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An evangelical perspective on science and the Christian faith

Creation and/or Evolution

"The fear of the Lord is the beginning of Wisdom." Psalm 111:10

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JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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"In the beginning God created the heavens and the earth." Genesis 1:1

WE BELIEVE IN CREATION

It should be well known to readers of the *Journal* ASA that the American Scientific Affiliation does not take an official position on controversial questions. Creation is not a controversial question. I have no hesitancy in affirming, "We believe in creation," for every ASA member.

The Biblical doctrine of creation is one of the richest doctrines revealed to us by God. It reveals to us that the God who loves us is also the God who created us and all things; at once it establishes the relationship between the God of religious faith and the God of physical reality. It is because of creation that we trust in the reality of a physical and moral structure to the universe, which we can explore as scientists and experience as persons. It is because of creation that we know that the universe and everything in it depends moment-by-moment upon the sustaining power and activity of God. It is because of creation that we know that we are not the end-products of meaningless processes in an impersonal universe, but men and women made in the image of a personal God. It is by the formulation of "creation out of nothing" that we affirm that God created the universe freely and separately, and reject the alternatives of dualism and pantheism. To worship God as Creator is to emphasize both His transcendence over the natural order and His imminence in the natural order; it is to recognize that His mode of existence as Creator is completely other than our mode of existence as created. To appreciate God as Creator is to recognize that which He created as intrinsically good; the rationale for scientific investigation, the assurance of ultimate personal meaning in life, and the nature of evil as an aberration on a good creation are all intrinsic to such an appreciation. We believe in creation. It is unthinkable for a Christian to do otherwise.

"I believe in God the Father Almighty, Maker of heaven and earth." Apostles' Creed

"For in Him all things were created, in heaven and on earth." Colossians 1:16

It is because of this foundational character of the Biblical doctrine of creation that it is unfortunate when the word "creation" is used narrowly and restrictively to refer—not to the fact of Creation—but to a possible means in the creative activity, usually to that means known as *fiat* creation. When it is implied that creation and evolution are necessarily mutually exclusive, or when the term "creation" is used as if it were primarily a scientific mechanism for origins, a profound confusion of categories is involved. The implication is given, deliberately or not, that if evolution should be the proper mechanism for the growth and development of living forms, then creation would have to be rejected. To pose such a choice is to do basic damage to the Christian position. It is to play directly into the hands of those evolutionists who argue that their understanding of evolution does away with the theological significance of Creation. If such an evolutionist is wrong to believe that his biological description does away with the need for a theological description, the Christian anti-evolutionist is wrong to believe that his theological description must make any biological description *im*possible.

The key to much of the evolution controversy lies in the recognition of the necessity and propriety of descriptions of the same phenomena on different levels of reality. Even a complete biological description does not do away with the need for a theological description, any more than a complete theological description does away with the possibility of a compatible biological description. Evolution *can* be considered without denying creation; creation *can* be accepted without excluding evolution. Evolution is a scientific question on the biological level; it would be unfortunate indeed if a scientific question were permitted to become the crucial point for Christian faith.

Evolutionary philosophy—shall we say rather evolutionary religion—may well be something quite different. In its anti-Christian form, such philosophical evolutionism may involve an exaltation of man, a denial of the reality of moral guilt in any theological sense, and hence an interpretation of the life and death of Jesus as nothing more than a good example. In this view, continued development and improvement are inevitably assured as man, now become conscious of evolution, completes for himself the process of the ages. Such evolutionism is a faith-system which competes for the religious allegiance of men, and against which the Christian faith is called to stand. But, if it is true that the evolutionist must realize that he has little scientific support for extrapolating biological evolution into a general principle of life, the Christian anti-evolutionist must realize that he has little religious justification upon which to attack a scientific theory dealing with biological mechanisms. How tragic it often is when Christians, seeking to avoid the errors of philosophical evolutionism, promulgate the falsehood that the efficacy of faith in the atonement of Christ effectively depends upon the dogmatic acceptance of *fiat* creation and the dogmatic rejection of any evolutionary processes.

We believe in Creation. We praise the Lord for that faith. But let us avoid either posing creation and evolution as intrinsically antithetical alternatives, the acceptance of one demanding the rejection of the other, or presenting creation as a scientific mechanism alternative to evolution, as though good science must ultimately lead to the verification of *fiat* creation and a falsification of evolution.

R. H. B.

"By faith we understand that the world was created by the word of God." Hebrews 11:3

The Protein Clock*

HALE SPARKS

The University Explorer
The University of California

There's a kind of clock, now, that tells us when man first parted company with his fellow primates, the anthropoid apes. According to the clock, that happened some four to five million years ago.

Branch-off From the Apes

Although anthropologists have taught us a great deal about ourselves—the earth creatures known as human beings—the fact is that we still know remarkably little concerning our own immediate ancestry. By "immediate" in this case I mean going back to the time when our ancestors first parted company with the apes and began that rather spectacular hominid march leading to—well, leading to the possibility of making reflections such as this, regarding ancestry. Surprisingly enough, exactly when man started his branch-off from the apes continues to be a matter of much argument. Some believe that man, chimpanzee, gorilla and monkey all descended from the same common ancestor that roamed the wilds of Africa up to around 30,000,000 years ago; others contend that a common ancestry is more recent, 15,000,000 years perhaps; but the truly radical thinkers, of whom there are a gradually increasing number, say that man and Old World apes started out on their separate ways a mere 4 to 5,000,000 years ago, and if this turns out to be true it will profoundly influence our thinking about ourselves.

Protein Evolution

What gradually seems to be weighing in favor of the radicals is the possibility of putting a "clock" to our molecular past and present, in order to prove the time of divergence of man and ape. The timepiece in question is called the Protein Clock by its two young inventors, Allan Wilson and Vincent Sarich, whose scientific collaboration at the University of California in Berkeley brings together the departments of biochemistry and anthropology. Out of this fusion of disciplines has come the creation of a workable timepiece. It's based upon the fact of regular mutation in protein evolution. This timepiece may help us resolve crucial questions not only of our own past but of all other living species as well.

