



Creationism



**SCIENTISTS
RESPOND**

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CREATIONISM: SCIENTISTS RESPOND

Is it possible to have a rational discussion on science with people who believe that the world is less than 10,000 years old and was created in six 24-hour days?

How do scientists respond to creationist statements attacking evolution?

The Australian Skeptics took ten leaflets published by the fundamentalist Creation Science Foundation and asked scientists and educationists to respond to them. All the contributors are experts in the topic they have written about.

Briefly and clearly, they give the scientific perspective on the points raised by the creationists.

This book will help non-scientists understand why creation “science” can’t be taken seriously.

CREATIONISM: SCIENTISTS RESPOND

EDITOR

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AUSTRALIAN SKEPTICS

Victorian Committee

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Australian Skeptics is a non-profit organisation whose aim is to scientifically investigate paranormal claims and pseudo-science.

The views of Australian Skeptics and those of the individual authors are not necessarily the same.

FOREWORD

Graeme O'Neill

Both as a private citizen, and as science reporter for *The Age*, I have had frequent contacts with creationists. In recent years I have changed from regarding them as fairly harmless zealots, whose influence had waned this century, to an insidious force whose growth threatens the intellectual roots of our society.

No doubt the various Christian fundamentalist churches, and a body like the Creation Science Foundation, would deny vehemently that they pose any threat to society. But the cage that creationism builds around young minds limits curiosity and inquiry to narrow avenues, and constrains the free and creative thought that has characterised Western science since the Renaissance.

I am dismayed that at least 30 per cent of students entering the science courses in our universities are either creationists, or hold views incompatible with modern evolutionary theory. We live in troubled times, and the alienation of our youth has created an ideal environment for the purveyors of religious fundamentalism.

Science is being blamed, rightly or wrongly, for many of society's ills, and we should not be surprised that so many young people are expressing their disenchantment by gravitating towards groups that offer emotional and spiritual support, and which seem to offer a simpler, more rewarding way to look at the world. Unfortunately, the world is more complex than that. In proffering a rigid framework of thought that is implacably opposed to mainstream Western scientific thought creationism offers a false haven.

I have known many Christians, including fundamentalists, and have found most of them to be admirable, gentle people. Individually, I bear them no malice because I believe their own constrained mind-set prevents them from comprehending the damage that creationism can do to young, uncritical minds. To paraphrase an ancient benediction: Forgive them, for they know not what they do.

Religious fundamentalism is one of the most socially divisive forces in the modern world; in its Christian identity, Creationism, it must be actively and forcefully confronted by scientists and thinking citizens. I am happy to be counted among its opponents, and commend the Skeptics for their continuing work in exposing the deep flaws in "creation science" - a term that does injury to the very word "science".

INTRODUCTION

Peter Hogan

Why This Booklet?

At a Creation Science Foundation presentation, attended by members of Australian Skeptics, we collected a number of small, coloured leaflets, which had been produced by the Melbourne Support Group of the Creation Science Foundation. The leaflets made short comments about a number of aspects of evolution. They were of course designed to undermine belief in evolution and encourage belief in creationism.

Members of the Australian Skeptics Creationism Group felt that the leaflets gave a very misleading view of evolution and needed to be rebutted. We approached a number of academics and asked them to write a rebuttal of one or two leaflets concerned with their field of expertise.

These articles, together with the leaflets, are the subject of this book. All of the articles and the work of producing this book have been done voluntarily.

What is it about creation “science” that makes busy people give up their time to oppose it? It is not, despite what the creationists like to think, due to anti-religious feelings. At least three of the contributors to this book are practising Christians (they will probably be referred to as “professed Christians” by the Creation Science Foundation).

All the contributors to this book are scientists and science educators who are appalled at the misleading and scientifically incompetent material produced by the Creation Science Foundation.

To biological scientists the evidence for the theory of evolution is overwhelming. The evidence from palaeontology, physiology, biochemistry, genetics and other areas of science fits together so well that the theory is as certain as any scientific theory can be. Certainly there are disagreements about whether prehistoric evolutionary changes occurred gradually or suddenly, (which the creationists attempt to exploit), but biologists do not doubt that present life forms exist on Earth because of evolution.

Geologists are equally certain that the Earth is thousands of million years old. The evidence from rock strata, radioactive dating, cooling rates, salt concentration in the sea, plate tectonics and fossil layering attest to a very ancient Earth. The currently accepted figure for the age of the Earth is at least 4,500 million years. Look at some of the references given on page 39 and following to understand how the age of the Earth has been worked out.

The Australian Skeptics and The Creation “Scientists”

The Australian Skeptics’ opposition to creation “science” is not anti-religious. The Skeptics see creation “science” as an attack on science and science education (see page 36 for a full statement of our attitude to creationism). There are many fundamentalist groups which believe in creationism. However the Australian Skeptics’ activities have been mainly directed at the Queensland-based Creation Science Foundation. This is a non-denominational group of Christian fundamentalists who promote the belief that there is scientific evidence to support the explanation for the origins of the Earth and its life forms which is given in Genesis. They believe very strongly that the Bible is the divine word of God and is scientifically and historically accurate. They see evolution as an attack on Genesis which they regard as the foundation of Christianity.

The members of the Creation Science Foundation take the Bible even more literally than the Jehovah’s Witnesses. An article in their magazine *Creation Ex Nihilo* (June/August 1990, page 16), tells their readers how to convince a Jehovah’s Witness that the Watchtower Society’s teachings are erroneous. One example discussed in the article is the meaning of a ‘day’ in the Genesis account of Creation. The Jehovah’s Witnesses accept that these Biblical ‘days’ may have been longer than 24 hours, but the Creation Science Foundation insists that they were 24-hour days.

The beliefs of members of the Creation Science Foundation include the following:

- the Earth is no more than 10 000 years old;
- the world was created with all its present life forms in six 24-hour days;
- the great flood of Genesis covered the whole Earth and all present day land life is descended from animals and plants carried on Noah’s ark.

Is there any scientific evidence to support these unlikely beliefs? In a nutshell - none. The evidence the Creation Science Foundation claims to have just does not stand up to scientific scrutiny.

Scientific and Creationist Methods

To understand the vast gap between science and creation “science” we need to compare the methods scientists use to develop a theory with the way creation “science” writers seem to arrive at their ideas. The scientific method involves looking at all the data available and forming a theory which best fits the data. If further research reveals facts which are inconsistent with the theory then it will be modified or, in some cases, a new theory will replace the old one.

The methods of the creation “scientists”, as revealed in the material published by the Creation Science Foundation, are classic pseudo-science. They are so committed to creationism that they consider only observations which support their beliefs. They are capable of interpreting evidence only in a way which maintains their view of the Bible. Any facts or scientific theories which contradict these

beliefs, no matter how well accepted by scientists, they either ignore or attempt to undermine. The differences between the methods of science and creationism are discussed more fully in Geoff White's article on page 32.

The Creation Science Foundation publishes a quarterly magazine (*Creation Ex Nihilo*) and numerous books to promote their ideas. Their material is of course aimed at non-scientists. It is often misleading and inaccurate, but to a lay reader can sound convincing. The Australian Skeptics are particularly concerned that their material will be confusing to students.

The Australian Academy of Science has issued a two-page statement on creationism (Australian Academy of Science, *Statement on Creationism*, 1986). A paragraph from this statement says: "The' Creationist account of the origin of life is not ... appropriate to a course in the science of biology, and the claim that it is a viable scientific explanation of the diversity of life does not warrant support."

The reactions of scientists to the material produced by the Creation Science Foundation range from amused contempt to outraged disgust. This booklet gives scientists with real knowledge of the topics alluded to in the leaflets a chance to put the record straight. Obviously it is possible to give only a brief outline of the scientific viewpoint in these short articles. We hope that readers will be stimulated to look at some of the books in the Recommended Reading list (page 39) to get a better understanding of the careful research and multiple checking that the scientific community has used to arrive at its conclusions.

As already mentioned, the production of this booklet (apart from the printing) has been done by volunteers. Australian Skeptics are very grateful to the many people who have contributed. Please take some time to read the acknowledgments on the next page.

ACKNOWLEDGEMENTS

Australian Skeptics thanks the following people for freely giving their time to make this book possible.

