

We may also take note of an interesting account of 'the cleaning symbiosis'.[18] Large fishes with sharp teeth, habituated to feed on smaller fish and shrimp, get their mouths and rows of teeth cleansed of food particles and parasites by the same smaller fishes and shrimps. The predatory fish periodically has its mouth wide open, baring its teeth. The small cleansing fishes, instead of fleeing out of fright, enter into the jaws of death, crawling around its tongue, and picking out parasites and food particles in the soft tissues of the mouth and the hard tissues of teeth. The predatory fish not only allows the cleaners to do their work, but also holds its gill chamber open so that they can crawl on to the gill filaments to pick off parasites. The incredible part of the operation is that, when the cleaning is on, the predator does not hunt its prey.

Cleaning symbiosis is a well known example of mutualism, an intimate relationship of benefit to both species involved. One would meet the same phenomenon, again, in the Nile crocodile, having its saw of teeth cleaned by the clover bird; in the dairy ants, tending the herds of aphids for milking the honey-dew. Could the neo-Darwinian mutations produce the co-ordinated set of behavioral adaptation produce the co-ordinated set of behavioral adaptations, necessary to cleaning symbiosis? The Nobel laureate, Szent-Gyorgi, commenting on the activity of a young herring gull, pecking at a red spot on its parent's beak, to elicit a food regurgitation response, similar to the cleansing symbiosis, says:

> All this may sound very simple, but it involves a horribly complex underlying nervous mechanism... All this had to be developed simultaneously...., which as a mutation has the probability of zero. I am unable to approach this problem without supposing an innate drive in matter to perfect itself.[19]

Szent-Gyorgi then goes on, as a matter of personal choice, to coin the term, 'syntropy', to suggest an impersonal creative force, that drives the evolutionary process upward. What would prevent a creationist, once again as a matter of choice, to think of this creative force to be a personal creator? This has led an evolutionary biologist, in the face of 'the unsolved puzzles' to Darwinian frame-work, to wonder: 'Is the framework wrong? Is Paley right'.[20] The provocative comment is really a rallying point for both creationists and evolutionists. Darwin and Paley are in the opposite camps on the notion of design.[21] The challenge to evolution does not come from a few creationists but from the study of nature itself.

The examples cited are often sought to be explained away by the evolutionists with recourse to instincts. This goads me to reflect briefly to conclude that the realm of instincts too is not devoid of design.

Darwin admitted that 'Many instincts are so wonderful that their development will probably appear to the reader a difficulty sufficient to overthrow my whole theory'.[22] Scientists, no less than the psychologists, of the 20th century are no closer to explaining instinct than Darwin was. They can only observe that instinctive wisdom is handed down by genetic make up, but not taught. There is no indication that we can adequately explain the instinctual behaviour with whatever knowledge we have from evolution. The origin of instinct is a perplexity to us. Creationist sees in them a purposeful design of the boundless wisdom of the supernatural Creator. The meaning of the dance of

a honey bee, the synchronization of labour by termites for 'air-conditioning' their colonies, procurement of oxygen by the under water spider, migration of birds over long distances without losing their way, are all attributed to instincts. Design is what is transparent in these instincts. We can ask questions on instincts endlessly, but the wisdom of instinct demands an intelligent source. It would be difficult to distinguish between the philosophical and the religious perceptions in the verse below:

> But ask the animals, and they will teach you;
> Or the birds of the air, and they will tell you;
> Or speak to the earth, and it will teach you;
> Or let the fish of the sea inform you.
>
> Which of all these does not know
> that the hand of the Lord has done this?
> In his hand is the life of every creature
> and the breath of all mankind. (Job 12:7-10).

One of the fascinating phenomena in the animal kingdom is mimicry, further exhibiting design. Often a living organism is endowed with a capacity to imitate another type in sound, colouration etc., in order to obtain for itself a certain advantage. Mimicry is common among insects, but some animals and plants too may exhibit the capability. The extra ordinary perfection, variety, and versatility of mimicry in nature may also scorn the evolutionary theory.

Mimicry is so perfected by the insects 'that it can successfully deceive a skilful naturalist who is watching for that very thing'. 'The mimic can live among his enemies undetected'.[23] For instance, spiders disguise themselves as ants. Spider holds its front pair of legs over his forehead to appear like the ants; it wiggles them like antennae; to perfect this deception, it also imitates the jerky gait and feeding movements of the ants. It often is observed carrying the skeletons of ants over its body to disguise itself. Some caterpillars can look like bird droppings or twigs. Butterflies can look like leaves, as they rest on a twig with their wings closed. Their disguise is most effective as long as they remain still. Should they be detected and attacked, such insects and animals as butterfly, chameleon and frog may try a bluff technique to put the potential predator to flight. Even a momentary confusion in the predator may be sufficient for the prey to escape, if the former were to persist in closer exploration.

Sometimes the predator, rather than the prey, becomes the mimic. A species of desert lizard entices insects to their death, by way of opening the corner of its mouth in the form of a small desert flower. The angler fish tempts other fish within reach of its hungry mouth. Cuckoo and cowbird lay their eggs in the nest of other birds, and successfully manage to have their young raised by the unsuspecting foster parents.[24] Numerous are the ingenious mimicry, each one of them an affront to the theory of evolution.[25] The abundance, variety, perfection and resourcefulness of mimicry observed in nature almost defy the comprehension and description in terms of evolution.[26]

A contemplation of nature thus leads the human intellect to discover principles in use over long ages, even before man perhaps came upon the scene. Design is inbuilt in nature. If ever man is said to design something, it may be a mere plagiarization of what has already been there in nature.[27]

Nature is the first inventor, man's invention is only an imitation. We readily admit that human invention requires elaborate planning, thinking and experimenting, in short, designing. However, in most instances, human inventors only repeat what nature in plant and animal kingdoms has been doing for thousands of years. A biologist confesses, 'I have the suspicion that we're not the innovators'.[28] Copying from living things is so prevalent in industries that the new science is named 'Bionics'. Scientists themselves admit that practically all the blue prints for human technology, that is utilized for the human advantage, are found in the world of the living things in nature, long before the human mind cared to understand and master their techniques. Gifted men later copied from nature the blueprints operative in nature. I shall be selective in choosing my examples.

The engine, that drives the modern automobile is an invention, deriving inspiration from the functioning of a human organ. There never was an internal combustion engine that operated satisfactorily, until a British physician took a French mechanic into his surgery, and showed him how the valves of the human heart function. When the latter transmitted the idea to iron and steel, the result was a gasoline engine. He copied a design that he was intelligent enough to perceive in nature. Many a simple devices we use in every day life has its counterpart in nature. Lever systems, such as we use in scissors and pincers, are common in the anatomy of vertebrates, and in the claws of crabs almost perfected. The lubrication of machinery has its counterpart in the lubrication, found in the smooth movements of moving parts in nature.

Air-conditioning, a modern technological invention, has long been in use with the blind termites. By the ingenious use of leaves, soil and water, cleverly insulated, termites 'air-condition'their 'homes'. Insects, microscopic plants, fishes and trees use their own form of 'anti-freeze' to survive in temperatures of - 4° F. Humans learned from them the use of glycol in car radiators as antifreeze. Edison's electric bulb, because it loses energy in the form of heat, in principle, is not as half efficient as the cold light produced by the glow-worm. Many sponges, fungi, bacteria, worms and deep sea fishes produce electric light, often in variegated colours. Man has a lot more to learn from the design in nature, yet. The design for the wings of aeroplane is taken from the study of bird's wings. The curvature of the bird's wing given both the angle and the lift needed to overcome the downward pull of gravity. It is admitted that the most sophisticated wings of the aeroplane are still falling short of the engineering marvels of the avian wings. "It is doubtful whether man would ever have conceived flight, had nature not provided the pattern".[29]

The progress in the construction of such structures as bridges, towers, cranes and high-rise buildings has a great deal to do with the designs in nature. Paradoxically, in rushes and reeds, in straws and bones of birds, is such strength that their design is copied by engineers in hollow stems and tubes that enable them to withstand lateral pressure; they can withstand even a circular bending. In palm trees, fibres so criss-cross, as if they were following street lines, that they give them the power to overcome 'fatigue'. The same geodesic principle is widely applied to the construction of the wings of aircraft to overcome 'metal fatigue'. Scientists are studying the composition of spider's web to produce better quality lighter steel. 'Stiffeners' in construction was invented by the use of rings after the model of bamboo nodes. The Russian technique of the tunnel construction by way of hardening the tunnel walls without much excavation of the soil was adopted from the burrowing techniques of the mole. The principle of the ball-mills for grinding flour was copied from the activity of the gizzard in birds.

We see divers strap tanks of air to their backs to work underwater. Certain water beetles do it more simply by grabbing a bubble of air before submerging. Our expensive desalination plants are the replicas of simple glands in the heads of sea gulls, pelicans, cormorants, albatross, penguins and sea turtles, that eject the excess salt from the sea water before it mixes with blood. Long before the Egyptians invented paper from papyrus, wasps and hornets used it in making their nests. The French naturalist Rene Reaumur

(1683-1757) noted that wasps used minute filaments of wood fibre to make their nests, and that was the paper manufactured by the wasps to build its nest. Wasps teach us 'that paper can be made from fibres of plants without the use of rags and linen, and seem to invite us to try whether we cannot make fine and good paper from the use of certain woods'. Jacob Schaffer remade some paper out of pulped wasps' nest, as if to prove the point.

Indeed, the dawn of a new technological age has arrived, precisely because man learned to duplicate complex shapes and patterns in nature. Our machine age is really foreshadowed by nature. A poet's vision may be a fitting conclusion for the design in the animal world:

> Go from the creatures thy instruction take,
> Learn from the bird what foods the thickets yield;
> Learn from the beasts the physic of the field;
> The art of building from the bee receive;
> Learn of the mole to plough, the worm to weave;
> Learn of the little nautilus to sail,
> Spread the thin oar, and catch the driving gale.[30]

E. THE SECOND LAW OF THERMODYNAMICS

It is possible for a perceptive philosopher to discern design and the hand of creator even in the carefully formulated laws of theoretical physics. I shall consider for my purpose the law of Entropy, popularly known as the Second Law of Thermodynamics. The law states that every system, left to its own, tends to move from order to disorder. In other words, the universe is proceeding downward in a degenerating direction to a decreasing organization. All material things deteriorate, even as all living organisms eventually return to dust, perhaps matter too decays, to a state of complete disorder. The law provides the most devastating and conclusive argument against evolution.