In summarizing the human puzzle, Dr. Wilson told me this: "Speaking now just of man, there's that point of view holding that man's no closer in time to apes than he is to monkeys—with all three lineages separating about 30,000,000 years ago. And there's the alternative view which says the close anatomical resemblances are due to a recent common ancestry. Now this view is what the molecular data fully support; in fact, they push the relationship even closer than anyone has ever proposed before."

Confidence in the latter theory comes from the fact that scientists now have a pretty good idea of how proteins evolve. They know, in other words, what the units of change are; and they can test the question of whether or not proteins evolve in a regular fashion. As a matter of fact, they can count the number of mutations or changes that have occurred. This is something that can't be done merely by comparing anatomy. In other words, by looking only at anatomy, scientists have no idea how many mutational events were required, for example, to cause a chimpanzee-like creature to lose his hair, or develop a big brain, or walk on two legs. They've no idea of the quantitative basis of the difference. But with proteins they do, and they can actually count the number of mutational events that have occurred.

So there's now a measure which is applicable to all species of living things, the measure of how much change has taken place in the given microbe or plant or animal over the ages.

This timepiece may help us resolve crucial questions not only of our own past but of all other living species as well.

Hemoglobin Changes

For example, consider this question: has the hemoglobin in a human being changed as much in its history as the hemoglobin in a monkey? Wilson and Sarich point out that, in fact, it has. They say that if you look at a Rhesus monkey and you look at man in their respective hemoglobin structures, you see that man and monkey have had exactly the same number of changes since they separated from one another, but the structure of their hemoglobin is different. But when you compare the hemoglobin of man and chimpanzee, you get an entirely different story. Since the time when man and chimp separated from one another, there have been no changes in the hemoglobin structure. Furthermore, man and chimp hemoglobin are

*University Explorer Broadcast 2110, April 5, 1970, over the CBS Radio Network produced by the University of California.

structurally identical.

Thus we see a pattern of regularity in protein evolution; and we see also that in one line (man and chimp) very little change has occurred. Hence, the conclusion: this must reflect a short time scale since the existence of a common ancestor.

But the hemoglobin comparison is just one part of the mounting molecular evidence. More than two years ago Wilson and Sarich had already noted that if you look at the albumins in the blood of man and chimp you see regularities and very little difference. And since that time researchers the world over have found the same to be true of other protein structures of the two species. "No matter what you look at," says Sarich, "there's nothing in the molecular evidence indicating any significant degree of divergence between man and chimpanzee."

History of the "Clock"

Such is the remarkable "time-telling" of the evolutionary clock—the idea for which, by the way, goes back a lot further in scientific history than you might imagine. Actually, back in 1902, it was an English researcher named Nuttall doing very crude protein comparisons, who first suggested that someone might measure the distance between species by just taking his approach a little further. No one took him up on this, though, until about the beginning of the last

WHY NO BROADCASTS BY CHRISTIAN SCIENTISTS?

The scientific community continues to increase its efforts to educate the public about various elements of scientific advance. Motivation for this effort lies somewhere between altruism and the recognition that the public (e.g. Congress) might be more willing to support science if it were more aware of the wonders of scientific advance. The broadcast media have provided opportunity for professional scientists such as Leonard Reiffle and John Fitch, and others associated with government agencies, large universities or technical societies such as the ACS or AAAS to reach the general public. Translation of the data and theoretical framework of modern science into a language which is both accurate yet of interest to the casual lay listener is a challenging task. The long established University Explorer Series sponsored by the University of California has been a pioneer in this effort.

The "Protein Clock Broadcast" deals with one of the more complex fields in molecular biology—that of extracting evolutionary information about species by comparing homologous proteins (those having a common ancestral origin) in different species. This newly developing area of research is seen to provide three main areas of evolutionary information from protein analysis.

(1) The construction of phylogenetic trees suggesting the evolutionary relations of the various species based on the amino acid sequences of a set of homologous proteins found in these species (e.g., eytochrome C, hemoglobin, insulin or albumin) using the same kinds of considerations employed traditionally in establishing relationships from anatomical features.

(2) The probable amino acid sequence of the specified protein is deduced for a precursor common to a given set of species on a branch of the phylogenetic tree.

(3) The rates of evolution of these homologous proteins are found to be related to a number of amino acid positions in a given protein at any one time which are free to mutate (called codons or covarions). Proteins with many covarions change relatively rapidly while those with few change slowly. It is found as well that the rates of change appear to be nearly constant over evolutionary time for a given amino acid.

In evaluating this broadcast in terms of popular appeal, one is impressed by the clarity of style, development of the subject and the choice of a subject of general interest and the suggestion of a behavioral application. The listener did not appear to be lost in numbers and data but came away with a conclusion, some idea concerning the experimental basis for the conclusion, and some interesting implications to be drawn from the conclusion.

However, the very features which lead to popular appeal detract from the overall accuracy and balance of the presentation. Until the last paragraph one detects tending toward "positive thinking." No mention is made of experimental difficulties, of differences of opinion among various workers, the differences in the phylogenic trees developed for different proteins and the obvious errors in a tree when compared with the classically developed lines even though the results are very similar.

Christian broadcasting continues to expand yet sees little input from science or any of the non-theological disciplines.

One may well share the enthusiasm of these workers, yet the caution appearing in the regular scientific literature is missing. In spite of this criticism the article does accurately reflect the general conclusions of workers in the field.

We scientist-Christians talk to one another at great length in person and in print and occasionally enter the more popular religious press. The science film ministry and other media presentations of the Moody Science group is impressive. Yet for the most part we neglect the general Christian public. Radio provides a relatively inexpensive and simple means for reaching a vast audience. Christian broadcasting continues to expand yet sees little input from science or any of the non-theological disciplines.