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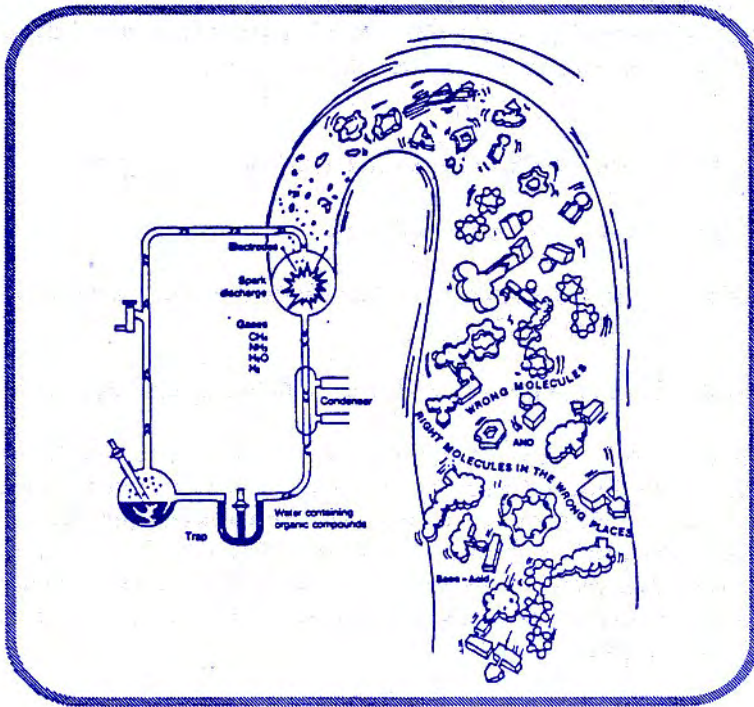
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Australian Skeptics thank Ron Suter and the Melbourne Support Group of the Creation Science Foundation for permission to reproduce their pamphlets.

NOT the . . .
**"BEGINNING
OF LIFE"
at all !**



Left to time, chance, and natural chemical processes, the bases and amino acids of DNA and proteins would react in ways that would prevent, not promote, the evolution of life. In the same way, natural reactions among molecules in Miller's famous "*spark chamber*" would destroy any hope of producing life. Living systems must constantly repair the chemical damage done to them, and when biological order loses out to "natural" chemical processes, death results.

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The Beginning of Life - A Scientific Perspective

Dr Les Christidis and Dr Robin Wilson

Our understanding of how life may have begun is being constantly refined, but some critics of scientific ideas rely on misconceptions to make their points. A living system must be able to metabolise and be self-replicating. Systems of such complexity would not have arisen in a single step, as some claim scientists believe. Instead, the emerging picture is one of "aliveness" in stages with a gradual transition between chemical and biological evolution. The ability to make proto-peptides and proto-polynucleotides (the building-blocks of proteins) would be one such stage of aliveness.

Evolution from prebiotic systems to increasingly complex organic molecules, and finally to living cells, has been driven by natural selection. Simply put, this concept states that any system (including molecules) that more successfully favours its own existence over others, will multiply and dominate.

A common misconception often used by critics is that of abiotic systems tending to disorder. In fact, amino-acids (the very components of proteins) have been found to be self-sequencing and self-ordering. There is now a new focus on non-random variation in developing ideas on life's origins.

The abiotic synthesis of simple organic materials is commonplace in nature. Furthermore, complex organic molecules have been successfully synthesised in the laboratory. A surprising aspect of such experiments is the ease with which the very compounds most critical as precursors to the important biological molecules are formed. It is a striking fact that of the thousands of organic compounds which we know, these very ones should be the most easily obtainable.

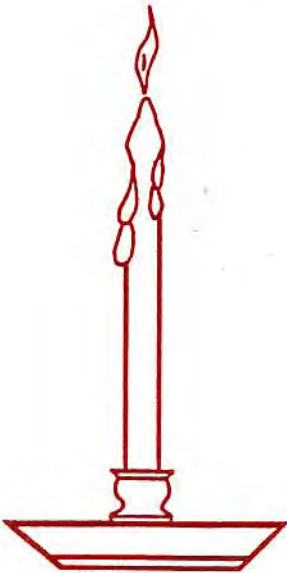
The approach of combining the facts of selection, non-randomness and abiotic synthesis of organic molecules with the concept of a gradual increase in "aliveness" has given scientists a clearer perspective of the processes which led to life. Chemical and biological processes do not compete with each other. On the contrary, they are at opposite ends of the same continuum.

A BURNING CANDLE

Burning is an example of a physical process that is continuous, (while it is left to continue, that is!).

The question can be asked:

HOW LONG HAS THE CANDLE BEEN BURNING ?



This is like asking "*How long has the Earth been here?*" - if your basis for information is material phenomena alone.

Even if you find out the rate at which it is now burning (and you can) ...

YOU STILL MUST KNOW

- (1) Whether the *burning rate* has been the same *ever since burning started*.
- (2) Exactly *how much* of the burnt material was *there to begin with*.

WELL, CAN YOU TELL HOW LONG THE CANDLE HAS BEEN BURNING ??

Then Who can tell reliably about the EARTH'S age?

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How Long Has the Candle Been Burning?

Professor Andrew Gleadow

It is quite true that in order to estimate the total time that the candle has been burning you need to know not only the rate at which the candle burns, but also that the rate has been the same ever since burning began, and exactly how much of the burnt material was there to begin with. This is indeed analogous to the basic information that is required for geological dating techniques, as is pointed out clearly in any textbook on the subject of geochronology.

What is misleading, however, about the argument presented opposite is the implicit assumption that the behaviour of candles during burning is somehow so mysterious that it cannot be understood, or that it may not follow known physical laws. It is quite obvious that the laws controlling the burning behaviour of candles can quite easily be determined by experiment and observation. If candles of this type are always observed to have started at a certain length and to bum at a constant rate, then they could indeed be used as a kind of clock. Candles have, in fact, been used in the past for this very purpose. It is simply not true, and quite illogical, to suggest that the burning of candles cannot be understood well enough to estimate how long a candle has been burning.

In using natural radioactivity to determine the ages of rocks, many careful experiments are conducted to determine the physical behaviour of the particular measurement systems being used. The behaviour of different dating systems can be investigated directly by experiment and observation to determine, for example, the amount of daughter isotope (the "burnt material") that might be included at the time of formation. For radioactive decay rates to vary through time would violate the known laws of physics, meaning that all science would have to be wrong, not just a few "inconvenient" rock-dating measurements.

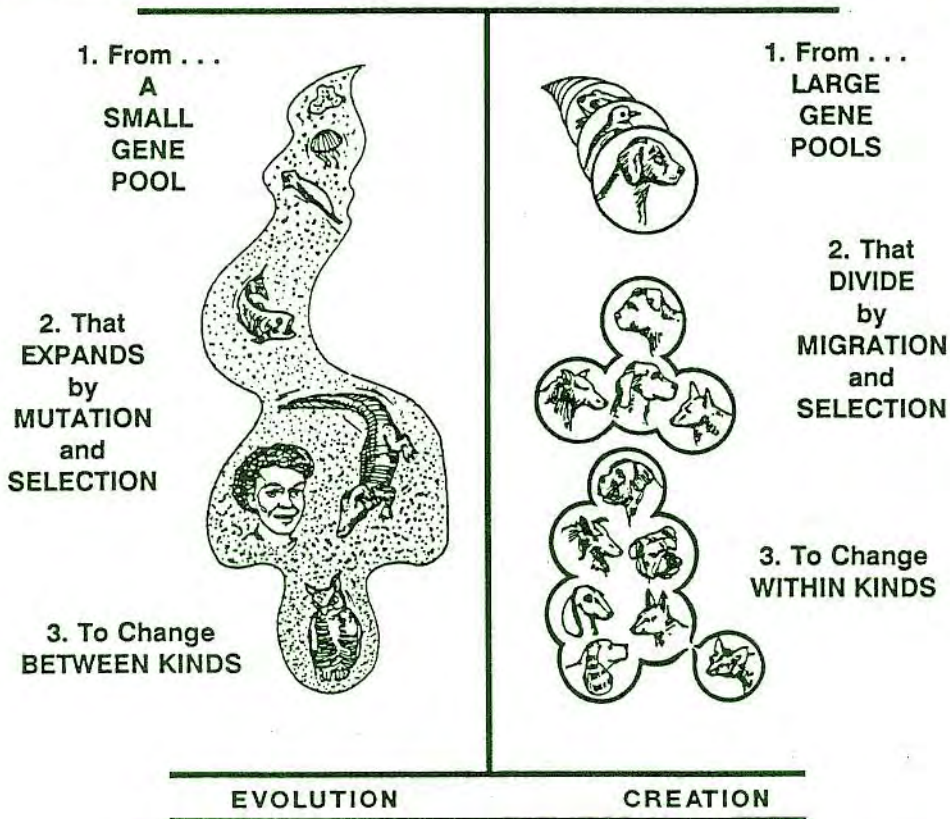
No guess-work is required in determining how much "burnt material" was present initially in the radioactive dating systems used in geology, which are based on the measurements of a radioactive element and its decay products, or the accumulated effects of the decay. A number of techniques are available to determine whether any of the product material was actually present when the system began. These include the isochron method, which requires no assumptions about how much daughter product was present initially, or using mineral systems which are known experimentally to incorporate no daughter product when they are formed.