The evolutionary model of origin and development requires some universal principle, which should increase order, causing random particles eventually to organize themselves into complex chemicals, non-living particles to become living cells, these again to become complex organisms, and finally human organisms to evolve into human societies. However, the only naturalistic scientific principle, which is known to effect real changes in any given system, is the Second Law of Thermodynamics.All natural pro-

cesses generate entropy, a measure of disorder. The law is one of progressive disorganization. The most fundamental natural law thus contradicts the basic assumption of the evolutionary model of a universal principle that increases order. Evolutionists, nevertheless, retain faith that, somehow evolution and entropy can co-exist. The theory of evolution then tries to juxtapose two opposing principles, suggesting possible exceptions in accidental increases in order. But nature knows no exceptions. The Theory of evolution then in the final analysis is an act of faith, in direct opposition to the laws of science. Whether they know it or not, the problem the evolutionists have with entropy is thus 'one of the most fundamental unsolved problems in biology'.[31] In fact, it is not simply a problem, rather a devastating denial of the model itself.

While the model of evolution totally fails to cohere with the Second Law of Thermodynamics, the model of creation may however remarkably fit into it. The creation model postulates a perfect creation of all things in the beginning. No process of evolutionary change could improve them, but only bring deterioration of them; disorder is inherent in everything created. The creationist postulation is that, since present observable things are running down to disorder, they must originally have been in a state of high order. Since no known naturalistic process could produce such initial perfect condition, its cause must be the supernatural and omnipotent God. However depressing the truth of the Second Law of Thermodynamics be, philosophers everywhere have not been averse to entertain the ideas of perfect beginnings that gradually run out of order. Religions have a remarkable empathy with these philosophers of lost paradise.

F. FROM COMPLEXITIES TO PERPLEXITIES

The study of design all around us opens us to a host of complexities. There are incredible series of coincidences, that are beyond adequate explanations, coincidences without which life on earth would be impossible. They seem to be 'an astonishing sequence of stupendous and unlikely accidents that paved the way for life's emergence: Distances between stars, resonance of sub-atomic particles and atoms to form carbon; equal and opposite charges of electron and proton; unique and anomalous properties of water; frequencies of sunlight and absorption frequencies required for photosynthesis; the separation between sun and earth, three dimensions of space'.[32] They are all a pointer to an intelligent and purposeful God.

Hoyle therefore is led to believe that 'the origin of the universe requires an intelligence; an intelligence on a higher plane, an intelligence that preceded us and that led to a deliberate act of creation of structures suitable for life'.[33] There are some people who, though they could not explain how life began on earth, believe that life may exist elsewhere in the universe. They further believe that, if life did not originate on earth, it might have migrated to earth. But this kind of reasoning only transfers the problem of origin to other planets, and does not solve the core problem of the origin. The mystery of creation cannot but retain its mysteriousness.

In conclusion, of the incredibly vast area of philosophical plausibility and scientific evidences for creation, only a few are presented in the chapter. As scientific knowledge increases, the evidence of design too is accumulating. The whole universe itself is a living witness to the unfathomed majesty and grandeur of its Creator. The complexities in living organisms, genetic code, photosynthesis, the uniqueness of the planet earth, the amazing animal behaviour and instinct may be scientifically and philosophically persuasive enough for the theory of creation. The watchword of the evolutionists is 'from simplicity to complexity'; but of the creationists, 'from complexities to perplexities'. To the philosopher of religion, perplexity is the wonder at the mystery of creation.❐

CHAPTER - 7

CONCLUSION

CHAPTER - 7

C O N C L U S I O N

I have presented in the foregoing chapters the respective claims of both evolution and creation for explaining the origin of living things. Although the range of creation is much wider, in-as-much as it claims to explain the origin of everything, and not merely living beings, the concern of this thesis is confined to the latter. Only in this delimitation could we study evolutionism as a counterfoil to creationism. Aware of the fundamental arguments employed in the current debates over evolution and creation, I will now sum up the results of this study. However I shall be brief here. In the second part of this concluding chapter, I intend to reflect on the implications of treating evolutionism as a religious belief, however disguised as a scientific theory it may be. These implications are important for new probings into evolutionism and creationism by scholars in science as well as philosophy. I shall close the chapter with some practical suggestions, which may have some bearing on our systems of education.

A. **RECAPITULATION**

My introductory chapter laid bare the problem of the thesis : Explanation of the origin of living beings by way of two main conflicting theories of creation and evolution. My objective was twofold, firstly, to study their nature and, secondly, to critically evaluate them from the point of view of philosophy of religion. To qualify to be scientific, a theory must be testable by repeatable observations, which render its claims verifiable. To say the least, the test of verification, or falsification, makes possible a growth in scientific knowledge. Both the theories of evolution and creation, if judged according to this criterion, are found to be unprovable by scientific means. The supposed original transformation of life from nonliving things, as claimed by the evolutionists, and the supernatural creation of all living things in the beginning, as

claimed by the creationists, are not observed in their process by us.Nor can they be repeated under the controlled conditions in the experimenter's laboratory. Both evolution and creation cease to be empirical sciences in-as-much as they are equally 'unscientific'. Their philosophical legitimacy however comes to the fore. Conversely, both qualify to be 'religious beliefs', since the truth of both are accepted on certain 'faith'. Therefore, the theory of evolution is as religious as of creation, even as creation could be as scientific as evolution itself.

In chapter two, I have studied the two concepts of creation and evolution philosophically. While creation is studied as the divine act, which establishes everything in existence out of nothing, it has to be understood in terms of causation. Evolution, on the other hand, is a process, in which nature so works as to give rise to the emergence of new things, in particular, to life out of non-living matter and its various forms in a chain of succession continually. The concept therefore is to be understood with reference to the theory of progress. But, both the concepts have their particular history. I traced therefore the ancient origins of creation in the myths of the people across the cultures. But for my present purposes, I took the philosophical concept of creation, as understood in the western context. This context has accommodated Greek philosophy with the Semitic religions. So,special emphasis was placed on the Biblical doctrine of creation *ex nihilo*.

Likewise the idea of evolution was traced back to the writings of classical Greeks; its historical development too is studied as finding its culmination in the scientific theory by a theological student-turned naturalist, Charles Darwin. He transformed the ancient philosophy of evolution into the most popular worldview of the modern man. The Darwinian version of the theory completely undermined the age-old belief in the existence of a Creator God. A quick survey of his *magnum opus* provided me with an opportunity to look into its persuasive arguments, not without certain lacunae at crucial junctures. Remarkably Darwin himself draws our attention to them. Special attention was given to the pervasiveness of evolutionism today, as Neo-Darwinism, and to reasons operative in transforming it into a worldview.

The anti-religious bias of evolutionism, especially against the Christian doctrine of creation, was studied. It is also pointed out that mainstream scientific community, leading educators and the great majority of educational institutions teach evolution as an established scientific fact, often totally

oblivious of the difficulties acknowledged by the evolutionists. All this only goes to suggest how evolution is a fundamental concept, giving rise to an underlying philosophy of our modern civilizations. Consequently, a philosophy, based on the concept of creation, is truly at a receiving end. The reasons for the improverishment of human spirit in every sphere of human enterprise may have to be located in the interface between the twin concepts of creation and evolution to the detriment of the former.

The standard evidences for evolution, proceeding from fossil records, vestigial organs and embryonic recapitulation, are then critically evaluated in the third chapter. The so called foundational evidences are seen to turn against evolution. Instead of the evolutionary prediction of simple life forms gradually changing into complex forms, the existing fossil records narrate a very different story. They show the abrupt appearance of complex life forms, in great variety, to fit paradoxically the creation model. The absence of transitional forms, or what are known as the 'missing links', between different biological families has been a serious handicap for substantiating the theory. It can be stated with near certainty that there was no transition from one species to another. By itself this may not be a trajectory in the arms of the creationists, but the fossil finds of complex organisms, as they are known to us today, in the oldest geological records, strengthen the beliefs of the creationists. My investigation into the vestigial organs in man further reveals that there are no such vestiges of ancestral life forms in our body, now dysfunctional. They are all, without exception, found to be functional. Similarly, why the now infamous theory of embryonic recapitulation, often cited by evolutionists as a conclusive proof for evolution, cannot stand scrutiny, receives a considerable philosophical discussion. The debate, on the relation between ontogeny and phylogeny, has not lost its philosophical significance in almost all the disciplines, that implicitly subscribe to forms of evolutionism. Darwin's mechanisms of evolution, with a special focus on natural selection, were dealt in chapter four. These mechanisms I found to be wanting in many respects. Thus natural selection cannot really account for the production of different species of organisms. The case of the peppered moth, acknowledged as the classic example of observable evolution in progress, was found to be not a real evolution at all. With a great deal of variations, it has remained the peppered moth, rather than change into a higher form of insect. I believe, philosophers have a role in bringing in a great deal of conceptual clarity in the muddled scientific debates, when even well-known scientists confuse between terms like 'varia-

tion' and 'evolution'. The other mechanisms like inheritance of acquired characteristics and hybridization, in the service of the theory of evolution, can be disproved with the help of the Mendelian Laws of Inheritance, or the science of genetics. The laws show that only characters already latent within the genetic system can manifest, and that the resulting of a new kind is an impossibility. The mechanisms cited have therefore been rendered irrelevant for evolutionary development. On the contrary, to the extent that creationism has a philosophy of change within the clearly defined boundaries, it effectively accounts for the variegated changes occuring within a kind.

The Neo-Darwinian mechanism of evolutionary changes is mutation. Mutation introduces sudden changes in heredity, therefore,it is believed to be generating new species.I have argued that mutation too cannot salvage the theory of evolution, for the simple reason that mutations are generally lethal. They can be thought of as laying the axe at the root of the concept of progress and development, implicit in every form of evolutionary model, biological in particular.The much talked about cloning of mammals, that is effected by way of induced mutation in the nucleic material in the non-generative cells, geared to the commercial purposes, too, cannot be a mechanism for evolution.

Evolution of man is the culmination of the theory of the evolution of species. Hence, I studied in chapter five the ape-man theory. The stages through which man is said to have evolved from ape-like ancestors, were carefully analysed. Selecting the conclusive evidences, generally held to be the common ancestor of man and ape, such as the *Australopithecus*, '*Lucy*', *Ramapithecus*, *Java Man* etc., I investigated into the philosophical merits of the evidences. I find their evidences to be a *non-sequitur*. None of them is found to be an ape-man, qualifying to be the common ancestor of man and ape. For they are now acknowledged to be either plainly apes, having no linkages with man; they are found to be closer to the present day chimpanzee, orangutan and gorilla than to man. Or, at times, they are found to be plainly the fossils of man. I have found the necessity of exposing the hoax of parading the fossil bones of 'African' apes, in particular, to pass for an ape-man by their discoverers, with adequate arguments.

The desperate need for finding the hypothetical missing links of ape-man ancestors has led evolutionists to practice rather dubious scholarship, not always in deference to the sound academic ethics. The infamous Piltdown Man is a telling point to the case. The Nebraska Man and the Orce Man only

lengthen the list of dubious scholarship. Even so, the Neanderthal Man is now acknowledged to be indisputably man. In either case, the reconstructed fossils into the ape-man turned out to be either ape or man, but not the ape-man purporting to be the common ancestors in the long evolution of man.