Are we negligent in not encouraging a Hale Sparks, a Leonard Reiffle or a John Fitch to interpret scientific advance to the Christian community and provide an alternative view especially in those areas where science and ethics converge?

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decade (1960). Then it was that Linus Pauling and his associate, Emil Zuckerkandel, first proposed (rather lightheartedly) that it looked as though proteins were behaving like evolutionary clocks. However, the evidence for such talk was still very fragmentary. Since then, many key pieces have fallen into place, and the picture now looks like this:

Proteins—such as hemoglobin, albumin, insulin, and so on—are composed of long chains of amino acids, of which there are around 20 types. The sequence of amino acids in a given protein is a characteristic of the species; and each protein sequence is controlled by a single gene (which means there's a gene for hemoglobin, for albumin, for insulin, a gene for every protein). Now a gene, in turn, is composed of a long chain of nucleotides, known as DNA. When a mutation occurs in the DNA, this generally results in a "nucleotide substitution event," as it's called. Let's say, for example, that one nucleotide, at position 10 in the DNA sequence, is replaced by another nucleotide; that generally will result in a single amino acid change

The reconstruction of human history is pretty narrowly circumscribed, and the room for speculation markedly limited.

AN INCONSISTENT POSITION

Barlow has said "Evolution has a fascination for all biologists, for all scientists. Since it is the all-pervading concept of biology, every worker is able to categorize his findings, somehow, into an evolutionary framework."[1] Molecular biologists are meeting this challenge as adroitly as have other evolutionary biologists, although the conclusions of Wilson and Sarich,[2] as well as those of King and Jukes,[3] and of Fitch and Margoliash,[4] that the majority of amino acid substitutions are due to neutral mutations and thus have become fixed by random genetic drift rather than by natural selection, will be too much for "classical evolutionists" to swallow. One of these "classical evolutionists" has recently challenged the validity of the calculations of King and Jukes, and of Fitch and Margoliash, and has reached just the opposite conclusion, namely, "that protein sequences, like other characters, seem to have evolved under the dominating influence of natural selection."[5]

Wilson and Sarich have stated that "In spite of the vast effort which has been devoted to the study of human evolution, there is still no measure of agreement as to the origin of man". After pointing out that current estimates of the time of divergence of the human lineage from that leading to apes have varied widely (from 4 million to 30 million years), they go on to say "The disagreements are due in part to the fragmentary nature of the fossil record which consists largely of teeth and jaws, and in part to the failure of traditional comparative anatomy to develop methods which would lead to agreement, even among anatomists, as to the evolutionary meaning of such data."[2] As a "special creationist", I would like to suggest that this lack of agreement among evolutionists as to the origin of man is due not so much to the fragmentary nature of the evidence, as fragmentary as it indeed may be, but due simply to the fact that man did not evolve, but was created as described in the Bible (Genesis 2:7, 21, 22).

Concerning the problem of "protein clocks", we would like first to consider the implication of the fact that there is an undeniable similarity in amino acid sequences, or "homology", in the proteins found in various species which perform the same function. Here we use the term "homology" in the sense of Neurath, Walsh, and Winter,[6] that "The term homology as applied to proteins refers to similarity in amino acid sequence", rather than according to Nolan and Margoliash,[7] where the term homologous was taken to imply "that the genes coding for the polypeptide chains considered, in all the species carrying these proteins, had at one time a common ancestral gene". The similarity, or homology, of certain proteins, such as the cytochromes, insulins, proteases, corticotropins, etc., is exactly what would be expected on the basis of either evolution or special creation. On the basis of evolutionary theory, the insulins from various species, for instance, would be expected to be similar in structure, since they at one time had a common ancestral gene. The "special creationist" would also expect them to have similar structures, since they were designed to perform the same function. They would not be expected to have identical structures, because it is obvious species are not identical, and thus there are differences in the internal structures of the cells making up the species. For each cell, the structures of all the molecules found in it are tailored in such a way that a perfect balance is obtained for its metabolic activities.

Already many data have accumulated that are inconsistent with an evolutionary hypothesis for the origin of protein structures, and no doubt future research will uncover many more.

Whether differences in amino acid sequences of homologous proteins may be used as "protein clocks" to determine the time of evolutionary divergences, if, in fact, the origin of the various categories is due to evolution, depends on the validity of several assumptions. Wilson and Sarich accept, first of all, the assumption of paleontologists that the divergence of the horse lineage from that leading to primates occurred about 75 million years ago. In view of the fact that paleontologists estimate the time of divergence of man from ape variously from as little as 4 million years to as much as 30 million years would seem to recommend great caution in accepting their estimates for times of divergence of other lines.

Secondly, Wilson and Sarich have made the dubious assumption that in a fixed interval of time, the probability for a mutation to occur is constant. This assumption brings them into conflict with the mutation-selection theory held by neo-Darwinian evolutionists. Wilson and Sarich, as do King, Jukes, Fitch, and Margoliash, assume that most changes in protein structures were due to neutral mutations, and thus became fixed by random genetic drift, rather than being fixed by natural

in the protein that's made by that particular gene.

Thus, at a particular point in the protein you have a replacement of a "normal" amino acid by a "different" one—a mutation in the protein. Thus by comparing the proteins of different species scientists are in essence comparing their genes, and counting the number of mutational differences that have occurred since they had a common ancestor.

"Neutral" Mutations

Now, much to the surprise of most evolutionary biologists, it's been found that the rates of change, the rates of incorporation of mutations into proteins, seem to be nearly constant over evolutionary time. And this raises the possibility of dating the divergence of species. It also raises questions about the mechanism of evolution. In Dr. Wilson's word, "We're led to conclude that besides normal Darwinian evolution there's a phenomenon of the spread of so-called 'neutral' mutations, which represent changes that have neither a detrimental nor a beneficial effect on the function of the organism; and that Natural Selection, which is the guiding agent in Darwinian evolution, can do nothing to stop these 'neutral' mutations. They spread at a constant rate, and are responsible for the phenomenon we've called the Protein Clock."