Another approach is to look at the isotopic composition of the daughter product in minerals in the same rock which do not contain any of the radioactive decay element.

Radiation-damage techniques, such as fission-track dating, study the damage produced in natural materials by radioactive decay. Such materials clearly cannot incorporate radiation-damage from before they were formed. In geologically undisturbed systems, all of these approaches can be shown to give the same results indicating that many rocks, and therefore the Earth itself, are of enormous age (billions of years).

The answer to the argument presented is simply that it is possible to understand natural systems and physical laws. Such understanding leads to predictions that can be tested to the point where the underlying physical laws cannot reasonably be doubted. On this basis, it is entirely possible to use a candle to estimate elapsed time, and the same is true for geological dating systems.

CHANGE and VARIATION



Change?

Yes - but which kind of change?

What's the most logical inference, or the most reasonable extrapolation, from our observations: Unlimited change from one kind to others (*evolution*), or limited variation within kinds (*creation*)? Given the new knowledge of genetics and ecology, shouldn't we be willing to "think about it"?

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Variation and Change

Dr Rick Willis

Variation

Mutation provides the source of heritable variation. Creationists view mutation purely as disorder. An analogy would be the corruption of a computer program through an error in copying. However, here the analogy is too simplistic, as computer language is exact, whereas the genetic code is not. There is a considerable degree of redundancy in the genetic code; for example there are four different threebase sequences which code for the amino acid alanine: GCU, GCC, GCA and GCG. Consequently, the mutation of a single DNA base (for example, the last in the sequence of three) may have no effect. Another possibility different from computer language is that the deletion of a single base may drastically alter the reading of an entire segment of DNA. A closer analogy to the genetic code is human language, which like DNA is constantly changing according to use. The spelling of words changes with time, as do the meanings of words. New words arise through new combinations of letters, for example the classic "chortle" coined by Lewis Carroll. One can argue that this word has a creator, but very occasionally new words arise simply through transcriptional error. Time will tell whether the word "dord" meaning density, which appears in the 1934 Webster's Dictionary, gains currency. It arose accidentally through someone previously misreading an entry "D or d: density".

It is not disputed that the vast majority of mutations are neutral or of deleterious effect; however, rarely new combinations of DNA are of benefit, especially in a changing environment. It is instructive, when considering the likelihood of a mutation causing the appearance of a beneficial new trait, to consider the magnitude of the number of mutations that occur from day to day. In the lowly bacterium *Escherichia coli*, it has recently been estimated that over the globe, each gene of the *E. coli* genome mutates at least 250 million times a day. Even in man it is estimated that worldwide there are 80,000 new mutations for each gene per human generation. One cannot argue that every combination of DNA already exists in this world, and that mutation provides nothing new. Consider that, even for a short piece of DNA coding for say, 200 amino acids, there are more possible combinations, 10264, than there are atoms in the known universe.

Change

A frequent challenge laid before the evolutionary biologist is this: 'show me an example of a species that has just evolved'. Clearly this is a difficult task, as such change in higher organisms may take many, many generations, and may be impossible to witness within the time scale of a human life. A human lifetime represents only about twenty billionths of the estimated time over which organisms have been evolving, and thus the average number of species expected to evolve within a human lifetime should be small.

Unfortunately too much of our information regarding evolutionary change relies on studies of rapidly-growing bacteria such as *Escherichia coli*, which has only a single chromosome, and numerous ancillary means of altering its genetic composition, and these are not found in higher organisms, as far as we know.

There is no shortage of examples of artificially created domestic species, especially hybrids and polyploids, but have any new species emerged without human assistance within, for example, the past hundred years? The answer is yes.

One of the best examples of a recently emerging species is that of the apple maggot fly (a form of *Rhagoletis pomonella* in the United States). The original species is a native pest of the North American hawthorn. With the introduction of apple trees from Europe in the nineteenth century, it was found that the hawthorn maggot fly was able to feed on the apple trees. Over the course of decades, two populations of maggot flies are now found in the same area: one population feeds on hawthorn and the other on apple. The two populations have diverged such that interbreeding, although still possible, does not commonly occur. Furthermore there is evidence that there are now marked differences in egg-laying preference, maturity times, and in enzyme-coding genes. It appears that it is simply a matter of time before full breeding isolation is apparent, and full speciation will be regarded as having occurred.

Amongst plants, examples of emerging species are also known from the wild. Perhaps the best known is that of the rush *Spartina townsendii*, and its fertile form *Spartina anglica*, which were first collected in southern England in 1870 and 1892 respectively. However, one could argue that these are special cases, being polyploids. In more recent times an unusual population of the wireweed appeared for the first time in 1966 in Oregon, and has since been shown to be reproductively isolated; it has since been named as a new species *Stephanomeria malheurensis*.

What does "NATURAL SELECTION" really achieve ?



By artificial selection, all the "fancy" varieties of pigeons above have been bred from the common wild rock pigeon, and they can be bred back to the wild rock pigeon (just as special varieties of dogs and cats can be bred from and to the "mongrel" types). Darwin used artificial selection, selective breeding by man, as a model for natural selection, survival of the fittest selected by nature in the struggle for life.

But does natural selection lead to evolution,
or point back to creation ?

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Natural Selection

Dr Rick Willis

Introduction

Evolution theory contains three fundamental ideas:

- 1) there is enormous and continuously emerging variation within populations of living organisms;
- 2) there is differential survival amongst the individuals comprising these populations, known as natural selection (those individuals carrying characteristics which enhance survival and ultimately reproduction, are most likely to pass these characteristics to the next generation); and finally, as a result of the foregoing,
- 3) there is biological change or evolution.

The modern synthetic theory of evolution encompasses the above, and provides much of the mechanistic genetic and biochemical detail of which Darwin was ignorant. Mutational processes provide the continual source of variation required, and this variation is the substrate for change. In support of this, chromosomes which carry DNA can be manipulated in the laboratory in numerous ways, through the use of mutagenic chemicals, irradiation, and biological agents such as phages to yield a seemingly limitless array of mutant forms.

Natural Selection

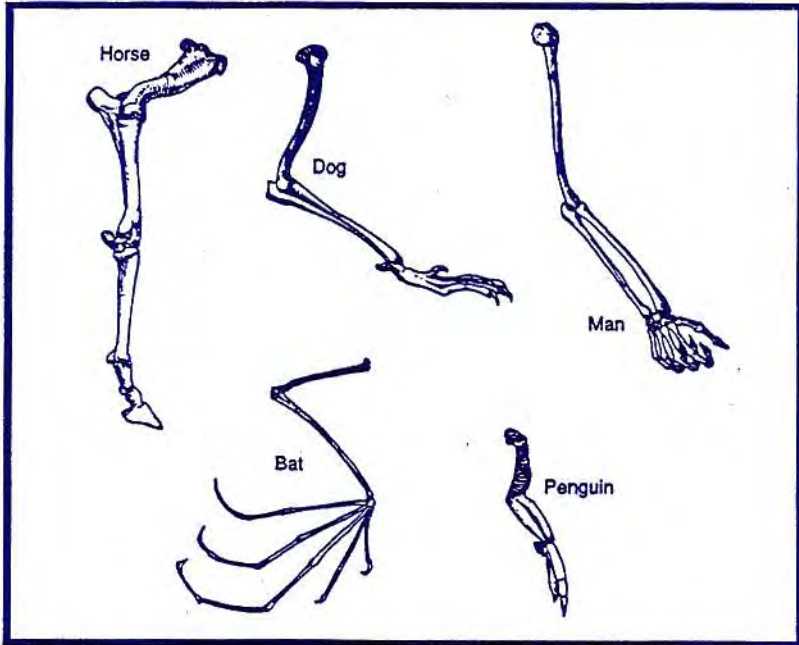
The term "natural selection" was coined by Darwin to contrast with artificial selection, or selection as practised by humans on domestic animals and plants. Through both conscious and unconscious selection and culling within domestic species, humans have very clearly altered the form of many animals and plants, and Darwin was much influenced by the wealth of examples available, including that of the common pigeon. Darwin envisaged a similar process of change occurring in the wild, in which the causative agent was "Nature" herself. This concept served Darwin well in Victorian times; however, today, natural selection is a term which is less important than before.