I have also addressed myself to some of the methodological problems, associated with researches, in ensuring accuracy of such tests as potassium and carbon dating, even as of the legitimacy of the reconstructed models serving as the infrastructure for the construction of elaborate theories, lest they should end up in wild and fanciful imaginations of the anthro-artists. The evidences for the contemporaneity of a host of living organisms, including man and ape alike, is evidenced too deeply into the fossil records to disprove the claims of evolutionary theories. They may, on the contrary, lend credence to creationistic theories far more readily than to evolutionistic theories. Creation, as a special act of bringing into existence everything, as they are seen to exist today with their variations, and without any evolutionary changes, is a perfectly viable philosophical possibility, substantiated in the fossil records of the earth.

Having laid bare the flaws in the alleged scientific and philosophical evidences for evolution, and show how the same evidences can be better used to support the creation model, I explicated in chapter six a few evidences in favour of the philosophical concept of design. It has been said that the argument from design has lost its privileged position before the philosophers on account of scientific evidences. Hence I aimed at subjecting the evidences to a critique to reinstate the philosophical force of design. I have sufficient philosophical ground to argue for design in the scientifically observable world, and there from for a Designer, who should at the same time, be an infinitely intelligent and supernatural being.

I do not arrive at a belief in a supernatural Creator God via the myths of the 'primitive' peoples all over the world, viewed often as the antithesis of modern scientific and philosophical world-view fostered by evolutionism, but, rather, through the endless scientific complexities in living organisms, - cells, genetic code, photosynthesis, - the amazing planet earth, the marvellous nature and functions of water, and the mechanisms through which our ecosystem is sustained. All of them are compelling evidences for a design, necessitating an intelligent creator. Just because one also arrives at this belief on the basis of his particular faith, the scientific evidence thereby does

not become any weaker. Philosophers need not take sides, but he cannot afford to be blind to sound reason, consistent logic and philosophically sustainable common sense. Creationism can be an eminently viable philosophical explanation for the origin of living things.

B. IMPLICATIONS

The above study on creation and evolution as explanatory theories for the origin of living things would impel us to draw certain implications, which are likely to have their full impact on all our intellectual pursuits in our times. One such implication is that both creation and evolution are formidable belief systems. While this is readily admitted with regard to creation, it is vigorously sought to be rejected with regard to evolution. Hence, as a student of philosophy, I must dwell at some length on the latter.

My analysis of the theory of evolution, accepted uncritically 'as a proven scientific fact', may be said to make a dent in it. The scientific evidences are here less than evident; and philosophical arguments less than convincing. It is nothing short of a 'religious' doctrine to its adherents on the basis of a 'scientistic' faith. The religious nature of evolutionism is evident, not only from a considerable lack of scientific evidence for its precepts, but also from the viciously emotional defences against the modern attempts toward a revival of creationism. Henry Morris perceptively observes something of this emotionalism: "Over forty anti-creationist books and hundreds of anti-creationist articles have been published in recent years. Almost all are highly sarcastic and emotional, exhibiting a complete lack of understanding of the creationist arguments and evidences, and never citing any real evidence for evolution."[1] Eileen Barker, herself an evolutionist, also admits how evolution is dogmatically held on to, inspite of the contrary evidence: "At one stage in my research, when I had become quite well-versed in the creationist literature, I tried putting their arguments to a number of my academic colleagues. I was amazed to find that on nearly every occasion we reached a point at which my friends would abandon rational or empirical argument in favour of irrational condemnation or dogmatic assertion (for evolution).On one occasion, a colleague ended up by exclaiming in utter exasperation, 'but they're just wrong!"[2]. The two observations, the one from a creationist and the other from an evolutionist, highlight the same situation of surcharged emotions on the part of the evolutionists in their

refusal to give a fair hearing to creationists. Such emotions are obviously attached to only religious beliefs.

That evolution is the guiding philosophy today for most biologists, or scientists, in general, is readily conceded. In a review article, Dobzhansky shockingly takes note of the universal appeal of the theory of evolution as constituting 'the mechanistic materialistic philosophy shared by most of the present 'establishment' in the biological sciences'.[3] The euphoria of Sir Julian Huxley, in declaring that 'Gods are peripheral phenomena produced by evolution', has in itself an ethereal ring around it.[4] It is interesting to observe that the evolutionary pattern of thinking makes the idea of god itself as evolved, as man evolved from the lower animals. Since religion itself was seen as a product of evolution, Huxley hoped to establish a 'humanistic religion' a superstructure resting on the foundation of evolution. Little wonder then that in our times evolution has become a humanistic religion. Humanism has been defined by its adherents as 'the belief that man shapes his own destiny. It is a constructive philosophy, a non-theistic religion, a way of life'.[5] In this definition the need for a supernatural creator God is done away with, besides humanism is made at once into a philosophy, a religion and a culture.

Thus, there is an inseparable link between the non-theistic, humanistic, philosophical and cultural religion and belief in evolution, in-as-much as the latter is the very foundation of the former. Evolutionists therefore have combined their theory with a naturalistic philosophy. They staunchly believe such a humanistic complex is for the promotion of progress and development of mankind. Evolution has come a full-circle to become a complete worldview. It has thus become our de facto state-sponsored religion, not declared as such,though. Indeed, Thomas Huxley 'virtually deified the evolutionary process as the basis in science for a new - religion without revelation'.[6] Remarkably, even the leading theologians of the day were compelled to acknowledge the power of the new religion. The French theologian - cum-palaeontologist, Pierre Teilhard de Chardin (1881-1955), embarked upon reconciling theology with religious evolutionary humanism. With him, evolution changed not only theological method but also its content in France. In the perception of Eileen Barker,

> Teilhard attempted the complete recasting of Christian theology in evolutionary terms. Each element within the Christian world-view, matter, life, mind and spirit; the birth of the Cosmos, the person and work of Christ and

> the ultimate redemption of humankind - was treated alike as moment in the evolutionary ascent to the Cosmos towards the Omega point of ultimate unity with God.[7]

The evolutionary tenets of the humanistic religion, supported by the secular state, have percolated in the standard systems of education. Any hinting at the Biblical values, especially the foundational doctrine of super-natural creation, is systematically excluded from the institutional curriculum. On the contrary, the humanistic religion of evolutionism finds an elaborate treatment in the text-books. The humanists themselves acknowledge that their system is a philosophy, effectively replacing religion as a new faith:

> Humanism does not include the idea of a God and as such is considered a philosophy... In a way, it is an alternative to all religions... Those caught up by its religious aspects know that it provides a vibrant, satisfying faith.[8]

Henry Morris observes in the similar vein:

> In the name of modern science and of church-state separation, the Bible and theistic religion have been effectively banned from curriculum, and a non-theistic religion of secular evolutionary humanism has become for all practical purposes, the official state religion promoted in the public school.[9]

In the American context, he finds the promotion of the secular humanism, or evolutionary humanism, even unconstitutional, in as much as it excludes other religious teachings, especially the religions of creationism, founded on the Biblical outlook.[10] To the extent that we have modelled our polity and education in India on the western secular pattern, (if 'secularism' is defined as equal respect to all religions), we too may not be free from the biases of the evolutionistic humanism.

The religious nature of evolutionism has not gone unnoticed. Since the days of Darwin's popularity, biologists have been indulging in unverifiable speculation; it is increasingly 'accompanied by a decline in scientific integ-rity'. Thompson deplores how the approach of the evolutionists has been detrimental to progress in knowledge itself :

> This situation, where scientific men rally to the defence of a doctrine (evolution-ism), they are unable to define scientifically, much less demonstrate with scientific vigour, attempting to maintain credit with the public by the suppression of criticism and the elimination of difficulties, is abnormal and undesirable in science.[11]

The perplexity, that Matthews, a British biologist, exhibits, clearly refers to the religious nature of the theory of evolution:

> The fact of evolution is the backbone of biology, and biology is thus in the peculiar position of being a science founded on an unproved theory - is it then a science or faith? Belief in the theory of evolution is thus exactly parallel to belief in special creation - both are concepts which believers know to be true but neither, up to the present, has been capable of proof.[12]

Such observations as are placed before us are from the quarters of scientists and philosophers, subscribing to either evolutionism or creationism. What they unmistakably prove is that evolution is only 'a hypothesis, and not a well supported one at that', but that it is dogmatically held and defended by the scientific community exactly in the same way as any religious belief is. This concludes that the belief in special creation and the belief in evolution are parallel belief-systems. Creation, admittedly, is unproven and unprovable. Even so is evolution; it cannot be considered as a scientific fact. Much as evolution is not subject to test by the ordinary methods of experimental science of observation and verification, so also is creation. Therefore creation, even as evolution, does not even qualify to be a scientific theory in a strict sense. Both are postulates, and may serve as models, within which attempts may be made to explain and correlate the evidence from the geological records, and to make predictions concerning the nature of living things in future. In the light of what has been argued for, here, a practical suggestion, bearing on our educational system, may be made.

C. A PRACTICAL SUGGESTION

It has been shown clearly that the dominant world-view of the theory of evolution is no more than a religious philosophy, tenaciously and dogmatically held by its adherents. There is, in the final analysis, little difference between its adherents and the fundamentalists of a religious doctrine. In the attitude of both, suppression of criticism is the norm rather than exception. If evolution is still considered as scientific, it is not so any more than creation model is scientific, in as much as a great deal of scientific data is in perfect consonance with its fundamental religious tenets. Conversely, if creation is religious, it is no more so than evolution model is religious, in-as-much as it turns out to be a worldview subscribed to by its devout adherents. All this only goes to suggest that creation and evolution are two competing worldviews within which both creative science and scientific religion can be pursued. By

implication it must be reiterated, precisely because it has been more often than usual negated, that creationism can be an alternative theory for explaining the origin of life, species and man.

The above observation has a practical implication to our systems of education, which perhaps has not received the attention of the educationists. It is imperative that the evidences for both creation and evolution must be taught, without any bias for or against the Bible or the humanistic ideology. At present, however, our educational system is far too adumbrated in the humanistic ideology in the name of science, objectivity and reason. Since its claims are seen to be hollow, the models of creation and evolution should be incorporated into our educational systems without succumbing to any bias. An equitable treatment of both theories may have within itself hitherto unexplored potentialities for growth in knowledge in the sphere of science, philosophy and religion alike.

Firstly, an equitable treatment of creation and evolution in our systems of education contributes towards a genuine progress in knowledge. The negative sanctions by Erhlich and Holm against the present day one-sided education is worth noting: "Perpetuation of today's theory or dogma of evolution will not encourage progress towards more satisfactory explanatory explanations of observed phenomena."[13] Inclusion of the theory of creation in the educational curriculum and its equal treatment, side by side with evolution, could open up new vistas, or new outlooks, towards knowledge and research. This paves the way for genuine scientific progress, with the better explanations for the observable phenomena emerging.