This achievement of the two Berkeley scientists recently inspired the following editorial in an Austin, Texas, newspaper: "We're told that man and the apes may not be nearly as far apart as has been thought. Studies conducted at the University of California at Berkeley suggest that the time of divergence by man and ape from the common ancestor they're supposed

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selection. If these changes were due to natural selection, they could not have occurred in a constant and regular way, since natural selection depends upon changes in the environment, which do not occur in a regular or constant fashion.

Wilson and Sarich maintain that these changes have been the result of neutral mutations, since they have not altered the active center, and each protein, though differing somewhat in structure, functions equally well. For instance, all cytochromes C function equally efficiently in electron transport, regardless of differences in amino acid sequence. Wilson and Sarich have forgotten, however, that these activities are measured *in vitro*, and not within the cell from which they have been derived. It is possible, even likely, that cytochrome C derived from a human source is more efficient in man than that derived, for instance, from carp. It is also possible that other factors, in addition to function, may influence the adaptation of a particular structure. The efficiency of synthesis of a protein must surely be affected as the structure of that protein changes, since that synthesis depends upon the particular internal structure of the cell in which it is synthesized. With these arguments, the creationist finds himself in agreement with the Darwinian evolutionist. The creationist must assume that the Creator has given each protein its particular structure because that structure confers upon it a uniquely efficient ability to perform its particular task.

The acceptance of a theory as scientifically valid should be dependent upon the consistency of the data from which it has been derived, and upon its ability to predict the nature of data to be derived from further investigations. *All* data must be shown to be consistent with the theory. Many data were consistent with the Ptolemaic theory of the universe, and this theory was accepted for centuries. As further data were collected, however, more and more inconsistencies developed, requiring construction of more and more subsidiary hypotheses. The Ptolemaic theory was eventually replaced by the Copernican theory, which seems to account for all the known data. Already many data have accumulated that are inconsistent with an evolutionary hypothesis for the origin of protein structures, and no doubt future research will uncover many more.

On the basis of Wilson and Sarich's theory that most differences in homologous proteins have been due to neutral mutations, considerable heterogeneity in the structure of a particular protein among the individuals of a species would be expected. Although there are considerable differences when species are compared with one another, the structure of a protein within each species, however, is remarkably consistent. For example, in the case of human hemoglobin, the sequence of any one of the four most prevalent chains, alpha, beta, gamma, and delta, is identical in most humans. There are a number of individuals, however, who produce abnormal hemoglobin, usually containing one site which has mutated. Very often these people are ill with some form of anemia. If Wilson and Sarich are correct, it would seem that we should expect a family of alpha chains, for example, each capable of functioning equally well in human hemoglobin. This is not what we find. There seems to be a unique structure, the human alpha hemoglobin chain, for all healthy individuals. The same applies for the beta, gamma and delta chains.

The consistency of such data permits us to speak, for example, of "ox insulin", "human insulin", "guinea pig insulin", etc. If there were hetereogeneity within species, we could only speak of the "ox insulins", "human insulins", "guinea pig insulins", etc. In all horse cytochromes C examined to date, there is a threonine at position 47. That position in the donkey, on the other hand, always has a serine. How could such specificity arise if such a change is due merely to neutral mutations?

Many features of protein structure have been discovered which are inconsistent with current evolutionary theory, only a few of which can be mentioned here. The insulins of the sperm whale and of the fin whale are identical to those of dog and pig, but differ from that of the sei whale.[8] The insulin of guinea pig is unique, its structure being considerably different from all other known insulins.[9] For instance, there are 18 differences when the amino acid sequence of guinea pig insulin is compared to that of either human insulin or that of a fellow rodent, the rat.

Among the cytochromes C, we find that the structure of that for the rattlesnake varies in 22 places when compared to that for the turtle, another reptile, but only in 14 places when compared to that for human.[10] When the cytochromes C of two closely related organisms, those of *Desulfovibrio desulfuricans* and *Desulfovibrio vulgaris*, are compared, it is found that although these proteins have similar molecular weights, partial specific volumes, chain lengths, and number of hemes, they differ markedly in amino acid composition[11]. When Narita and Titani compared the cytochromes C of two species of yeast, those of

to have shared occurred only 5,000,000 years ago, and not the 30,000,000 held by some scientists. Of course, humans actually should not resent too deeply this more intimate cousinship to the ape, for the closer the scientists get man to the trees, the easier it should be to explain why he acts the way he does."

The Narrowing Gap

Dr. Sarich observed that this was an excellent point, because to find out the whys and wherefores of behavior it's helpful to know what kind of animal we have to start with to get where we are today. And the close time divergence of man and chimp gives us a much clearer idea about our beginnings. It narrows the gap, as it were, between the time when our species branched off from the apes and the start of the human fossil record—now dated at close to 3,000,000 years. So through the study of bones and teeth we can go back some 3,000,000 years. And through their molecular studies, Wilson and Sarich are suggesting that only 4 or 5,000,000 years ago there was still in existence a common ancestor of man, chimp and gorilla—a form that was going to be ancestral to all three.

"So the new finding doesn't leave you too much room to play around with," comments Dr. Sarich. "You have the three living forms today. The history of one of them goes back (in the fossil record) a long way, in terms of the total time you have to work with. So the kind of animal that would've been a common ancestor of all three is pretty well determined." The looks of such a fellow, if we could see him running around today, would hardly be surprising. He'd be chimpanzee-like in appearance. "I should think he'd be similar enough to the modern chimp," says Dr. Sarich,

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Candida krusei and of *Saccharomyces oviformis*, they concluded that a total of 38 base exchanges would have had to occur in DNA to account for these differences.[12]