Natural selection is really a collective term like "ageing" which implies directional change with respect to time, but which involves many specific activities. We can say that an individual is undergoing ageing, but in reality we are talking about a host of physiological changes to cells and organs. Similarly, natural selection is a convenient term that summarises the changes to a population due to differential birth and deaths of certain individuals; but, there is no purposeful agency or power as natural selection. Natural selection as an operational force in evolution is no more real than is "Lady Luck" in directing the throw of dice.

In spite of this, natural selection is an often useful term to encapsulate the processes that accompany biological change. That change does occur in the biological world is indisputable, even amongst most creationists. Virtually every biology student has learned of the black forms of the peppered moth (*Biston betularia*) which suddenly became prominent in industrial 19th-century England. Other notable examples include the appearance of strains of micro-organisms resistant to antibiotics, including the infamous "golden staph" (*Staphylococcus aureus*), pesticide-resistant populations of rodents and insects, and amongst the most striking examples is the natural emergence of grass populations resistant to poisonous heavy metals, on soil contaminated with mining wastes. These examples are very important to evolutionary theory as they provide striking examples of sudden change in response to man-made environmental conditions.

These are not necessarily the best examples of evolution, as only a single character is involved, and reversal to the wild or "mongrel" type can occur. Where the course of evolution is known over a longer period, the case is different. Banana plants were introduced by Polynesians to the Hawaiian islands approximately 1000 years ago, and since that time, five new banana-feeding species of a moth, *Hedylepta*, which normally feed on palms, have evolved: this cannot be reversed.

And those **HOMOLOGIES...** accident or design?



Bones in the human arm, the forelimbs of horses and dogs, a bat's wing and a penguin's flipper all share a similarity in basic structural pattern called homology. What does this similarity (homology) mean: descent from a common ancestor (*evolution*), or creation according to a common plan (*creation*)? The detailed research of Gavin de Beer and others shows that the growth of similar structures are usually NOT governed by similar genes. Neither do similar structures develop from matching sites in different embryos. (Ernst Haeckel's diagrams "proving" "embryonic recapitulation" were fraudulent.)

Thus comparative anatomy and physiology DO NOT support the evolutionary hypothesis.

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Homologies

Professor Jim Warren

Comparing anatomical structures, physiological processes and behavioural patterns between organisms strongly supports the concept of evolution; this concept is not a "hypothesis" yet to be proved, but is as well-established as many scientific paradigms. In different organisms (plants or animals) there are anatomical structures, chemical processes and behavioural patterns that are either identical or similar and may have common features in their embryological, developmental stages. Such features are called "homologies", and they are considered to be derived from a common ancestral stock.

.Examples of homologies are (1) physiological - the nervous impulse is chemically and electrically the same in all animals; (2) behavioural - nest building is similar in all species of Australian grass wrens; (3) anatomical - the leaves of roses and blackberries are structurally similar, as are the limbs of terrestrial vertebrate animals such as horses, birds, humans, etc.

Although homologous features in different organisms are derived from a common ancestor, it does not follow that they should necessarily have the same underlying genetic control mechanisms. The original genetic structure could change over time through mutations and/or rearrangement of the chromosomes carrying the genes. In fact, the genetic structure must have changed to lead to the differences between homologous features in the descendants of the ancestral stock.

The late Sir Gavin de Beer contributed greatly to our understanding of homologies and evolution. However, none of his original research contributes to a modern genetic understanding of gene control of any structure, homologous or not, and for the Creation Science Foundation to say otherwise is to admit ignorance of the man, his work and genetics. Sir Gavin did study the well-known fact that similar structures, for example the limbs of vertebrates or the gills of fish, may not develop from matching sites in different species.

The evidence is that such structures develop from different segments in those animals that are built on a segmental pattern such as mammals, including humans, where the embryonic segmental pattern persists in adults as the segmental vertebral column, the segmental spinal nerves, the segmental muscles, etc. In such a developmental pattern the limbs may originate from, say, segments 28 through 31 in one species, but segments 24 through 27 in another, counting the segments backwards from the head. This does not mean that such structures are not homologous and therefore derived from common ancestral features. It means lie

number of segments have changed, some may be lost and some added, and this has been demonstrated experimentally in some groups of animals.

Related to the question of homologies is that of relic structures. These are features that are clearly functional in some, usually more primitive animals but appear to serve no purpose in animals considered more advanced, that is, descended from the primitive groups. An excellent Australian example is that of the egg tooth on the snout of the embryo of the common brushtail possum which is homologous with the egg tooth of reptiles and birds. The egg tooth is a cornified tooth-like projection on the snout which is used by the hatchlings of reptiles and birds to cut the egg membranes and shell and so emerge from the egg. In the brushtail possum it serves no purpose because there is no enclosing egg. It is a remnant bequeathed by ancestors that hatched from eggs.

The question of "embryonic recapitulation" as expressed in 1874 by Ernst Haeckel in the phrase "ontogeny recapitulates phylogeny", and used by him in essays on evolution, has never had substance in rigorous evolutionary biology; in today's terms Haeckel's views on this and other subjects would be considered to border on mysticism. He was correct, however, in illustrating and stating that embryos of some animals possess features only during embryonic stages, but which persist into the adult stage in other animals. This is related to the evolution of life cycles from fertilised egg to mature adult, which is a complex subject examined in detail in S.J.Gould's book, *Ontogeny and Phylogeny*, and explained in more general terms in Sir Gavin's book, *Embryos and Ancestors*. To cite Haeckel and his views as a cornerstone of evolutionary biology is to cite a straw man, and reflects a lack of knowledge of embryology and its role in evolutionary studies, as well as contemporary developments in biological science.

Reference

de Beer, G.R. (1951). *Embryos and Ancestors*. Oxford University Press. [This is a thorough examination of the relationship between morphological features of embryos and those of adults in the context of evolutionary biology.]

DINOSAURS - THE TRUTH

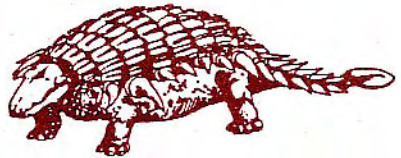
*"Of all the creatures that have ever lived, the dinosaurs are of greatest fascination to man, particularly children. This is perhaps because of their spectacular size in many cases and because they possessed so many unusual anatomical features." **

Before discussing what happened to dinosaurs, it is equally interesting to discover where they came from.

Alleged Pseudosuchian Ancestors

Dinosaurs (order Saurischia ("reptile like") and order Ornithischia ("bird-like")), flying reptile (order Pterosauria) and various other reptiles (order Thecodontia) are all believed to have "evolved" from a common ancestor, the Pseudosuchia.

The truth is, however, there is no way to connect the dinosaurs to their thecodontal ancestors. If evolution is true, one should find a series of transitional forms showing the unusual structures gradually coming into being.



The Absence of Transitional Forms in the Fossil Record

The fossil record, abundant in the number of bones found, is extremely destitute of examples of transitional forms. No fossils have been found showing the alleged evolution of dinosaurs, in fact, no fossils have been found of any evolving intermediate creature, including ape-to-man.

An unusual dinosaur was the hadrosaur, a duck-billed dinosaur with numerous teeth, an odd-shaped bony crested creature with webbed feet. If this creature evolved from some preexisting reptilian ancestor, the fossil record should show a succession of gradually evolving jaws into duck-bills. But, no such fossils have been found.