Secondly, a reasonable mitigation of the 'scientistic' euphoria of evolution may not be without a value to the theory of evolution itself. The religious, often the unscientific, nature of the theory of evolution must be made more evident than it has been hitherto, if new avenues within it are to be explored. Classical Darwinism may no longer be relevant, but the Neo-Darwinism, with the incorporation of new discoveries, has taken its place. It is salutary for us to consider that even Neo - Darwinism 'is not sufficiently strong to allow us to consider it as anything more than a working hypothesis'.[14] For anyone, set on the path of truth, there is a considerable difference between a working hypothesis and an established scientific fact. While it has remained a hypothesis all through, the ' fact of evolution ' is actually made into a faith by the evolutionists in their particular world view.[15] Resis-

tance to teaching creationism will have to break down in the systems of education. The awareness, that evolution too is of the nature of religious belief, will, to begin with, permit even those tacit evolutionists to object to the exclusive teaching of evolution in the public schools as discriminatory. Therefore, the present practice of exclusive teaching of, or perhaps the indoctrination in, the theory of evolution should be forthwith discontinued. Instead, both the theories may be presented as alternative approaches to the problems of the origins, for the benefit of progressive knowledge within the given systems.

Thirdly, the introduction of a two-model approach to the problems of origins in the educational systems may be required for fostering a spirit of academic freedom. It is only where the freedom of thought and expression are respected that a growth in knowledge is possible. Likewise the Indian Constitution guarantees to its citizens, besides the freedom of thought and expression, the religious freedom as well. Classroom instruction, that caters only to the tenets of evolution, without a treatment of its alternative theory, may not be the respecter of religious freedom. This is all the more true, when it is seen that evolutionary humanism is no less religious than creationism. Hence an indoctrination in evolutionism may be tantamount to the undermining of the faith of the creationists and their religious beliefs. An insistence on evolutionary dogma to be taught to the students may be construed as an indoctrination in a purely atheistic, materialistic and mechanistic explanation for the origins, to the exclusion of an alternative explanation based on theism; this may be violative of the religious freedom enshrined in the Constitution.

The practical suggestion, that an equitable treatment of both evolution and creation be given in our educational system, may surprise many academicians. But the idea is not altogether new to many serious scientists, including evolutionists, as is evidenced from the following:

> No teacher should be dismayed at efforts to present creation as an alternative to evolution in biology courses; indeed, at this moment, creation is the only alternative to evolution. Not only is this worth mentioning, but a comparison of the two alternatives can be an excellent exercise in logic and reason.[16]

With the number of creation scientists rising, the suggestion is gradually gaining ground. Public schools in many localities in USA have been increasingly adopting the agenda of teaching both models, to explicate the origin of

the universe, life, the species of living organism and, above all, man. The new thinking has made quite a few philosophers and scientists to benefit from the paradigm shift. Thus E.J.H. Corner remarks, 'Much evidence can be adduced in favour of the theory of evolution - from biology, biogeography, and palaeontology, but I still think that, to the unprejudiced, the fossil record of plants is in favour of special creation'.[17] This statement of an evolutionary botanist is corroborated by Gish, an ardent creationist:

> After many years of intense study of the problem of origins from a scientific viewpoint, I am convinced that the facts of science declare special creation to be the only rational explanation of origins.[18]

In conclusion, the religious nature of the theory of evolution is now becoming increasingly evident, along with the unscientific attitudes of its adherents. Evolutionism is wrongly called 'science'. It is only because of its scientific label that all the educational systems have advocated its naturalistic concepts to be taught dogmatically as scientific explanations of origins. The exclusive, or one-sided, indoctrination in it does not redound to the glory either of science or religion. It is inimical to both, indeed, to the enterprise of human knowledge itself, besides being detrimental to academic freedom and civil rights as well. An equitable treatment of creation and evolution may go a long way in rectifying the imbalance in our educational system. ❐

REFERENCES

Chapter I

1. Henry M. Morris, *Scientific Creationism*, Master Books, El Cajon, CA, 1987, p.10.

2. Ibid, p.11.

3. Duane T Gish, "The Nature of Science and Theories on Origins," *Acts & Facts*, Vol. 24, No.4, April 1995.

4. George Gaylord Simpsom, *Science*, 143:769, 1964.

5. Colin Brown, "Philosophy of Religion," *New Dictionary of Theology*, Sinclair B.Ferguson, ed. IVP, 1991, p 513. This definition would make not only religious ideologies, but also Marxism and atheistic materialism as 'religious', or what Tillich terms as 'pseudo-religious'.

6. Ibid. p. 510.

7. Henry M. Morris & Donald H. Rohrer eds., *Creation the Cutting Edge*, CPL, San Diego, CA, 1982, p. 59.

8. As reproduced by Eileen Barker, "Let There Be Light: Scientific Creationism in the 20th Century", *Darwinism and Divinity*, John Durant ed., Basil Blackwell Ltd., Oxford, 1985, p. 191.

9. The Institute for Creation Research (ICR) was established in 1970 at San Diego, California, USA. The ICR had set up a new Christian liberal arts college for study, research and propagate scientific creationism. The study centre has now grown to an international stature in its outreach and impact. Another organization, the Creation Research Society (CSR) was established in USA in 1963. It is an association of more than 600 creation scientists. Its main objective is to gather the scientific/Biblical evidences for creation, propagate and promote the knowlege of creation science.

10. Gish, *Acts & Facts*, p. 5-7.

11. Theodosius Dobzhansky, "Changing Man", *Science*, Vol.155, 1967, p. 409.

12. Paul Ehrlich and L.C. Birch, "Evolutionary History and Population Biology", *Nature*, Vol. 214, 1967, p.352. Square brackets are mine.

13. Morris, *Scientific Creationism*, p. 7.

14. L. Harrison Matthews in the Foreword to the 1971 edition of Darwin's *Origin of Species*, London, J.M. Dent & Sons Ltd. 1971, p.x
15. Richard B.Goldsmith, *American Scientist*, 40:84, 1952 as quoted by Gish, *Evolution: The Challenge of Fossil Record*, CLP Master Books, 1992, p.11.

16. D.M.S. Watson, "Adaptation", *Nature*, Vol.123, 1929, p.233.

17. Gish, *Evolution: Challenge of the Fossil Record*, p.23. ❐

Chapter II

1. Duane T. Gish, *Evolution: Challenge of the Fossil Record*, Creation Life Publishers, El Cajon, CA, 1992, p.28.

2. Donna Rosenberg, *World Mythology*, Harrap, London, 1986, p.470

3. Lawrence O. Richards, *Expository Dictionary of Bible Words*, Zondervan Corpn., Grand Rapids, Michigan, 1985, p.201.

4. Psalms 33:6-9. Biblical quotations throughout this thesis are taken from the *King James Version* (1611), also known as the Authorised Version.

5. Henry M. Morris, *The Biblical Basis for Modern Science*,Baker Book House, Grand Rapids, Michigan, 1984, p.143.

6. W.J. Marshall, *Philosophy and the Christian Faith*, Christian Literature Society, Madras, 1972, p.122.

7. Ibid, p.124. Emphasis is mine.

8. St Augustine, *Confessions*, Book XI, Chapter 13.

9. Henry M. Morris, *The Long War Against God*, Baker Book House, Grand Rapids, MI, 1990, p.151.

10. Harry Rimmer, *The Harmony of Science and Scripture*, Wm. B. Eerdmans, Grand Rapids, MI, 1976, p.65.

11. Theodosius Dobzhansky, "Evolution", *Encyclopedia Americana*, 1980, p.734.

12. Sir Gavin de Beer, "Evolution", *Encyclopedia Brittanica*, 1978, p.7.

13. James Hutton published in 1795 his *Theory of the Earth*. He maintained that 'the present is the key to the past' and that, given sufficient time, processes now at work could account for all the geologic features of the globe.

14. Morris, *The Biblical Basis for Modern Science*, p.313.

15. Ernst Mayr, "The Nature of the Darwinian Revolution", *Science*, 176, June 1972, p.981.

16. Sylvia Baker, *Bone of Contention* (Is Evolution True?) Creation Science Foundation Ltd., Queensland, 1990, p.6.

17 Julian Huxley, "Evolution and Genetics, "*What is Science?* J R Newman ed , New York, Simon and Schuster, 1955, p 272

18 Theodosius Dobzhansky, "Changing Man" *Science*, 155, 1967, p 409

19 Ernst Mayr, "Evolution" in *Scientific American*, 239, Sept 1978, p 47

20 Rene Dubos, "*Humanistic Biology*", American Scientist, 53 March, 1965, p 6

21 As quoted by Morris, *The long War Against God*, p. 22

22 *Awake*, August 8, 1995

23 Ibid

24 G H Harper, "Darwinism and Indoctrination", *School Science Review*, 59, Dec 1977, p 258

25 Richard Dawkins, "The Necessity of Darwinism", *New Scientist*, April 15, 1982, p 130

26 Arthur J Snider, "Darwin's Issue Draws Rebuff of Professor", *The Commercial* Appeal, Memphis, Sept 9, 1973, Sec I, p 21

27 Fred Hoyle and Chandra Wickramasinghe, *Evolution From Space*, New York, Simon & Schuster, 1981, p 137

28 Charles E Raven, *Christianity and Science*, United Society for Christian Literature, London, 1960

29 Morris, *The Long War Against God*, p 34

30 Wendell W Watters, "Christianity and Mental Health", *The Humanist*, 47 5, Nov/Dec 1987 ❐

Chapter III

1. G.A.Kerkut, *Implications of Evolution*, Pergamon Press, New York, 1960 (As quoted by Sylvia Baker, *Bone of Contention*, op cit, p.8).

2. *Encyclopedia Britannica*, Vol 7, 1978, p. 10.

3. *New Scientist*, book review by Tom Kemp of The New Evolutionary Time table by Steven M Stanley, Feb 4, 1982, p. 320.

4. Charles Darwin, *The Origin of Species*, London, J.M. Dent & Sons Ltd., 1971, p. 55.

5. Ibid, p. 83

6. As quoted in *Life - How did It Get Here? By Evolution or By Creation*? Pub lished by Watch Tower Bible and Tract Society, New York, Inc. 1985, p. 58.

7. *New Scientist*, January 15, 1981, p. 129.

8. As quoted in *Life-How Did It Get Here? By Evolution or By Creation*, p. 59.

9. Steven M. Stanley, *The New Evolutionary Timetable*, 1981, p.6.

10. *A View of Life*, Salvador E Luria, Stephen Jay Gould, Sam Singer, 1981.

11. Ibid, p. 642.

12. *Life - How Did It Get Here? By Evolution or by Creation*, p. 59.