One example of heterogeneity among enzyme proteins that has been discovered is that of bovine carboxypeptidase A, reported by Neurath and colleagues.[13] They have found two allotypic forms which occur in approximately equal amounts. These two forms differ in their amino acid sequences at three places, positions 179, 228, and 305. One form is called the val form, the other, the leu form. In the val form, isoleucine, alanine, and valine occur at positions 179, 228, and 305, respectively, while in the leu form these positions are occupied by valine, glutamic acid, and leucine, respectively. According to evolutionary hypothesis, there should be at least two intermediate forms, since the two alleles differ at three positions. The required intermediates, however, have been definitely shown to be absent by the work of Neurath and his colleagues.[14]

Recently Braun, *et al*, have reported the amino acid composition of a lipoprotein isolated from the rigid layer of the cell wall of *Salmonella typhimurium*.[15] This lipoprotein is composed of about 60 amino acids. Surprisingly, it contains no glycine. This is especially puzzling if an evolutionary origin for this protein is assumed. In all experiments conducted to date to show how amino acids may have arisen under supposed primordial earth conditions, the amino acid produced in overwhelming relative abundance has been that of glycine. Based on this relative abundance, one would expect all naturally occurring proteins, especially those found in micro organisms, to contain some glycine. Yet not a single residue of glycine is found in this protein. One could not say that such an occurrence is impossible on an evolutionary basis, but it is certainly very highly unlikely.

Finally it may be mentioned that Eck and Dayhoff, with reference to attempts to infer biological phylogenetic trees from amino acid sequences, state that, "In some instances, there seems to be no unique plausible solution. We are still unable to resolve clearly such details as the relative divergence points of horse and pig".[16]

We wish to repeat that for a theory to be scientifically valid, all of the available data must be consistent with that theory. It seems obvious that such is not the case with reference to the evolutionary origin of proteins, whether all of protein evolution is said to be accounted for by Darwinian evolution, or whether some may be accounted for by neutral mutations and random genetic drift.

In "The Protein Clock", Sarich is quoted as saying that "No matter what you look at, there's nothing in the molecular evidence indicating any significant degree of divergence between man and chimpanzee". If this is true, and if it is true that the protein clock allows us to determine the degree of divergence of of the various species, then one may be led to the ridiculous conclusion that man and chimpanzee have not diverged at all! I am sure that Sarich and Wilson do not go that far, although their conclusion is that, if their theory holds up, then "the kind of animal the chimpanzee is becomes ever more significant in man's ceaseless effort to know himself". After many decades of psychological, sociological, and anthropological research on the human species, man has yet to understand himself. I doubt that turning to the chimp will help to solve these problems.

Finally, in contrast to Sarich's statement that the molecular evidence indicates no significant degree of divergence between man and chimpanzee, Clark[17] has stated "There is a sharp, clean-cut, and very marked difference between man and the apes. Every bone in the body of a man is at once distinguishable from the corresponding bone in the body of the apes . . . . . Man is not an ape, and in spite of the similarity between them there is not the slightest evidence that man is descended from an ape".

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[14]See L. Butler, *J. Creation Research Soc.*, 6, 127 (1969) for a more complete discussion.
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"so that at first glance you'd say, 'That's a chimp!' "

Summary

Thus, to summarize, the Wilson-Sarich thesis: you start with something like a chimpanzee, which your molecular clock puts at 4 or 5,000,000 years ago. You then jump the gap to the first clearly human fossils, at about 3,000,000 years. This leaves relatively little intervening time to account for. Thus the reconstruction of human history is pretty narrowly circumscribed, and the room for speculation markedly limited. This narrowing-of-the-gap in human evolution may well be the most important contribution of the Berkeley researchers.

Narrow as this gap now appears, it's expected that it soon will be bridged by new fossil finds. The place of key discoveries will probably be the African continent; and the time period Wilson and Sarich confidently predict will be consistent with the measurements of the Protein Clock. So perhaps one day we'll be hearing about the discovery of bones and teeth, the remains of creatures, not quite gorilla, not quite chimp, not quite human, but creatures beginning to edge slowly in the human direction.

Says Dr. Wilson, "It's important that people have a realistic understanding of what our relationship is to apes. It's one thing to picture them either as rapacious King Kongs or comic TV cutups; it's another to see the truth. And the truth is that we are by far the most aggressive species. Chimps and gorillas are quite gentle, gorillas particularly. So we've really been deluding ourselves about what we are like and what they are like."

"To understand our own evolution," says the Berkeley biochemist, "we must know what the real base is, both from the standpoint of anatomy and behavior. And it's lucky we still have with us creatures like chimps and gorillas, so we can actually compare anatomies and study behavior. Then, too, it's important that their relationship to us be put in the proper evolutionary perspective." Such is the mission of the biochemist, Dr. Allan Wilson, and the anthropologist, Dr. Vincent Sarich. And if their conclusions are corroborated in the crucible of scientific criticism, then the kind of animal the chimpanzee is becomes ever more significant in man's ceaseless effort to know himself.

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[17]A. H. Clark, in *The New Evolution: Zoogenesis*, A. H. Clark. ed., Williams and Wilkins, Baltimore 1930 p. 224.

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SCIENTIFIC TOOL OR CREATION PITFALL?

A biochemical timepiece for measuring the period of time since man and his fellow primates, the anthropoid apes, diverged from a common ancestor has been proposed by biochemist Allan Wilson and anthropologist Vincent Sarich.[1] Their molecular clock has shed new light on primate evolution: man and apes separated about 4 to 5 million years ago or 25 million years more recently than some anthropologists believe. Since the start of the human fossil record is dated at close to 3 million years, the new clock has considerably narrowed the gap in the story of human evolution. This narrowed gap limits room for speculation on reconstruction of human pre-history.

What should be the reaction of a Christian to "The Protein Clock?" Or, what might be the reaction of a Christian who understands the science of the protein clock? Is the protein clock merely a scientific tool for studying man's ancestry and measuring the time of divergence of biological species? Or, is it a pitfall to the Christian who believes in the God of creation?

First of all, I believe God has created everything in the universe, including all living beings. His creation is good and has purpose. On a personal level, I can say with Luther "that God has created me and all that exists, has given me and still preserves my body and soul with all their powers, provides . . . , and protects me . . ."[2] This personal aspect of creation directly relates my existence to God, and gives my life meaning because God gave it to me and continues to sustain it.