The Myth of Evolution

Indeed, the whole concept of evolution, from the "big-bang" to the formation of the earth to the spontaneous origin of life and the ever-increasing evolutionary progression is based upon speculation and guesswork. Evolution of flora and fauna exists entirely on paper as no scientific evidence (despite claims to the contrary) backs it up.



The Evolutionary Prejudice

Evolution is a belief system which must be believed entirely by faith. Science is the study and observation and measurement of current processes, and is therefore outside the scope of determining origins. In short, evolution is a religion.

The main thrust of teaching evolution is to remove God completely out of human consciousness. If the heavens, earth and man were not created by God, then there is no need to be responsible to Him, and there is no guilt in sin therefore no need for salvation. All this is done under the false veil of "science".

P.T.O.

* "Evolution, The Challenge of the Fossil Record", Duane T. Gish, 1984, page 117

The True Origin of Dinosaurs (and all Creatures, Plants and Man)

The fossil record and living animals show no intermediate, evolving forms. The only valid scientific conclusion, based on known facts, is that all animals and plants were created in completion by the Creator, each "after its own kind". Indeed, the Bible teaches us that the earth is about 6,000 to 10,000 years old, not 4.6 billion years, as the evolutionists would tell us. Thus dinosaurs were created wholly functional, as is depicted by the fossil record.

Dinosaurs and Man Lived Contemporaneously

Clear tracks of dinosaurs can be found in the Paluxy River Valley near Glen Rose, Texas. Only a few metres from the dinosaur tracks, unmistakable human tracks can also be found.

This evidence shows that dinosaurs and man lived contemporaneously, but for evolutionists to admit this would cause their theory to fall to pieces.

Oort's Cloud

Oort's cloud of comets is said to exist somewhere, conveniently, outside our solar system. From this cloud, a comet was supposedly flung out of orbit and collided with earth, causing the destruction of dinosaurs.

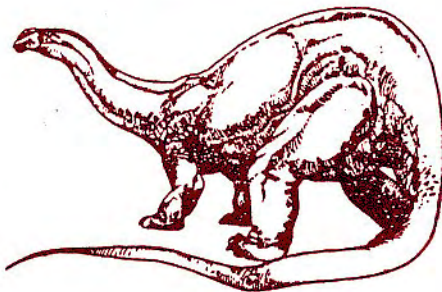
It should be noted that this cloud has never been observed and its existence is totally speculative. It has been thought up to try to explain certain phenomena.

The Sudden Disappearance of the Dinosaurs

Why the dinosaurs just suddenly disappeared has presented scientists with a baffling problem. However, the Bible-believer is not intimidated by such problems, as the Bible speaks clearly of a universal hydrological cataclysm known as Noah's Flood. This flood covered the entire earth, wiping out completely all living creatures, and man, that breathed air.

To the truly unprejudiced, the known data speak of special creation. The reader of this paper is urged to read the creation account in Genesis, the first book of the Bible.

What man cannot find out by his own means (primarily by science), God has chosen to reveal in His written Word.



Dinosaurs

Professor Jim Warren

The unravelling of the evolution of dinosaurs presents problems no different from those of any other group of plants or animals. To hope to establish a complete evolutionary history, that is a graded series of fossils from ancestor to descendant with all transitional forms, is to expect too much of the fossil record in most cases, but there are exceptions. Simple observations of geological processes and fossilisation as they occur around us today will show why, as even the most casual observer will detect.

First, terrestrial animals are rarely preserved because they do not usually die in places where they may be fortuitously buried and preserved. Their bodies usually decay or are eaten by scavengers, as anyone travelling in the country may observe, Australia is not littered with dead kangaroos though tens of millions have died,

To be preserved, plants and animals must be washed into an area where they will be covered by sediment with a chemical composition suitable for preservation. There must then be no subsequent destructive erosion. The chain of events leading to these circumstances is rare, and to think it would, or should occur repeatedly generation after generation is to think the absurd. But this is what would be required if complete evolutionary lineages were to be preserved. Nevertheless, if one postulates the conditions under which continuous sedimentation and fossilisation may occur with little or no erosion and, therefore, preserve a graded series of transitional forms, there are such places: the ocean basins.

Unfortunately, recovering fossils from a series of sediments in an ocean basin is difficult and expensive, but it has been done in a few places by drilling. Drill cores from ocean sediments may be many metres in length but are only a few centimetres in diameter, so only small fossil organisms are recovered. In these circumstances there is a graded, evolutionary sequence showing change through transitional forms from the lower end of the drill core (ancestors) to the upper end (descendants).

Although the fossil record is incomplete in most places, as would be expected, some fossils are occasionally found that are clearly on the border between primitive and advanced groups. A good example would be a group of small animals called "microsaurs". These are well documented in the fossil record and they have some features that are characteristic of amphibians and others characteristic of reptiles. Accordingly, it has not been straightforward to determine whether these fossil animals were reptiles or amphibians, although on balance most palaeontologists consider the amphibian features predominate.

The well known fossil Therapsids, often called the "mammal-like reptiles", from sediments in the Karoo Desert are, like the "microsaurs", another problematic group. In the detailed anatomy of their skulls these fossil animals exhibit a condition of the jaws and the middle ear hearing apparatus intermediate between the otherwise markedly different conditions that distinguish reptiles from

mammals. The condition of this hearing apparatus in reptiles and mammals is so different that until the discovery of the fossil Therapsids it was difficult to imagine an intermediate stage to link the mammals with the reptiles from which they were thought to have evolved; now that problem is solved by having excellent intermediate forms.

Dinosaurs are extremely diverse and, contrary to their popular image, are not common as fossils. As would be expected of large, terrestrial animals very few died under conditions that allowed fossilisation; the same is true for large animals today. There are less than 10 good specimens known for many types of dinosaurs, and as few as one or two specimens for some species. Accordingly, a series of intermediate forms is uncommon, but some are known. There is a good sequence of evolution from ancestral reptiles, called thecodonts, through to dinosaurs, largely from recent discoveries in Argentina. There is also a good sequence of how the so-called "duckbilled" dinosaurs evolved their characteristic jaw structures.

It is not well established if dinosaurs became extinct suddenly or gradually over time, but the latter is more likely from evidence to date. The vagaries of fossil preservation result in a fossil record that does not allow the time nor rate of extinction to be determined precisely. However, the fact that a variety of plants and animals contemporaneous with dinosaurs survived them, suggests there was not a global biological cataclysm.

The last dinosaur is known from rocks around 60,000,000 years old, which is some tens of millions of years before the first human type fossil is recorded. The Creation Science Foundation does not accept this geologically unequivocal evidence, and in support of their view allege that human tracks are found in association with dinosaur tracks at Paluxy River near Glen Rose, Texas. This allegation was shown to be false as early as 1939 when pictures of the purported tracks were published in the magazine *Natural History*. The tracks are clearly fake, and are obviously carved into the rock by someone with a poor knowledge of foot anatomy. For example, the toes are not connected to the rest of the foot, and there is no arch. Scientists do not accept this evidence, not because it contradicts evolution, but because it is a combination of poor analytical skills and deception, as anyone visiting the Paluxy River trackway locality can see for themselves.

And what about those

Bivalve Molluscs ?

(two-shelled shellfish eg. mussels, clams.)

When these shellfish die, or their flesh is eaten away, no longer do their muscles hold the two shells closed. They open at the hinge line and soon become separated from each other. On the beach or in a rock pool nowadays you find separated halves of these creatures' shells

lying around open empty.

Fossilised, these kinds of creatures are found in many places around the world eg. on a mountain top in Ethiopia and in the outback of N.S.W., or in cliffs near Adelaide

buried whole shells closed

**buried by water-borne sediments,
external shapes preserved.**

**Did these Molluscs in their
FOSSILISED MILLIONS die ...**

"NATURALLY" or SUDDENLY

? ? ? ? ? ?

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Bivalved Molluscs and Past Environments

Dr Neil Archbold

As you walk along the beach you will indeed notice many bivalved mollusc shells lying separated as the waves wash them back and forth. However, swim out into the deeper water, below wave base and where are the dead molluscs?

Invariably, away from the hectic, wave-washed beach, in deeper water you will find layers of sediment that have been quietly deposited. Within this sediment lie many burrowing bivalved molluscs - hidden from view. When they die, their shells are already buried whole with the shells closed, to be in turn covered with additional layers of sediment.