13. Darwin, *The Origin of Species*, p. 94, 296.

14. Fred Hoyle and Chandra Wickramasinghe, Evolution From Space, J.M. Dent & Sons, London, 1981, p. 8.

15. As quoted in *Life - How Did It Get Here?* p.60.

16. Ibid, p. 60-61.

17. Henry M Morris, *The Biblical Basis for Modern Science*, Baker Book House, Grand Rapids, MI, 1984, p.339.

18. Darwin, *The Origin of Species*, p.208.

19. Ibid, p.90

20. Alfred S. Romer, "Darwin and the Fossil Record", *Natural History*, October 1956, pp. 466-467.

21. Ibid.

22. Luria, Gould, Singer, *A View of Life*, p.651.

23. Kentish *Times*, England, "Scientists Reject Evolution", December 11, 1975, p.4.

24. A Brower, in *General Palaeontology*, 1967, as quoted by Sylvia Baker, *Bones of Contention*, p.13.

25. M. Kusinitz, *Science World*, 4 Feb 1983, pp 12-19.

26. Stanley, *The New Evolutionary Timetable*, p.95.

27. John N Moore, "Should Evolution Be Taught"? in a letter to editor, *New Scientist*, September 15, 1983, p.798.

28. Gish, *Evolution : Challenge of the Fossil Record*, op cit, p.69.

29. *The World Book Encyclopedia*, 1982, Vol.6, p.333.

30. George Gaylord Simpson, *The Major Features of Evolution*, Columbia University Press, New York, 1953, p.258.

31. *Encyclopedia Britannica*,(Micropaedia) 1976, Vol.7, p.13.

32. Francis Hitching, *The Neck of the Giraffe*, Pan : London, 1982, p.31.

33. Sylvia Baker, *Bones of Contention*, p.11.

34. H. Enoch, *Creation or Evolution*, Union of Evangelical Students of India, 1966, pp. 35-37.

35. Gish, *Evolution : Challenge of the Fossil Record*, p.86.

36. Ibid, pp. 109 - 110.

37. Duane T Gish, "As a Transitional Form Archaeopteryx Wont Fly", *Acts & Facts*, Vol. 18:9 Sept. 1989.

38. F.E. Beddard, *The Structure and Classification of Birds*, Longmans, Green & Co., London, 1898, p.160.

39. J. Benton, *Nature*, 305:99, 1983.
40. A.J. Charig, *A New Look at Dinosaurs*, Heinemann, London, 1979, p.139.

41. Gish, *Acts & Facts*, Sept, 1989.

42. P.J. Regal, *The Quarterly Review of Biology*, 50:35, 1975.

43. S. Weisburd, *Science News*, August 16, 1986, p.103.

44. Fred Hoyle and Chandra Wickramasinghe, "Archaeopteryx: The Primordial Bird, A Case of Fossil Forgery", Christopher Davies Publishers, Swansea, 1986.

45. S.R. Scadding, "Do Vestigial Organs Provide Evidence for Evolution"?, *Evolutionary Theory*, Vol 5, May 1981, pp 173-76.

46. Gish, *Evolution : Challenge of the Fossil Record*, p.252.

47. J.N. Moore and H.S. Slusher ed., *Biology - A Search for Order in Complexity*, Zondervan, Grand Rapids, MI, 1974, p.434.

48 Henry M Morris ed., *Scientific Creationism*, Master Books, El Cajon, 1987, pp. 75-76.

49. Enoch, p. 43.

50. *Encyclopedia Britannica*, 1978; *Encyclopedia Americana*, 1980.

51. Malcolm Bowden, *Ape-men - Fact or Fallacy?*, Sovereign, Bromley, 1981.

52. Francis Hitching, *Neck of the Giraffe*, Pan:London,1982.

53. G. Rager,"Human Embryology and the Law of Biogenesis", *Rivista di Biologia-Biology Forum*, Vol. 79:4, 1986, pp.449-465.

54. Hitching, *Neck of the Giraffe*, p.204.

55. Monty White, *Wonderfully Made*, Evangelical Press, London, p. 69.

56. Bowden, p.142.

57. As quoted by Monty White, op cit, p.70. ❐

Chapter IV

1. H. Enoch, *Evolution or Creation*, Union of Evangelical Students of India, Madras, 1966, pp 62-63.

2. T. Dobzhansky, "Evolution", *Encyclopedia Americana*, 1980 pp. 736, 738.

3. Ibid.

4. As quoted in *Life-How Did It Get Here? By Evolution or By Creation?* p.13.

5. *Did Man Get Here By Evolution or By Creation?* Published by Watch Tower Bible & Tracl Society, Bombay, 1976, p.13

6. H.J. Muller, *Encylopedia Britannica*, Vol 22, 1959, p.988.

7. As quoted by Enoch, *Evolution or Creation*, op cit, p.62.

8. Morris, *Scientific Creationism*, op cit, p.51.

9. *Encyclopedia Americana*, p.743.

10. *The International Wildlife Encyclopedia*, Vol 20, 1970, p.2706.

11. Matthews L Harrison, *Introduction to Darwin's Origin of Species*, London: J.M. Dent & Sons Ltd. 1971, p.xi

12. *On Call*, July 3, 1972, p.9.

13. Morris, *Scientific Creationism*, p.52.

14. T. Dobzhansky, *Genetics and the Origin of Species*,p.96.

15. M.R. Dehaan, *Genesis and Evolution*, Zondervan Publishing House, Grand Rapids, MI, 1981, p.82.

16. *The Chambers Dictionary*, 1993 Edition.

17. Gish, *Evolution:Challenge of the Fossil Record*, p.38.

18. *The World Book Encyclopedia*, Vol 13, 1982, p.809.

19. Stanley, *The New Evoloutionary Timetable*, p.65.

20. Carl Sagan, *Cosmos*, New York, Ballantine Books, 1985, p.17.

21. Morris, *Scientific Creationism*, p.55.

22. C.H. Waddington, *The Nature of Life*, New York, Atheneum, 1962, p.98.

23. Francis J. Ayala, "Teleological Explanations in Evolutionary Biology", *Philosophy of Science*, Vol 37, March 1970, p.3.

24. J.H. Muller, "Radiation Damage to the Genetic Materials", *American Scientist*, Vol 38, January, 1950, p.35.

25. Julian Huxley, *Evolution in Action*, New York, Harper Bros., 1953, p.41.

26. *Encyclopedia Americana*, Vol 10, 1980, p. 742.

27. T. Dobzhansky, "Heredity and the Nature of Man", as quoted in *Life-How Did It Get Here? By Evolution or By Creation?* p.126.

28 Enoch, *Evolution or Creation*, p.60.

29. Norman MacBeth, *Darwin Retried*, Boston, Gambit, Inc., 1971, p.33

30. Richard Goldschmidt, *The Material Basis of Evolution*, Yale University Press, New Haven, 1940, p.390.

31. Ernst Mayr, *Populations, Species and Evolution*, Harvard University Press, Cambridge, Massachusets, 1970, p.253.

32. Stephen Jay Gould, "Is a New General Theory of Evolution Emerging"?, *Palaeobiology*, Vol 6:1, 1980, p.125.

33. Michael Denton, *Evolution : A Theory in Crisis*, Adler & Adler, Bethesda, Maryland, USA, 1985, p.193.

34. Gish, *Evolution : Challenge of the Fossil Record*, p.250.

35. Keith Stewart Thompson, "The Meaning of Evolution", *American Scientists*, Vol 70, Sept/Oct., 1982, p.529.

36. Scott M Huse, *The Collapse of Evolution*, Baker Book House, Michigan, 1988, p.39.

37. Darwin, F., (1888) ed., *The Life and Letters of Charles Darwin*, 3 Vols. John Murray, London, Vol 1, p.210.

38. As quoted by Huse, *The Collapse of Evolution*, p.40. ❐

Chapter V

1. *The New Scientist*, March 25, 1965, p.800; *Saturday Evening Post*, December 3, 1966; See also *The Primates*, 1965, p. 177.

2. S. Zuckerman, *Beyond the Ivory Tower*, Taplinger Publishing Co., New York, 1970, p.77.

3. Gish, *Evolution:Challenge of the Fossil Record*, p. 151

4. C.E. Oxnard, "Homo", *Nature*, 258:389.

5. C.E. Oxnard, *University of Chicago Magazine*, Winter, 1974. pp 11-12.

6. Louis Leakey, "Australopithecus, a Long-Armed, Short-Legged Knuckle Walker", *Science News*, Vol 100, Nov.27, 1971, p.357.

7. Donald Johanson, *Lucy: The Beginning of Humankind*, Simon & Schuster, New York, 1981, pp. 213, 223.

8. John D Morris, "Was Lucy an Ape-man"? *Acts & Facts*, Vol 18, November 1989.

9. Johanson, p. 352.

10. Gish, p. 154.

11. Morris, p.10.

12. As quoted by Morris, p. 10.

13. Jack T Stern and L.R. Susman, *American Journal of Physical Anthropology*, 60:298, 1983.

14. Morris, p. 10.

15. *Science News*, February 5, 1983, p. 89.

16. Henry M Morris, "Did Chimpanzee Evolve From Man"?, *Good News Broadcaster*, July/August, 1983.

17. Henry M Morris, *Scientific Creationism*, p.172.

18. Gish, *Evolution: Challenge of the Fossil Record*, p.140.

19 Robert B Eckhardt, "Population Genetics and Human Origins", *Scientific American*, Vol 226, January 1972, p.101.

20. Gish, *Evolution:Challenge of the Fossil Record*, p 141.

21. Ibid, p.67.

22. *The New York Times*, "Time to Revise the Family Tree"? February 14, 1982, p.7.

23. "False Start of the Human Parade:, by Adrianne L Zihlman and Zerold M Lowenstein, *Natural History*, August/Sept.1979, p.86.

24. Gish, *Evolution : Challenge of the Fossil Record*, pp.142-143.

25. *Life - How Did It Get Here?* By Evolution or By Creation, p. 93

26. As quoted by Monty White, *Wonderfully Made*, Evangelical Press, Darlington, 1989, p.51.

27. W.S. Howell, *Mankind in the Making*, Doubleday Garden City, 1967, pp. 155-156.

28. M. Bouble and H.V. Vallois, *Fossil Men*, Dryden Press, New York, 1957, p.126.

29. Ibid, p.123.

30. Gish, *Evolution:Challenge of the Fossil Record*, P.184.

31. Malcolm Bowden, *Ape-Man - Fact or Fallacy*, Sovereign Bromley, 1981, pp. 58-59.

32. Under the pressure of the fundamentalists, Tennessee state had legislated against the teaching of evolution in the school. John Scopes, a school teacher was accused of breaking the law.