Secondly, along with the overwhelming majority of scientists, I believe that life has arisen through natural processes of chemical and biological evolution. We are convinced that life has evolved or changed over a long period of time on the basis of the vast amount of scientific evidence from the geologic and geographic distribution of life, from comparative anatomy, biochemistry, embryology, genetics, and paleontology.[3-6]

Thirdly, I believe God has been and is intimately involved in His creation and that He has used natural processes of evolution to bring about and change life forms for His purposes. He directs, guides and controls every detail of His creation, even though evolution, in our present capacity of perception, appears impersonal and depends upon random events. (Note that although gene mutation may be statistically random and constant, the net result usually is not, since the environmental pressure is the final determinant in the expression of gene mutations as evolutionary changes.) Creation and evolution are not contrasts, but they complement each other.[3] God operates through natural processes, and the Biblical view of creation takes these processes into account.[3]

We are convinced that life has evolved or changed over a long period of time on the basis of the vast amount of scientific evidence from the geologic and geographic distribution of life, from comparative anatomy, biochemistry, embryology, genetics, and paleontology.

Fourth, I believe that a proper consideration of the truth of God's revelation of Himself through His Word, in general, will never conflict with a valid interpretation of the evidence for natural processes operating in God's world. Apparent conflicts, I am convinced, arise only from misinterpretation of God's Word or from misapplication of knowledge of God's world. Asking questions inconsistent with the revela-

tional purpose of the Bible leads to misinterpretations of God's Word.[8] Proper Biblical interpretation can only result from deriving the revelational content of the Biblical message according to its revelational purpose and using other widely accepted principles of hermeneutics.[8] On the other hand, the nature and scope of science must be understood in order to avoid extending knowledge of God's world beyond valid scientific limits.[7]

Fifth, I believe God chose to endow hominids having the mental capability with consciousness and moral responsibility. During the course of evolution hominids obtained the capacity for a consciousness of self and of their relationship to others and to their world. This consciousness led to their need for moral responsibility. I believe the unique relationship between man and His Creator was established at this early stage of human evolution.

Finally, I believe that an honest appraisal of Biblical exegesis established by Old Testament scholarship and a consistent application of hermeneutical principles accepted by the Lutheran confessors, as well as other truly conservative and orthodox Christian scholars of the Bible, will lead one to the conclusion that Adam is our representative.[9] Theologically speaking, Adam is the "father of mankind," the first man, the first sinner, the first in a long line of believers.[3] He is our spiritual ancestor whose characteristics we still bear in the concept of original sin, the tendency of man to assert his independence from God, thus severing his relationship with God and setting himself up as his own god, or ultimate concern. But from our present state of knowledge about man's ancestry, the idea of a "first man" seems neither biologically nor historically relevant.[3] As Adam is understood to represent all mankind, the fall is recognized as universal sin and imperfection in human relations.[5, 9] The Biblical story of the idyllic beginning of man in Eden strongly emphasizes that God is not the originator of sin, but that man, as a result of his disobedience and rebellion against God, is fully responsible[3] for his alienation from God, from others, from nature, and from himself. (Perhaps this alienation is the reason why man is more violent than his fellow primates who have had no such relationship with God to sever.)

With these principles in mind, I conclude that the protein clock, as well as any other scientific tool for the measurement of time which estimates the antiquity of past events on an evolutionary time scale, is not a "creation pitfall", nor is it a threat to Christian faith or to the validity of statements of faith expressed by the Ecumenical Creeds or by the ASA membership (see inside back cover of this *Journal*). Both the Christian and non-Christian need to realize that the reliability of the Bible as God's Word and the vitality of a human life with God as Creator, Redeemer, and Sanctifier are entirely independent of whether the theory of evolution is completely true, partially true, or merely incomplete. Also, everyone needs to recognize that the validity of science as a means to understand God's world and of the pursuit of science by a Christian are entirely independent of whether the doctrines of Biblical inspiration, inerrancy, and infallibility are absolutely true, theologically true or applicable only to dynamic reationships, rather than to stagnant propositional statements.

The Bible tells us that the world is God's good creation. Science tells us what is in the world and attempts to explain how and when everything came about. According to the Bible, creation is not "explanation" of the world, but it relates this world and everything in it to God. "Explanations" can be left to the proper domain of science, but the relationship between God and this world is eminently the domain of theology.[3] The Bible and science can thus complement each other.

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Christianity is no insurance policy against the vicissitudes of life. But the new birth does mean that the character is gradually changed, for character is what the raw material becomes as it is influenced. The dishonest becomes truthful; the idle, hardworking; the fearful, bold; the sullen, sweet-tempered; the shiftless, reliable; the selfish, concerned for others. This is a slow process, and it is never complete in this life. God does not go about his new creation in a hurry, any more than He did the first.

T. M. Kitwood
What is Human? Inter-Varsity (London) 1970, pp. 114, 115

Proto-neolithic Adam and Recent Anthropology

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If we accept that Adam of Genesis 2 to 4 was Proto-neolithic, as represented there, we find that the culture sequences and technologies in the rest of Genesis correlate with Prehistory. An understanding of the characteristics of a Genesis toledoth helps us to see that earlier man could be referred to in Genesis 1. The anthropology described by Seely which brings him into difficulties is more that of the 19th century, than of the 20th. Recent anthropology gives us a more biblical picture. It admits the existence of more than one hiatus, and regards the present races as having a common source not more than 30,000 years ago, and possibly as recent as 12,000 Before Present (B.P.)