As part of the geological record of our Earth, many extensive and thick marine sedimentary sequences have been preserved. Within these sequences are old beach deposits and old deeper water deposits. The way in which fossil shells are preserved assists geologists in determining in which ancient environment the sediments were once deposited. Fossil occurrences of separated bivalve shells (not all such fossils are of whole, closed shells) usually indicate shallow water deposition above wave base. Fossil occurrences of complete closed shells usually indicate deeper quiet water sedimentation which preserves the shells in life position.

An understanding of the full range of modern sedimentary processes (not just those operating on a beach) is essential for understanding the environments of deposition of the ancient sedimentary sequences in the geological record.

Shells found in high mountains or far inland do not imply a world wide flood but rather tell us of the dynamic way in which the land may be uplifted over geological time. Read further on the science of geology - the reference below is a comprehensive, readable text on the subject.

Reference:

S.M. Stanley, 1989. *Earth and Life Through Time* (2nd edition), W.H. Freeman and Co., New York, 689 pages

Today's

Fairytale



"COAL"

Many people think that coal began in swamp country "ONCE-UPON-TIME" !!

THAT'S A FAIRY TALE !!

THERE IS NO INDISPUTABLE EVIDENCE
anywhere in the world to support the idea
that **COAL** began in swamps.

TO THE CONTRARY :-

- Coals in Australia and elsewhere include huge tree trunks of kinds of trees that do not grow in swamps. (Some of these trunks are vertical, having been buried quite rapidly.)
- Coal in Gippsland includes layers containing pollen. (Swamp plants don't have lots of pollen!)
- Gippsland coal is underlaid by white kaolin clay. (There is NO sign of swamp soil or roots of swamp plants.)
- Quite often, perfect coal is found in fruit sized fragments or very thin layers surrounded by hardened sandstone or mudstone. (Swamp origin utterly impossible!)
- With laboratory workshop equipment, coal has been shown to need only very short periods of time in which to form.

Huge logs (some vertical) pollen Small amounts
of coal within hard sand or silt rapid formation
all point to CATASTROPHIC, WATER-BORNE origin.

A devastating world wide flood the ONLY solution !

COAL - A Question of Time: Another Creationist Fairytale

Dr Neil Archbold

The Creation Science Foundation's pamphlet on Coal is yet another example of poor thinking, incorrect statements, and ignorance about the science of Geology.

Coal formation requires the accumulation of the remains of vegetation which may range in type from club-mosses to flowering plants (depending on the age of the deposit). Coal may form in situ, that is, where the vegetation grew, or it may form as a result of the transport of the remains of vegetation. In general terms, coal geologists recognise that most extensive coal deposits developed from the formation of peat bogs. The peat accumulation may then be covered with extensive sedimentary layers, and during tectonic deformation the peat layers may be subjected to pressure and heat which may increase the rank of the coal (peat --> lignite --> black coal --> anthracite). Each coal deposit has its own unique history of formation; to generalise about world-wide coal formation may fool the layman, but is nothing but a poor joke to the coal geologist.

Coal deposits, like all sedimentary rock sequences, are dated by their contained fossils using principles and laws established at the end of the eighteenth century. These principles and laws have never been disproved and are used on a day to day basis in the exploration for oil and coal today. Why is it that older coal deposits (as dated by the geological time-scale) contain only the remains of more primitive plants, whereas the younger coal deposits contain the remains of more advanced plants? Conventional geological dating predicts this state of affairs; creationist ideas do not predict this observable sequence. It is time for creationist pseudo-scientists to face the facts of the world.

An excellent (but highly technical) book on coal is named below. The book represents the true state of the modern knowledge of coal deposits and their formation. Come on creationists, show us scientists where we are wrong! Let's get down to real data and facts.

Reference: Lyons, P.C., and Alpern, B. 1989: *Peat and Coal: Origin, Facies and Depositional Models*. Elsevier, Amsterdam.

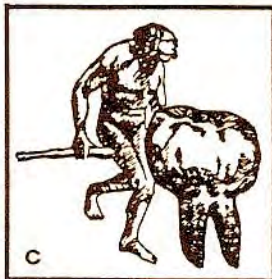
Afterthought: Quote from pamphlet: "Swamp plants don't have lots of pollen!".
Suggestion to creationists: study the plant *Typha australis* - a plant not unfamiliar to Moses.
(Reference: Zoliary, M., 1982: *Plants of the Bible*. C.U.P., Cambridge.)

DISCARDED CANDIDATES for MANKIND'S ANCESTOR . .



A. *Neanderthals* turned out to be just plain people, some of whom suffered from bone diseases. In ordinary clothing, they would attract no particular attention today.

B. *Pitldown Man* (*Eoanthropus dawsoni*) was a deliberate (but not very clever) hoax palmed off as "proof of evolution" to students for more than two generations. It turned out to be a bit of ape jaw and human skull artificially aged.



c. *Nebraska Man* (*Hesperopithecus*) was reconstructed, family and all, from a tooth - a tooth that later was found to belong to an extinct pig!

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Mankind's Ancestors - An Evolving Story

Dr Neil Archbold

The Creation Science Foundation's *Discarded Candidates* pamphlet is a classic "straw man" argument. It must be remembered that the three discarded examples were discarded by scientists (not fundamentalist creationists) as the specimens were subjected to further study. They provide proof of the way in which scientific investigations accept no "ultimate truths"!

Neanderthals, about whose relationships there is still a lot of debate, were never considered by most authorities to be our direct ancestors. "Piltdown Man", after 40 years during which its position in the human evolutionary tree came to seem more and more anomalous, was shown by scientists (NOT by fundamentalist creationists) to be a fake (but a very clever one). "Nebraska Man" fooled a few scientists for just 5 years in the 1920's, before it was found to be a peccary (not "pig") tooth - again by scientists, NOT by fundamental creationists. "Nebraska Man" is a perfect straw man, since no textbook mentions "him", no evolutionary theory is based on "him" and no evolutionist anywhere has considered him to be a primate since 1927.

What fundamentalist creationists should be addressing is the vast amount of genuine evidence discovered by scientists over the past century - particularly the past quartercentury. The second edition of the *Catalogue of Fossil Hominids* (edited by K.P.Oakley, B.G.Campbell and T.I.Mollison) listed the discoveries in Africa up to 1977; the number of specimens (excluding isolated teeth) found at the three most productive fossil sites to that date was: Koobi Fora (Kenya), 113; Swartkrans (South Africa), 85; Sterkfontein (South Africa), 78. Where is the creationist critique of the abundance of material found at these and other sites, and of the mass of specimens found in the years since that date? Or are the creationists afraid to face up to the true state of affairs?

The modern story of Man's ancestors (with differing scientific interpretations) is summarised in: "Tracks Through Time: The Story of Human Evolution", *Australian Natural History Supplement* No. 2, 1988, 58 pages, The Australian Museum Trust, Sydney.

The RELIGIOUS NATURE and the SCIENTIFIC IRRELEVANCE of EVOLUTION

Many evolutionists now acknowledge the religious character of evolutionism. The introduction to the 1971 edition of Darwin's "Origin of Species" admits that "*belief in the theory of evolution*" is "*exactly parallel to belief in special creation*" with evolution merely "*a satisfactory faith on which to base our interpretation of nature.*" The Jesuit apostle of evolutionism, Teilhard de Chardin, stated that "*(Evolution) is a general postulate to which all theories, all hypotheses, all systems, must henceforward bow and which they must satisfy in order to be true.*"

In view of the fundamentally religious nature of evolutionism, it is not surprising to find that most world religions are themselves based on evolution. It is certainly improper for educators to object to the teaching of the scientific implications of creation in schools on the grounds that it supports Biblical Christianity when the existing pervasive teaching of evolution is supporting a host of other religions and philosophies. Examples of these are: atomism, pantheism, stoicism, gnosticism, and all other humanistic and polytheistic systems. Buddhism, Confucianism, Taoism, Hinduism and Animism all have links with evolutionism. All beliefs which assume that space, time and matter are final categories of explanation, presuppose that the universe has existed from eternity and are therefore basically evolutionary systems. Primitive varieties of evolution personified the forces of the universe as gods and goddesses who organized the eternal chaotic cosmos into its present form. Modern evolutionism credits the physical forces themselves with inherent organizing ability. The common element in all of these is the denial that there is one true God and Creator of all things. Creationism is the basis of Orthodox Judaism, Islam, and Biblical

Christianity. However, the liberal varieties of Judaism, Islam, Roman Catholicism, and Protestantism, as well as most of the pseudo-Christian cults, are all based on evolution. These facts expose the absurdity of banning creationist teaching from schools on the basis that it is religious.