33. Gish, *Evolution:Challenge of the Fossil Record*, p. 188.

34. W. Herbert, *Science News*, 123:246 (1983).

35. Moline, *Illinois Daily Dispatch*, May 14, 1984.

36. This refers to the infamous Piltdown Man discussed later in this chapter.

37. Zuckerman, pp. 75-94; See also Gish, p.190.

38. Theodosius Dobzhansky, "Changing Man", *Science*, Vol 155, Jan. 27, 1967, p. 410; See also "Neanderthal Had Rickets", *Science Digest*, Vol 69, Feb. 1971.

39. Morris, *Scientific Creationism*, pp. 175-76.

40. F.H. Brown, *Nature*, 300:631, 1982.

41. J.E. Cronin, N.T. Boaz, C.B. Stringer & Y. Rak, *Nature*, 292:113, 1981.

42 Gary Parker, "Origin of Mankind", *Creation - the Cutting Edge*, ed. Henry Morris & Donald Rohrer, CLP, San Diego, 1982, p.161.

43. Gish, p. 188.

44. White, *Wonderfully Made*, p. 57.

45. Parker, op.cit.,p.161.

46. *Life - How Did It Get Here? By Evolution or By Creation*, p 97.

47. "Leakey's New Skull Changes Our Pedigree that Lengthens Our Past", *Science News*, Vol 102, Nov. 18, 1972, p.324.

48. Morris, *Scientific Creationism*, p.177.

49. Enoch, *Evolution or Creation*, p. 95.

50. Johanson, *Lucy: The Beginning of Humankind*, pp.245-52.

51. *Science*, 208:175, 1980.

52. Monty White, *Wonderfully Made*, p. 56. ❐

Chapter VI

1. As quoted by Robert E.D. Clark, in *The Universe: Plan or Accident?*, Zondervan Pub. House, Grand Rapids, MI, 1972, p.154.

2. Clark, op cit, p. 160.

3. L.L. Larson Cudmore, *The Centre of Life-A Natural History of the Cell*, pp. 13-14.

4. Ibid.

5. Richard Dawkins, *The Blind Watchmaker*, New York: Norton, 1986, p. 116.

6. Michael Denton, *Evolution : A Theory in Crisis*, Adler & Adler, Bethesda, Maryland, 1985, p. 250.

7. Francis Hitching, *The Neck of the Giraffe*, Pan:London, 1982, pp. 62-63.

8. Fred Hoyle and Chandra Wickramasinghe, *Evolution From Space*, J.M. Dent & Sons, Ltd, London, 1981, p. 27.

9. Hitching, op cit, p. 66.

10. *Scientific American*, September, Vol 239:3, 1978, p.73.

11. *New Scientist*, April 15, 1982, p. 151.

12. Francis Crick, "Life Itself, Its Origin and Nature", as quoted in *Life-How Did It Get Here? By Evolution or By Creation?* p. 40.

13. R.E. Dickerson, "Chemical Evolution and the Origin of Life", *Scientific American*, Vol 239:3 Sept 1978, p.62.

14. W. Went Frits, as quoted in *Life-How Did It Get Here? By Evolution or By Creation?* p. 44-47.

15. Eugene I Robinowitch, "Photosynthesis", *Scientific American Reader*, Simon and Schuster, New York, 1955, pp.218-219.

16. *Life-How Did It Get Here?* p. 151.

17. Harry Rimmer, *Modern Science and the Genesis Record*, Vol 2, Wm B Eerdman's Publishing Co., Grand Rapids, 1946, p.231.

18. Gary Parker, "Nature's Challenge to Evolution Theory", in *Acts & Facts*, October, 1978.

19. Albert Szent Gyorgyi, "Drive in Living Matter to Perfect Itself", *Synthesis I*, Vol. 1:1, 1977, pp 14-26.

20. Garrett Hardin, ed., *39 Steps to Biology*, W.H. Freeman and Co., San Francisco, 1968.

21. William Paley, a creationist wrote *Natural Theology*, first published in 1803. He strongly advocates a creationist view of a designer.

22. Charles Darwin, *The Origin of Species*, p.228.

23. Scott M Huse, *The Collapse of Evolution*, Baker Book House, Grand Rapids, MI, 1988, p. 84.

24. Helena Curtis, *Biology*, Worth Publishers Inc., New York, 1969, p. 862.

25. Evan Shute, *Flaws in the Theory of Evolution*, Craig Press, New Jersey, 1961, p. 468.

26. Scott, op cit, p. 86.

27. Clark, *The Universe : Plan of Accident*, op cit, p. 151.

28. L.L. Larison Cudmore, *The Centre of Life*, op cit, pp. 23, 24.

29. M.J.B.C. Davy, *Nature*, 1950, pp. 165, 825.

30. G.E. Pope as quoted by Robert Clark, *The Universe:Plan or Accident?* p. 144.

31. Henry M Morris, "Entropy and the Open System", in *Up With Creation*, ed. by D.T. Gish and D.H. Rohrer, CLP, El Cajon, 1978, p. 238.

32. As quoted in *Awake*, January 22, 1990.

33. Ibid. ❐

Chapter VII

1 Henry M Morris, *The Long War Against God*, Baker Book House, Grand Rapids, MI, 1990, p 51

2 Eileen Barker, "Let There Be Light Scientific Creationism in the Twentieth Century", in *Darwinism and Divinity*, John Durant ed , Basil Blackwell Ltd, Oxford, 1985 p 193

3 Theodosius Dobzhansky, *Science*, Vol 175, 1972, p 49

4 Julian Huxley, *The Observer*, July 17, 1960, p 17

5 The Humanist Community of San Jose, *What is Humanism?* California, 95106, n d

6 John Durant, *Darwinism and Divinity*, p 29

7 Ibid

8 Lloyd Morain, "How Do Humanists Define Their Beliefs"? *The Humanist*, 47, Sept/Oct 1987

9 Morris, *Scientific Creationism*, p iii

10 H M Morris, *The Long War Against God*, p 50

11 W R Thompson, "Introduction" to the centenial edition of Darwin's *Origin of Species*, Dutton, Everyman's Library, New York, 1956

12 L Harrison Matthews, Introduction to Darwin's *Origin of Species* reprinted by J M Dent and Sons, London, 1971, p xi

13 P R Erhlich and R W Holm, *Science*, Vol 137, p 655, 1962

14 G A Kerkut, *Implications of Evolution*, Pergamon Press, New York, 1960, p 157

15 Gish, *Evolution: Challenge of the Fossil Record*, p 257

16 R D Alexander, "*Evolution Versus Creationism: The Public Education Controversy*", J P Zetterberg ed , Oryx Press, Phoenix, 1983, p 91

17 E J H Corner, in *Contemporary Botanical Thoughts*, A M Mcleod & L S Cobley, eds , Quadrangle Books, Chicago, 1961, p 97

18 Gish, *Evolution: Challenge of the Fossil Record*, p 258 ❐

BIBLIOGRAPHY
A- **BOOK**

Alexander, R D , *Evolution Versus Creationism The Public Education Controversy*, J P Zetterberg ed , Oryx Press, Phoenix, 1973

Andrews, Edgar H , *Concepts in Creationism*, Presbyterian and Reformed Press, Philadelphia, 1994

From Nothing to Nature, Presbyterian and Reformed Press, Philadelphia, 1978

God Science and Evolution Presbyterian and Reformed Press, Philadelphia, 1980

Austin, Steven A , ed , *Catastrophes in Earth History*, Institute for Creation Research, El Cajon, CA, 1984

Baker, Syl-via, *The Bone of Contention*, Creation Science Foundation Ltd , Queensland, Australia, 1990

Barnes, Thomas G , *Science and Biblical Faith*, Creation Research Society, St Joseph, MO, 1993

Barjun, Jacques, *Darwin Marx Wagner*, Doubleday, Garden City, New York, 1958

Beddard, F E , *The Structure and Classification of Birds*, Longmans, Green & Co , London, 1898

Berkhof, Louis, *Systematic Theology*, The Banner of Truth Trust, Edinburg, 1988

Biaksiama, P C , *Bible leh Science*, (2 Vols) (in Mizo), Arts & Culture Department, Government of Mizoram, Aizawl, 1996

Binford, L R , *Bones Ancient Men and Modern Myths*, Academic Press, New York, 1981

Birsell, J B , *Human Evolution*, Rand McNally, Chicago, 1975

Blackmore, Vernon and Andrew Page, *Evolution The Great Debate*, A lion Handbook, London, 1989

Blick, Edward F , *Special Creation Versus Evolution*, South West Radio Church, Oklahoma City, 1981

Boule, M and H V Vallois, *Fossil Men*, Dryden Press, New York, 1957

Bowden, Malcolm, *Ape Man - Fact of Fallacy?* Sovereign Press, Brombay, 1981

The Rise of the Evolution Fraud, Creation-Life Publishers, San Diego, CA, 1982

Brooke, John Hedley, *Science and Religion*, Cambridge University Press, Cambridge, 1993

Brown, Colin, *Philosophy and the Christian Faith*, IVP, London, 1974

Burke, Derek, ed , *Creation and Evolution*, IVP, Leicester, 1985

Burton, M and R Burton, ed , *The International Wildlife Encyclopedia*, Marshall Cavendish Corp , New York, 1970

Bryan, William Jenning, *The Bible or Evolution*, Sword of the Lord Publishers, Tenessee, USA (n d)

Camp, Robert S , ed , *A Critical Look at Evolution*, Atlanta Religion Science and Communication Research and Development Corp , 1972

Carroll, R L , *Vertebrate Palaeontology and Evolution*, W H Freeman and Co , New York, 1988

Charing, A J , *A New Look at Dinosaurs*, Heinemann, London, 1979

Chittick, Donald E , *The Controversy Roots of the Creation Evolution Conflict*, Multnomah Press, Portland, OR, 1984

Clark, Martin E and Henry M Morris, *The Bible has the Answer*, Master Books, El Cajon, CA, 1987

Clarke, Robert E D , *The Universe Plan or Accident?* Zondervan Publishing House, Grand Rapids, Michigan, 1972

Cole, S , *Leakey's Luck. The Life of Louis Leakey*, Collins, London, 1975

Corner, E J H , *Contemporary Botanical Thought*, A M Mcleod & L S Cobley, ed , Quadrangle Books, Chicago, 1961

Cousins, F W , *Fossil Man*, A E Norris, Emsworth, 1971

Cremo, Michael A and Richard L Thompson, *The Hidden History of the Human Race*, Goverdhan Hill Publishing, Badger, CA, 1994

Curtis, Helena, *Biology*, Worth Publishers Inc , New York, 1969

Custance, Arthur C , *Evolution or Creation?* Zondervan Publishing House, Grand Rapids, MI , 1976

Darwin, Charles, *The Descent of Man*, J Murray & Co , London, 1871

The Origin of Species, J M Dent & Sons Ltd , London, 1971

Dehaan, M R , *Genesis & Evolution*, Zondervan Publishing House, Grand Rapids, MI , 1981