Types of men earlier than Homo sapiens *of the Upper Paleolithic (i.e. before 30,000 B.P.) have left no progeny.* Australopithicinae, Homo erectus, *and* Homo neanderthalenis *have all died out. None of the races alive today is descended from them. Australian aboriginals are no exception, neither are Bushmen or Hottentots. The date of man's entrance into America put by some at 25,000 B.P. does not affect the issue.*

Introduction

Paul Seely[1] commendably faces up to a problem concerning early man and Genesis. We are also indebted to those whom he quotes, i.e., James Buswell III of the Dept. of Anthropology, St. John's University, and T. C. Mitchell of the British Museum, who have also ventilated the problem which was ignored before.

The problem is that Adam of Genesis 2 to 4 is described as a farmer. Farming was not practised until the Neolithic Revolution 12,000 B.P. But Adam is represented as being the first man, whereas true men existed hundreds of thousands of years earlier and were of Paleolithic culture.

False Premises Give Inaccurate Solutions

Unfortunately Seely develops the problem in a way which misses the solution. He outlines a theory of anthropology which has since been eclipsed, finds it is in conflict with the Genesis picture, and concludes that Adam was not intended to be interpreted literally but symbolically (If such is the case from whom is our Lord's descent traced?) He further complicates matters by stating that "There are true men in today's world who descended from Paleolithic ancestors. Their physical and cultural descent has not been interrupted. There is no place in their historical descent to insert a Neolithic Adam as their father." (But we shall show that this is not the opinion of most anthropologists.)

He is correct, however, in stating that Christian anthropologists are in agreement that men who were truly human existed in Paleolithic times before a Neolithic Adam.

Further he quotes Jan Lever that Australian aborigines go back to Neanderthal and even Pithecanthropus in features. All responsible anthropologists would deny this, for among other things the morphology of the skulls in question is essentially different.

Concerning African Bushmen and Eskimos he says they probably lived in their present isolated biotype more than 10,000 years. This does not make them Paleolithic, and recent research concerning Eskimos places them quite late in human history.

Still further he says "There is no marked hiatus or discontinuity in racial type or cultural sequence," and that in the Shanidar Valley an almost continuous sequence of human history dates from the times of the Neanderthals. He quotes Buswell as saying something similar. Now, we intend to show that since the Neanderthals there are two hiatuses in Solecki's Shanidar Stratigraphy:[2] one of 10,000 years between Neanderthal and Upper Paleolithic *Homo sapiens,* and one of 15,000 years between Upper Paleolithic and Proto-neolithic.

It would seem that Seely's conclusions come largely from the earlier assumptions of anthropologists, and that he has been unreached by the great changes in anthropological theory of the 1960's. Seely is not to be blamed for this as his references are mainly the works of the older outlook. The anthropologist James

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Buswell III[3] and the archaeologist T. C. Mitchell[4] had written helpful papers to review the problem and had given the Christian public valuable information, but it was largely related to the picture in the 1950's, and while not necessarily committing themselves to what I have written in *Who Was Adam?* they have very kindly written to welcome its publication.[5]

Thus it becomes necessary to summarize the main conclusions of anthropologists before proceeding to the evidence. These are:

1. Contrary to the older idea that the present races are descended from all types of Paleolithic fossil men, the present consensus is that our present world population was derived from *Homo sapiens* stock only from the Upper Paleolithic 30,000 years ago and perhaps even later.
2. That no earlier non-*Homo sapiens* were ancestors to any of the living races. Australian aboriginals are no exception, nor are Bushmen or Hottentots. The date of man's entrance into America put by some at 25,000 B.P., does not affect the issue. *Australopithicus, Homo erectus* and *Homo neanderthalensis* have died out and left no progeny.
3. That the older theory that *Homo sapiens* intermarried with the Neanderthals is now abandoned after re-examination of Carmel Caves, and that a 10,000 year hiatus or unbridged gap between the two species is accepted. This means that Neanderthal vanished about 40,000 years ago, and that modern *Homo sapiens* appeared 30,000 years ago according to revised dating.
4. In addition, the author is investigating a more recent hiatus 12,000 years ago, which separates Upper Paleolithic *Homo sapiens* from Mesolithic Proto-neolithic culture.
5. That earlier *Homo sapiens* have existed, e.g., Swanscombe man 200,000 B.P. and Hungarian man 500,000 B.P. These could not be progenitors of modern *Homo sapiens*, because variation of characteristics among modern races would have become far more pronounced over such a long period than those which exist today. Some calculate that the present degree of variation of race polymorphism brings us to a divergent point not more than 6,000 years ago.
6. That in view of these findings, Adam of Genesis 2 to 4 can be taken as Proto-neolithic, and that through understanding the characteristics of a Genesis toledoth the saga of Proto-neolithic Adam in Genesis 2 can be taken as subsequent to Paleolithic man in Genesis 1.[6] For those who see that Adam must be the first of our modern races, there is the possibility of a hiatus preceding him (referred to in point 4).

Incidently, it is interesting that Harold Camping's new theory of calculating the Genesis genealogies[7]—whatever its validity—shows dates which correlate remarkably with those I had given from anthropological and archaeological sources in chapter 9 of my book.[8] Thus the contention of the two critiques that Camping's theory could not be correct because this would make Adam Proto-neolithic (a term which now largely replaces Mesolithic), is not valid—indeed it strengthens his case.

Descent from One Stock

Although we may not know all the answers it is helpful for Christians to know that there is a wide consensus of opinion among anthropologists that our race is descended from one human group (science has no tools for empirical observation to take us further to a single pair). This opinion comes from authorities in anatomy, genetics and anthropology. As the general reader usually requires assurance on this point, a number of authorities will be quoted:

Adam of Genesis 2 to 4 can be taken as Proto-neolithic, and . . . the saga of Proto-neolithic Adam in Genesis 2 can be taken as subsequent to Paleolithic man in Genesis 1.

Professor Wilfred Le Gros Clark is regarded as one of the world's leading authorities on Paleo-anthropology. In his revised edition of *Fossil Evidence*[9] he says: "It is now generally agreed that all the modern races of mankind are variants of one species, *Homo sapiens*." He then enumerates the anatomical characters by which our species is defined.