The schools are already teaching atheistic religion in the guise of evolutionary "science".

The scientific irrelevance of evolutionism may be indicated by a survey in "Science News" of the sixty most important scientific discoveries of the last 60 years. Of the 60, only 6 had any connection with evolutionist thought.

These were:

- (1) 1927 Discovery that radiation increases mutation rates in fruit flies.
- (2) 1943 Demonstration that nucleic acids carry genetic information.
- (3) 1948 Enunciation of the "big bang" cosmology.
- (4) 1953 Discovery of the "double helix" structure of DNA.
- (5) 1961 First step taken in cracking the genetic code.
- (6) 1973 Development of procedures for producing recombinant DNA.

Four of these six deal with the structure and function of DNA. Although evolutionists have presumed that the concepts of DNA somehow confirm evolution, the fact is that the DNA molecule provides strong evidence of original creation (since it is far too complex to have arisen by chance) and evidence of conservation of that creation (since the genetic code acts to guarantee reproduction of the same kind, not evolution of new kinds). The other two dis-

coveries, referred to ways of increasing mutations, but as all known mutations have been harmful, these discoveries have not contributed anything to an understanding of the presumed mechanism of evolution. One of these, the "big bang" concept, is certainly an evolutionary idea but it cannot be tested and is widely recognised as being inconsistent with basic physical laws. It seems fair to conclude that - no truly significant accomplishment of modern science either depends on evolution or supports evolution. There would certainly be no detriment to real scientific learning if creation were incorporated as an alternative to evolution in school curricula.

The introduction of creationism would only disturb the present monopoly exercised by atheistic humanism in schools.

The court decision in Arkansas was reached on the assumption that the teaching of creation science violates the principle of the separation of church and state. The comments above demonstrate that neither creationism nor evolutionism can be divorced from their ultimately religious character, so that the present teaching of evolution as the sole explanation of origins already violates the separation of church and state. Evolution is an essential tenet of humanism and the U.S. Supreme Court has previously classified humanism as a religion. The Arkansas court's ruling that "*creation science has no scientific merit or educational value as science*" can be challenged by noting the correspondence of predictions derived from the creationist model with observed phenomena. An example of this correspondence is the abrupt appearance of complex life in the fossil record and the systematic gaps between fossil

types. The Arkansas court was inconsistent in rejecting creation science on the grounds that it is not "*explanatory*", "*testable*", or "*falsifiable*" because the same criticism applies with equal force to evolution science. The court also rejected the two model approach advocated by creationists claiming that it is "*simply a contrived dualism which has no scientific, factual basis or legitimate educational purpose*". That there are only two basic scientific explanations of origins is admitted by logical analysis: the universe either always existed or was created; life either evolved or was created. The Arkansas decision maintained the opinion that teachers who do not hold evolution will deprive their students of the opportunity to be taught evolution properly if creationism is included in the school curricula. Such a criticism applies to partisans on both sides, but it also exposes the religious conviction of the court that evolution is "the cornerstone of modern biology", yet the court was unable to demonstrate this conviction scientifically. Creationists are not seeking to exclude the teaching of evolutionism but to insist on a teaching of comparative explanations of origins.

This article has been prepared from "Impact" notes in "Acts & Facts" published by the Institute for Creation Research, San Diego, California.

Further information and resources are available from:

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The Irreligious Nature and the Scientific Status of Evolutionary Theories

Geoff White

The Religions Status of Evolutionary Theories

Evolution is often presented by literal creationists (those who interpret the Genesis Creation narratives as scientifically and historically accurate records) as a thoroughly religious belief system. Henry Morris, the well-known American literal creationist, has defined evolutionism as:

"Worshipping the forces and systems of nature instead of their Creator"
(Morris, 1984, page 19)

And in the same spirit:

"The controversy is not religion versus science, it is religion versus religion"
(Ham, 1983, cited in Selkirk and Burrows, 1987, page 8).

Kemp challenges this claim by seeking to clarify the term religion:

"A better understanding of religion can be found in a list of religionmaking characteristics offered by William Alston. He suggested that religion is characterized by the following kinds of things: a belief in supernatural beings, a distinction between sacred and profane objects, ritual acts focused on sacred objects, a moral code with supernatural sanction, religious feelings (e.g. awe) aroused by sacred objects or ritual, prayer, a view of the world as a whole and the individual's place in it, organization of one's life based on that world view, a social group bound together by these traits"
(Kemp, 1988, page 227).

Evolutionary thinking clearly does not meet these criteria.

Having lost the battle for acceptance as a science (National Association of Biology Teachers, 1982), the creation "science" movement is now trying to achieve the inclusion of its teachings in school programs by claiming that it has equal status with evolution as a religious position. This is clearly untrue, and Morris' definition must be deeply offensive to both Christian and non-Christian evolutionists alike.

True Science and Creation "Science"

Much has been written about the processes of science (how science actually works) and the picture is now much more complex than many school science textbooks would have us believe. The production of new scientific knowledge does not occur via a single method, and is now understood to be a highly creative process (Chalmers, 1976). New ideas are presented to the scientific community for intense scrutiny and further testing and are held tentatively, the possibility of modification or outright rejection always being present.

The most basic check point through which all scientific ideas must pass is that of falsifiability. To be accepted as legitimate, a scientific hypothesis must be capable in principle of being proved incorrect. In contrast, the hypothesis that God created the universe is not open to disproof, because we cannot prove or disprove the existence of God. This proposition is therefore a theological statement and is not in any sense a scientific hypothesis. Evolutionary theories are, however, open to the possibility of disproof:

"The demonstration of human fossils in Carboniferous rocks, of vertebrates with three pairs of limbs (as in angels), or of a group of frogs with three ossicles in the inner ear, would certainly lead biologists to an agonising reappraisal" (Selkirk and Burrows, 1987, page 8).

Because creation "scientists" believe that statements in the Creation narratives in the Bible cannot be scientifically or historically incorrect, they come to the scientific data with minds already made up about what to do with observations which conflict with their view of Scripture: specifically, that such observations must be rejected, since the Biblical statements cannot be modified (or falsified) because they are regarded as divine literal truth.

Finally, one of the features of creation "science" literature is its limited number of frequently recycled predictions. In reality, creation "science" cannot use the processes of science to investigate Creation, because of its a priori rejection of explanations which do not involve the supernatural. To date, creation "science" has not provided any substantive critique of evolutionary theories, nor has it generated genuine scientific hypotheses.

The Importance of Presuppositions

nose of us favourably disposed towards an evolutionary perspective are frequently (and quite rightly) called by creation "science" writers to a re-examination of our presuppositions (those beliefs we already hold) about evolutionary ideas.

Presuppositions influence both what we observe in the first place and the conclusions we draw from those observations. Literal creationists could likewise benefit from an examination of their own presuppositions about the Bible.

Just what are some of the dearly held and unquestionable beliefs which literal creationists bring with them to their interpretation of the Bible? That:

- the Bible is the Word of God;
- the Bible is, therefore, without any error of any kind;
- the Bible must be interpreted literally (but only where the literalist community itself arbitrarily decides this to be appropriate);
- Chapters 1 and 2 of Genesis present scientifically and historically accurate data which must be interpreted literally and factually.

It is worth noting here that the Bible is a single volume comprised of many books and he~ having numerous authors. Within its covers are to be found many different styles of literature.- for example poetry, songs, historical records, letters to friends and churches. Some of these writings are more obviously intended to be interpreted literally than others.

Bearing in mind that the most powerful form of writing for conveying ultimate truths to readers over thousands of years is the symbolic (non-literal) form, it is not

surprising that the majority of Old Testament scholars, conservative and nonconservative alike, regard the Genesis 1 and 2 texts as non-literal.

Against this majority opinion stand the literalists who somehow decide, arbitrarily and without informed criteria, which portions of the Bible are to be interpreted literally and which not. To them, Genesis is literal truth. This is the crucial presupposition which literalists impose upon the Bible. It is they who decide what the Bible must mean, and in so doing they devalue the very Scriptures they venerate so highly, by placing themselves above the texts instead of allowing the Bible to speak for itself.