Demerec, M and B D Kaufmann, *Drosophila Guide*, Carnegie Institute of Washington, 1961

Denton, Michael, *Evolution A Theory in Crisis*, Adler & Adler, Bethesda, Maryland, 1985

Dennett, Daniel C , *Darwin s Dangerous Idea*, Simon and Schuster, New York, 1995

DeYoung, Donald B , *Astronomy and the Bible*, Baker Book House, Grand Rapids, MI , 1989

Durant, John, ed , *Darwinism and Divinity*, Basil Blackwell Ltd , Oxford, 1985

Encyclopedia Americana, 1980

Encyclopedia Britannica, 1946 Edn , 1978 Edn , 1994 Edn

Enoch, H , *Evolution or Creation*, Union of Evangelical Students of India, Madras, 1966

Ferguson, Sinclair B and David F Wright, *New Dictionary of Theology*, IVP, Leicester, 1991

Frair, Wayne and Won P Davis, *A Case for Creation*, Moody Press, Chicago, 1983

Futuyma, D J , *Science on Trial*, Pantheon Books, New York, 1983

Gish, Duane T, *Teaching Creation Science in Public Schools*, Institute for Creation Research, San Diego, CA, 1995

The Challenge of Fossil Records, CLP, San Diego, CA, 1992

Up with Creation, CLP, San Diego, CA, 1978

Speculations and Experiments on the Origin of Life, Institute for Creation Research, San Diego, 1972

The Battle for Creation, CLP, San Diego, 1977

Godfrey, L R , ed , *Scientists Confront Creationism*, W W Norton and Co , New York, 1983

Goldschmidt, Richard, *The Material Basis of Evolution*, Yale University Press, New Haven, 1940

Gould, Stephen Jay, *The Panda's Thumb*, W W Norton and Co , New York, 1980

Grasse, Pierre P , *Evolution of Living Organisms*, Academic Press, New York, 1977

Groves, C P , *A Theory of Human and Primate Evolution*, Clarendon Press, Oxford, 1989

Ham, Ken, Andrews Snelling and Carl Wieland, *The Answers Book*, Master Books, El Cajon, CA, 1992

Hill, Edward F , *Evolution in the Space Age*, The Christian Research Press, Iowa, 1967

Hawking, Stephen, *A Brief History of Time*, Bantam Books, New York, 1989

Hick, John H , *Philosophy of Religion*, Prentice Hall of India, New Delhi, 1987

Hitching, Francis, *The Neck of the Giraffe*, Pan Books, London, 1982

Horigan, James E , *Chance or Design*, Philosophical Library, New York, 1979

Howells, W S , *Mankind in the Making*, Doubleday, Garden City, New York, 1967

Hoyle, Fred and Chandra Wickramasinghe, *Evolution From Space*, Simon and Schuster, New York, 1981

Hull, David L , *Darwin and His Critics*, Harvard University Press, Cambridge, 1973

Humanist Community of San Jose, The, *What is Humanism?* (A Pamphlet published by the Human ist Community of San Jose, CA)

Huse, Scott M , *The Collapse of Evolution*, Baker Book House, Grand Rapids, Michigan, 1988

Huxley, Julian, *Evolution in Action*, Harper Bros , New York, 1953

Jauncey, James H , *Science Returns to God*, Zondervan Publishing House, Grand Rapids, MI, 1971

Johanson, Donald C and M A Edey, *Lucy The Beginning of Humankind*, Simon and Schuster, New York, 1981

Johanson, Donald C and J Shreeve, *Lucy's Child*, William Morrow, New York, 1989

Johanson, P E , *Darwin on Trial*, Regnery Gateway, Washinton D C 1991

Joseph, Lawrence E , *Gaia The Growth of an Idea*, St Martin's Press, New York, 1990

Kerkut, G A , *Implications of Evolution*, Pergamon Press, New York, 1960

Klotz, J W , *Genes, Genesis and Evolution*, Concordia Publication House, St Louis, 1970

Modern Science in the Christian Life, Concordia Publication House, St Louis, 1961

Kofahl, Robert E , *Handy Dandy Evolution Refuter*, Beta Books, San Diego, 1977

Kurten, Bjorn, *Not From Apes*, Victor Gollancz Ltd , London, 1972

Lammerts, W E , *Why Not Creation?* Baker Book House, Grand Rapids, MI, 1973

Le Gross Clark, W E and B G Campbell, *The Fossil Evidence for Human Evolution*, University of Chicago, Chicago, 1978

Lammerts, W E , ed , *Scientific Studies in Special Creation*, Presbyterian and Reformed Press, Philadelphia, 1971

Lester, Lane P and Raymond G Bohlin, *The Natural Limits to Biological Change*, Zondervan Publishing Co , Grand Rapids, MI , 1984

Cloning Miracle or Menace Tyndale Publications, Wheaton, Illinois, 1980

Levitt, Z *Creation A Scientist's Choice* Victor Books, Wheaton, Illinois, 1971

Lindsay, Gordon *Evolution - The Incredible Hoax* Christ for the Nations, Dallas, Texas, 1977

Lion Handbook, A , *The World's Religion*, Lion Publishing Co , Oxford, 1992

Lubenow, Marvin, *Bones of Contention*, Baker Book House, Grand Rapids, MI, 1992

Marsh, Frank L , *Variation and Fixity in Nature*, Pacific Press, Mountain View, CA, 1976

Marshall, W J , *Philosophy and the Christian Faith*, Christian Literature Society, Madras, 1972

Mayr, Ernst, *Populations, Species and Evolution*, Harvard University Press, Cambridge, 1970

Monsma, John Clover, ed , *The Evidence*, Gospel Literature Service, Bombay, 1973

Moore, John N , *How to Teach Origin without ACLU Interference*, Mott Media, Milford, MI, 1983

Questions and Answers on Creation and Evolution, Baker Books, Grand Rapids, MI, 1976

Moreland, J P , *The Secular City, A Defence of Christianity*, Baker Book House, Grand Rapids, MI, 1987

Morris, Henry Madison, *History of Modern Creationism*, Creation- Life Publishers, San Diego, 1984

Creation and the Modern Christian, Master Book Publishers, El Cajon, CA, 1985

The Long War Against God, Baker Book House, Grand Rapids, MI, 1990

Creation and Its Critics, Creation-Life Publishers, San Diego, CA, 1982

The Biblical Basis for Modern Science, Baker Book House, Grand Rapids, MI, 1988

Science and the Bible, Moody Press, Chicago, 1986

Scientific Creationism, Master Books, El Cajon, CA, 1987

Many Infallible Proofs, Master Books, El Cajon, CA, 1990

Men of Science, Men of God, Master Books, El Cajon, CA, 1986

The Remarkable Birth of Planet Earth, Creation-Life Publishers, San Diego, CA, 1978

Newman, J R , ed , *What is Science?* Simon and Schuster, New York, 1955

Nelson, Byron, *After its Kind*, Bethany Fellowship Inc , Minneapolis, Minnesota, 1970

Numbers, Ronald, *The Creationists*, Adolph Knopf Co , New York, 1992

Olson, E C , *The Evolution of Life*, The New American Library, New York, 1965

Overton, Basil, *Evolution or Creation*, Bible Teacher Publication, New Delhi, 1974

Paley, William, *Natural Theology*, American Tract Society, New York, n d

Patten, Donald W , ed , *Symposium on Creation II*, Baker, Grand Rapids, MI, 1970

Symposium on Creation III, Baker, Grand Rapids, 1971

Symposium on Creation IV, Baker, Grand Rapids, 1972

Symposium on Creation V, Baker, Grand Rapids, 1975

Ramm, Bernard, *The Christian View of Science and Scripture*, Wm B Eerdmans Publishing Co , Grand Rapids, MI, 1984

Raven, Charles E , *Christianity and Science*, United Society for Christian Literature, London, 1960

Reno, Cora, *Evolution and the Bible*, Moody Press, Chicago, 1976

Evolution on Trial, Moody Press, Chicago, 1970

Rendle-Short, John, *Man Ape or Image*, Creation-Science Association, Sunnybank, Queensland, Australia, 1981

Richards, Lawrence O , *Expository Dictionary of Bible Words*, Marshall Pickering, Zondervan Corporation, Grand Rapids, MI, 1985

Richardson, Alan, *The Bible in the Age of Science*, SCM Press, London, 1968

Riegle, D D , *Creation or Evolution*, Zondervan Publishing House, Grand Rapids, MI, 1971

Rifkin, Jeremy, *Algeny*, Viking, New York, 1983

Rimmer, Harry, *Modern Science and the Genesis Record*, Vol 2, Wm. B Eerdman's Publishing Co., Grand Rapids, Michigan, 1946.

Rohrer, Donald H., and Henry M.Morris, *Creation - the Cutting Edge*, CLP, San Diego, CA, 1982.

Sagan, Carl, *Intelligent Life in the Universe*, Pan Books Ltd., London, 1977.

..... *Cosmos*, Ballantine Books, New York, 1985.

Sheldrake, Rupert, *The Rebirth of Nature : The Greening of Science of God*, Bantam Books, New York, 1991.

Shute, Evan, *Flaws in the Theory of Evolution*, Craig Press, Nutley, New Jersey, 1981.

Simpson, George Gaylord, *The Major Features of Evolution*, Columbia University Press, New York, 1953.

Smith, Wolfgang, *Teilhardism and the New Religion*, Tan Books and Publishers, Rockford, Illinois, 1988.

Slusher, H.S. and J.N.Moore, ed , *Biology - A Search for Order in Complexity*, Zondervan, Grand Rapids, MI, 1974.

Sproul, R.C., *Not a Chance*, Baker Books, Grand Rapids, MI, 1994

Stanton, Don E., *Facts and Fictions about the Origin of Species*, MRC, Secunderabad, 1983.

Thilly, Frank, *A History of Philosophy*, SBW Publishers, New Delhi, 1993.

Thompson, Ben and Wayne Jackson, *The Case for the Existence of God*, Apologetic Press, CSR Books, St. Joseph, MO, 1996.

Waddington, C.H., *The Nature of Life*, Atheneum, New York, 1962.

Watch Tower Bible and Tract Society, Inc., *Life - How Did it Get Here? By Evolution or By Creation?* New York, 1985

Utt, Richard H., ed., *Creation Nature's Designs and Designer*, Pacific Press, Mountain View, CA, 1971.

Velikovsky, Immanuel, *Earth in Upheaval*, Dell Books, New York, 1955.

Webster, Gary, *Wonders of Science*, Sheed and Ward, New York, 1956

Whitcomb, John C., *The Early Earth*, Baker Book House, Grand Rapids, Michigan, 1972.

White, A.J.Monty, *How Old is the Earth?* Evangelical Press, Darlington, 1989.