The vital questions which Genesis addresses (e.g., why are we here? why did God create us? why is there a moral difference between God and ourselves?) cannot be answered by science. These questions are, however, appropriately addressed by the

Creation narratives. To approach the Genesis texts seeking answers to questions of mechanism (e.g., how did God create us?) is missing the point of their message and is not without risk:

"...what is much more likely to undermine Christian faith is the dogmatic and persistent effort of creationists to present their theory before the public, Christian and non-Christian, as in accord with Scripture and nature, especially when the evidence to the contrary has been presented again and again by competent Christian scientists"
(Young, 1982, page 150).

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Attitude and Aims of Australian Skeptics on Creationism

Our attitude to Creationism is:

- that scientifically untestable religious beliefs are not our concern;
- that there is overwhelming scientific evidence to confirm the theory of evolution;
- that creationists' opposition to evolution is based on religious concerns;
- that the Creation Science Foundation is misusing and distorting science in a way which is intellectually dishonest and scientifically incompetent;
- that the anti-evolution material being presented by the Creation Science Foundation is confusing to the public and gives a false impression about science and the theory of evolution;
- that creationist beliefs in the origins of life may be taught in religious instruction classes but should not be taught in science classes.

Our aims in opposing Creationism are:

- to present to the public scientifically acceptable information about evolution;
- to refute scientifically incorrect statements in Creation Science Foundation publications;
- to prevent Creationism being taught in science classes;
- to make the public aware that Creation Science Foundation publications cannot be relied upon for scientific information;
- to promote scientific appraisal of creationist claims.

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Australian Skeptics Victorian Committee. Science Teacher with the Victorian Department of School Education.

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Formerly Science and Technology Writer for The Age, now Science Correspondent for Time Magazine. He has been a science writer for 18 years, including 6 years with the Age. He has an interest in evolutionary theory and takes an interest in the creationevolution debate because he is frequently contacted by creationists who read his articles.

Professor James Warren, M.A., Ph.D. (University of California).

Professor of Zoology at Monash University. Active in research on vertebrate morphology and palaeontology and also the phylogenetic relationships of vertebrates.

Mr Geoff White, B.App.Sci.(Biol), Dip.Ed. MEd.

Department of Curriculum and Teaching, Deakin University, Rusden Campus. Geoff has a special interest in the teaching and learning of biology and is working towards the completion of a Ph.D. in the public understanding Of science. He is a committed member of a local church and is involved in the exploration of the relationship between faith and scientific belief.

Dr Rick Willis, B.Sc.(Hons), Ph.D.

Dr Willis is Lecturer and Chairperson of the Biology Division, School of Science and Mathematics Education, Institute of Education, University of Melbourne. He is in charge of teaching Evolution in the Biology course.

Dr Robin Wilson, B.Sc.(Hons), Ph.D.

Collection Manager, Department of Crustacea, Museum of Victoria. He has recently completed his Ph.D. on the evolutionary relationships of marine polychaete worms. Ten years experience studying the species diversity and biochemical genetics of marine invertebrates. Authored numerous scientific publications on this.

RECOMMENDED READING

On the Evolution/Creation Debate

Plimer, Ian, 1993. *Telling Lies for God*. Random House

Takes a thorough look at the basis of creationism. Analyses the "science" used by creationists and exposes the scientific fraud of the leaders of the "creation science" movement. Also looks at the theology of fundamentalism.

Australian Academy of Science, 1986. *Statement On Creationism* AAS, Canberra.

A two-page statement which gives some background to the creation/evolution debate and explains why creationism should not be taught in science classes.

Bridgstock, Martin and Smith, Ken (Editors), 1986. *CREATIONISM - An Australian Perspective*. Australian Skeptics.

Articles by academics and scientists on Creationism. Investigates Creation Science Foundation. Discusses and refutes arguments used by Creationists.

Committee on Science and Creationism, National Academy of Sciences, 1984. *Science and Creationism - A View from the National Academy of Science*. National Academy Press.

Comments on the differences in the methods of science and creationism. Discusses the evidence for: an old earth; general evolution; human evolution. Brief but authoritative.

Futuyina, Douglas, 1983. *Science on Trial*. Pantheon.

Recommended for a fuller understanding of the evolutionary perspective.

Godfrey, L.R. (Ed), 1983. *Scientists Confront Creationism* W.W.Norton.

Scientists and educators answer the creationists' arguments. Sometimes gets technical but fairly readable.

Kitcher, Philip., 1982. *Abusing Science*. MIT.

About the Creationists in the USA. Ably defends evolution.

Selkirk D.R. and Burrows, F.J. (Editors), 1987. *Confronting Creationism: Defending Darwin*. NSW University Press and the Australian Institute of Biology.

Scholarly refutation by scientists of the pseudo-science of creationism. Very comprehensive. Includes geology and age of earth material. Also discusses creationists and fundamentalists.

Price, Barry, 1990. *The Creation Science Controversy*. Millennium Books, Sydney.

Examines in detail the activities, publications, personalities and beliefs of the Creationists, in the USA and Australia. Outspoken.

On Evolution

Dawkins, Richard, 1988. *The Blind Watchmaker*. Penguin Books.

Explains how random mutations and natural selection have resulted in the diversity of life forms and their often amazing ability to adapt to their environment.

deBeer, GR., 1951. *Embryos and Ancestors*. Oxford University Press.

Thoroughly examines the relationship between morphological features of embryos and adults in the context of evolutionary biology.

Dickerson, RE., 1978. "Chemical Evolution and the Origin of Life", *Scientific American* 239: 62-78A

Popular account of the major theories on the origin of life.

Eldredge, N., 1987. *The Natural History Reader in Evolution*. Columbia University Press, New York.

Gould, S.J.: 1980, *Ever Since Darwin*; 1983, *The Panda's Thumb*; 1984, *Hens' Teeth and Horses' Toes*. All published by Penguin.

Collections of interesting and easy to read articles which will help understand aspects of evolution. The third book has three chapters on creationism.

Orgel, L., 1982. "Darwinism at the Very Beginning of Life", *New Scientist*, 15 April 1982: p 149A

Popular account by one of the leading researchers in the field of early organic evolution.

Patterson, C., 1978. *Evolution*. University of Queensland Press, S t Lucia.

Young, David, 1992. *The Discovery of Evolution*. Cambridge University Press.

A balanced, readable work which traces the history of the theory of evolution through to the present.

On Geology

Clarkson, E.N.K., 1986 (2nd edition). *Invertebrate Palaeontology and Evolution*. Allen and Unwin, London.

A good text on Palaeontology.

Harland, W.B.; Armstrong, R.L.; Cox, A.V.; Craig, L.E.; Smith, A.G. and Smith, D.G., 1990. *A Geologic Time Scale 1989*. Cambridge University Press, Cambridge.

A specialist reference on geological time.

Stanley, S.M., 1989. *Earth and Life Through Time*. W H Freeman and Co, New York.

Thackray, John, 1980. *The Age of the Earth*. Institute of Geological Sciences, UK.

Brief, well-illustrated book on the history of the Earth and geological dating methods.

Young, A. D., 1982. *Christianity and the Age of the Earth*. Zondervan Publishing House, Michigan.

A creationist geologist examines the evidence for an ancient Earth and decides that geologists are correct.

Moore R.C., Teichert C., Robison R.A., (successive Editors); from 1953, ongoing. *Treatise on Invertebrate Palaeontology*. The Geological Society of America and University of Kansas Press.

For the specialist palaeontologist. Summarizes tens of thousands of described fossil genera. This series is the starting point for serious palaeontological research, but is usually ignored by Creationists.

On Science and Religion

Asimov, Isaac, 1981. *In the Beginning*. New English Library

Discusses statements found in the first 11 chapters of Genesis in the light of accepted modern scientific views.

Birch, Charles, 1990. *On Purpose*. NSW University Press Ltd.

Proposes a holistic philosophy which integrates modern scientific ideas, religion and current global problems. Discusses evolution with some comments on creationism.

Ratzsch, Del., 1986. *Philosophy of Science. The Natural Sciences in Christian Perspective*. InterVarsity Press, Illinois.

Spong, John Shelby, 1991. *Rescuing the Bible From Fundamentalism: A Bishop Rethinks the Meaning of Scripture*. Harper, San Francisco

A controversial but well-researched look at the question of biblical inerrancy.