..... *Wonderfully Made*, Evangelical Press, Darlington, 1989

Wilder-Smith, A.E , *The Natural Science know Nothing of Evolution*, Master Books, San Diego, 1981.

...,*The Creation of Life*, *Harold Show Co.*, Wheaton, IL, 1970.

Wilson, Clifford D., *In the Beginning*, Word of Truth Publications, New York, 1975.

Wysong, R L , *The Creation-Evolution Controversy*, Inquiry, East Lansing, MI, 1976

World Book Encyclopedia, The, 1966

Zimmerman, Paul A , ed , *Darwin Evolution and Creation*, Concordia Publishing House, St Louis, 1959

Zuckerman, S , *Beyond the Ivory Tower*, Taplinger Publishing Co , New York, 1970

B JOURNALS

Ager, Derek, "Fossil Frustration," *New Scientist*, 100 (Nov 10, 1983) 425

Ayala, Francisco J , "Theological Explanations in Evolutionary Biology", *Philosophy of Science* 37 (March 1970) 3

Beck, Stanley B , "Natural Science and Creationist Theology", *Bioscience* 32 (Oct 1982) 738

Beigman, Jerry, "The Acceptance of Evolution and Belief in Life on other Planet Earth", *Creation Research Society Quarterly* 32 (Sept 1995) 71-77

Boehmer, Harold Von and Pawel Kisielow, "How the Immune System Learns about Self", *Scientific American* (October 1991) 50

Childress, James J , Horse Felbeck and George N Somero, "Symbiosis in the Deep Sea," *Scientific American* (May 1987) 107-112

Conner, Cliff, "Evolution Versus Creationism In Defense of Scientific Thinking", *International Socialist Review*, November 1980

Criswell, David, "Ancient Civilization and Modern Man," *Creation* 17 2 (March-May, 1995) 41-43

Darlington, Cyril D , "The Origin of Darwinism", *Scientific American*, (May 1959) 201

Dawkins, Richard, "The Necessity of Darwinism", *New Scientist*, (April 15, 1982) 130

Froede, Jr, Carl R , "A Proposal for a Creationism Geological Timescale," *Creation Research* Society Quarterly, 32 (Sept 1995)

Goldsmith, R B , "Evolution as Viewed by One Geneticist", *American Scientist*, 40 (Jan 1952) 84

Gore, Rick, "The Awesome Worlds Within a Cell", *National Geographic*, September 1976 357-360

Gould, Stephen Jay and Niles Eldredge, "Punctuated Equilibria The Tempo and Mode of Evolution considered", *Paleobiology*, 3 (Spring 1977) 145, 146

"The Return of Hopeful Monsters", *Natural History* 76, June/July 1977 28

"Darwinism and the Expansion of Evolutionary Theory", *Science* 216, April 23, 1982 380

Gould, James L and Peter Marler, "Learning By Instinct", *Scientific American*, January 1987 62

Grindal, Bruce T , "Creationism, Sexual Purity and the Religious Right", *The Humanist*, 43, March/April 1983 19

Hammond, Allen L , "The Uniqueness of the Earth's Climate," *Science*, January 24, 1975 245

Hanawalt, Philip C , "Molecules to Living Cells Simple Inorganic to Free Living Cells", *Scientific American*, Introduction to Section 1 (1980) 1

Harper, G H , "Darwinism and Indoctrination," *School Science Review*, 59 (December 1977) 259

Haskins, Caryl P , "Advances and Challenges in Science in 1970", *American Scientist*, 59, (May-

June 1971) 298

Hitching, Francis, "Was Darwin Wrong?" *Life* 5 4 (April 1982) 48-52

Homstreet, Robert M , "Religious Humanism Meets Scientific Atheism", *The Humanist*, 47, (Jan/ Feb 1987) 6

Johanson, Donald, "Ethiopia Yields First Family of Early Man", *National Geographic*, 150 6, (Dec 1976) 790-811

Lewin, Roger, "Evolutionary Theory Under Fire," *Science*, (November 21, 1980) 883-887

Lewontin, Richard, "Adaptation," *Scientific American*, (September 1978) 213

Lubenow, Marvin L , "The Pigs Took it All," (The Problems Behind Dating the Famous 1470 Skull), *Creation* 17 3 (June-August, 1995) 36-38

Lutz, Ernst, "A Review of Claims about Archaeopteryx in the Light of Evidence," *Creation Research Society Quarterly*, 32 (June 1995) 18-24

Marsden, George M , "Creation Versus Evolution No Middle Ground," *Nature*, 305 (October 13, 1983) 574

Mayr, Ernst, "Evolution", *Scientific American*, 239 (Sept 1978) 47

"The Nature of Darwinian Revolution," *Science*, 176, (June 2, 1972) 981

Moram, Lloyd, "How do Humanists Define their Beliefs?", *The Humanist*, 47 (September/October 1987)

Moore, J N , "Should Evolution be Taught?", *New Scientist*, (September 15, 1983) 798

Neville, George T , "Fossils in Evolutionary Perspective," *Science Progress*, 48 (Jan 1960) 1, 3

Newell, N D , "Adequacy of the Fossil Record," *Journal of Paleontology* 33 (May 1959) 496

Orgel, Leslie, "Darwinism at the very Beginning of Life," *New Scientist*, (April 15, 1982) 151

Osborne, Henry Fairfield, "The Evolution of Human Race," *Natural History*, (Jan/Feb 1926), Reprinted in Natural History 89, April 1980 129

Parker, Gary E , "Origin of Mankind," Impact No 10, *Acts & Facts*, ICR, (November 1981) 4

Provine, William B , "Influence of Darwin's Ideas on the Study of Evolution", *Bioscience*, 32, (June, 1982) 506

Richards, Eveleen, "Will the Real Charles Darwin Please Stand Up," *New Scientist*, 100, (December 22/29, 1983) 887

Romer, Alfred S , "Darwin and the Fossil Record," *Natural History*, (October 1959) 466-467

Rosevear, D T , "Scientists Critical of Evolution,"*Evolution Protest Movement*, 224 . (July 1980) 4

Salisbury, Frank B , "Doubts About the Modern Synthetic Theory of Evolution," *American Biology Teacher*, (Sept 1971) 336-338

Simon, Edward, "Another Side to the Evolution Problem," *Jewish Press*, (Jan. 7, 1983) 24B

Stanley, Steven M , "Resetting the Evolutionary Timetable", Interview by Neil A Campbell, *Bioscience*, 36 (Dec 1986) 725

Tax, Sol Ed , "Evolution After Darwin," *Issues in Evolution*, 3 (1960) 41

Thompson, Keith S , "Ontogeny and Phylogeny Recapitulated", *American Scientist*, 76 (May/June 1988) 274

"The Meaning of Evolution," *American Scientist* 70 (Sept/Oct 1982) 529

Turner, John, "Why We Need Evolution by Jerks," *New Scientist*, 101 (Feb 9, 1984) 35

Wald, George, "Fitness in the Universe Choices and Necessities," *Origin of Life*, 5 (1974) 26

Weinberg, Steven, "Origins," *Science*, 230 (Oct 4, 1985) 16

Wilson, Edward O , "Towards a Humanistic Biology," *The Humanist*, 42 (Oct 1982) 56

Zihlman, Adrienne B , and Jerold M Lowenstein, "False Start of the Human Parade," *Natural History*, (August/September 1979) 86

C MAGAZINES & NEWS PAPERS

Adler, Jerry, Gerald c Lubenow and Maggie Malone, "Reading God's Mind," **Newsweek**, June 13, 1988

Appenzeller, Tim, "What Drives Climate?" *Discover*, November 1992

Asiaweek, "Nature's Double-take," Editorial, March 14, 1997

Balakrishna, J , "Accuracy of DNA Finger printing," *Indian Express*, May 7, 1991

Bengelsdorf, Irving S , "Fishing for Evolution's Answer," *Los Angeles Times*, November 2, 1967

Bird, Wendell R , "Creation - Science in Court in Louisiana," *Good News Broadcaster*, March 1982

Blum, Howard, "Anyone Out There?", *Span*, August 1991, pp 40-45

Caldwell, Mark , "How Does a Single Cell Become a Whole Body?", *Discover*, November 1992 pp 88-93

Cowley, Goeffrey, "How the Mind Was Designed," *Newsweek*, March 13, 1989

Cowley, Goeffrey, "The Biology of Beauty," *Newsweek*, June 3, 1996, pp 47-53

Cumming, Kenneth, "Our Mother the Organ-utan," *Confident Living*, December 1987

Elmer-Dewitt, Philip, "Cloning Where do we draw the Line?", *Time*, Nov 8, 1993

Gish, Duane T , "Just Another Ape," *Confident Living*, May 1987

Gish, Duane T , "Whether Wentest Thou Lucy'?" *Good News Broadcaster*, June 1983

Gliedman, John, "Miracle Mutations," *Science Digest*, February 1982

Goldman, Daniel, "Lost Paper Shows Freud's Effort to Link Analysis and Evolution," *New York Times*, February 10, 1987

Gould, Stephen Jay, "Evolution as Fact and Theory," *Discover*, May 1981

Gwynne, Peter, Sharon Begley and Mary Hager, "The Secrets of the Human Cells," *Newsweek*, August 20, 1979

Hindu The, "Fossil Findings link ape and Man," December 16, 1992

"Eve's Origin Raises a Storm," November 13, 1991

"Cloning the Check Orchid Smuggling," August 13, 1989

Jaroff, Leon, "Crisis in American Labs," *Time*, August 26, 1991

Jha, Prakash K , and Suresh Nair, "How Plants Fight Insects," *Science Reporter*, October 1986

Johnson, Donald C , and Maittland, "Lucy - the Beginning of Humankind," *Readers Digest*, April 1982

Larsen, Torben B , "Winged Deceivers," *Science Age*, February 1986

Lemonick, Michael D , "Life, the Universe and Everything," *Time*, February 22, 1993

Morris, Henry M , "Did Chimpanzees Evolve From Man?", *Good News Broadcaster*, July/August 1983

"Dehumanizing Australopithecus," *Good News Broadcaster*, April 1982

New York Times, The, "Prehistoric Gnat," October 3, 1982

"Time to Revise the Family Tree," February 14, 1982

Parker, Gary E , "God's Colourful Creation," *Confident Living*, January 1987

Tierney, John, Lynda Wright and Karen Springen, "The Search for Adam & Eve:Scientists Explore a Controversial Theory About Man's Origin," *Newsweek*, January 11, 1988

Salwi, Dilip M , "Why are Flowers Attrative?", *Science Reporter*, January 1988

"How do bees navigate?", *Science Reporter*, October 1986

Webster, Bayard, "Monkeylike African Primate called Common Ancestor of Man and Apes," *The New York Times*, February 7, 1980

"Fossils Bolster a Theory on Man's Earliest Ancestor," *The New York Times*, February 14, 1982

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