Earlier in his *Antecedents of Man*[10] he gives a classification of the primates which is the taxonomic order to which man belongs. He says, "Three genera of the *Hominidae* are now generally recognized, of which *Homo* is the only survivor and *Homo sapiens* its only surviving species."

From the viewpoint of geneticists we also have agreement. The celebrated Professor T. Dobzhansky of Columbia and his co-author Professor L. C. Dunn, writing in *Heredity, Race and Society*[11] say: "About one fact of cardinal importance practically all scientists agree. All men belong to a single species, and there are no divisions between any varieties of men like those barriers which separate the species of animals." One reason for such a conclusion is that all kinds of human beings can mate and have offspring, regardless of geographical origin, color, or other morphological difference. All have the same general characteristics which caused the first great classificator—Linneus, son of a Swedish pastor—to assign all men to the species *Homo sapiens*.

Writing of the relativity of race,[12] Dobzhansky and Dunn conclude, "It looks as though the whole human race had got its genes from the same source." Their conclusion derived from the fact that characteristics show an inheritance from one gene pool at the beginning of our race, because there was a distribution throughout our world population of blood groups, color-blindness, tasters (of PTC) and non-tasters, etc.

Professor C. Stern in Principles of Human Genetics[13] says

> A taxonomic observer of mankind using the criteria which have just been described, would classify man as a single species subdivided into numerous subspecies . . . These phenomena—morphological and reproductive—have led the taxonomist since Linneus' time, two centuries ago, to assign a single species name, *Homo sapiens*, to all mankind.

The social anthropologist Dr. Raymond Firth of the London School of Economics in his book *Human Types*[14] refers to his knowledge of living primitive peoples, and distribution of blood groups and differences in the threshold of taste, tested by a bitter substance phenyl-thio-carbamide (PTC). He adds "All living human beings are classified as members of one species, *Homo sapiens*, and all crosses between them seem to be fertile."

In the realm of prehistoric archaeology, or pre-

history as it is also called, we have the words of Professor Grahame Clark of Cambridge [15] "The overwhelming consensus of professional opinions is that the existing races of mankind are without exception variants of this single species, *Homo sapiens.*" (*World Prehistory*, Cambridge, 1962 p. 23)

Quotations could be given indefinitely; suffice it to conclude with one from a professor of anatomy in the University of London. Dr. R. J. Harrison writes[16]

> It is generally agreed that all human beings alive today fall into a single but polymorphic species, *Homo sapiens*. Most anatomists who are anthropologists would also agree that all human beings that have lived on this earth during the past ten thousand years can be included in this one species.

An exception to this consensus is C. S. Coon's[17] *Origin of Races* (1962). He argued for the 19th century theory that the present sub-races of the earth were derived from the various types of fossil men, and that the course of evolution had followed the same pattern in each case, but that it had ended with a race which had an appearance of being one species. The newspaper gave much publicity to his book and as so often happens the public gained a distorted view. They received the impression that here was the opinion of the anthropological world.

In reply Le Gros Clark writes,[18]

> The thesis of the polyphylitic origin of modern man, propounded from time to time by a few anthropologists in previous years, has more recently been revived by Coon in his somewhat argumentative enquiring into the origin of human races. This author relies for his evidence

NOT A VIABLE THEORY

Before saying anything negative about Pearce's theory, we must state our full agreement with two of his points: (1) If Genesis 2 and 3 are interpreted literally Adam *must* be dated in Proto-neolithic times (c. 10,000 B.C.). (2) Men who were truly human existed in Paleolithic times before a Proto-neolithic Adam.[1]

Pearce's theory is a Pre-Adamite theory with Pre-Adamite man being referred to in Genesis 1:26ff. and a *de novo* creation of man in Genesis 2 and 3. He says that if we understand the characteristics of a toledoth (genealogy), "the saga of Proto-neolithic Adam in Genesis 2 can be taken as subsequent to Paleolithic man in Genesis 1". That is, Genesis 2:4, 5 summarizes section I (Genesis 1-2:3) about *Old* Stone Age man and introduces section II (Genesis 2:6—4:26) about *New* Stone Age man. Is this true?

The Bible and the Pre-Adamite Theory

The other toledoth in Genesis do not make a chronological separation between two historical sections; and it seems to us that even Genesis 2:4, 5 more likely *bind* Genesis 1 to Genesis 2-3 than separate them.[2] And, Genesis 5:1-6 shows quite clearly that there is a continuity of descent between the Adam of Genesis 1:26ff. and the Adam of Genesis 2-3; these two Adams cannot be divided into two separate races or two separate lines of descent.

In addition, Genesis 1:26ff. is the primary foundation for the doctrine that man is made in the image of God; and when later Biblical passages refer to man being made in the image of God, they refer back to Genesis 1:26ff. with the assumption that all men are descended from the man created in Genesis 1.[3] Romans 5:23 likewise testifies that it is through *one* man that sin entered into the world and not through two chronologically separated races.

We note also that when man was destroyed in the flood, God gave the same command to Noah that He had given to the Adam of Genesis 1, namely, to multiply and fill the earth. If the Adam of Genesis 1 and his descendants had been destroyed completely, we would expect to find this same command to multiply given to the Adam of Genesis 2-3. That we do not find any such command given is further evidence that the Adams of both Genesis 1 and 2-3 are continuous in descent and not separate races.

Also, there is nothing postulated of the Adam in Genesis 1:26ff. that is not equally postulated of the Adam in Genesis 2-3. Nor did Old Stone Age man subdue or accomplish anything that New Stone Age man did not. There is then no historical, exegetical, or literary reason for separating Old Stone Age man in Genesis 1:26ff. from a supposed *de novo* New Stone Age man in Genesis 2-3. As we have seen, however, there *is* reason to keep the Adam of Genesis 1 in a chronologically continuous relationship with the Adam of Genesis 2-3.

The teaching of the Bible is that man from his original creation to the present has one continuous line of descent. Attempts have been made to insert the Pre-Adamite theory in one form or another into accepted theology at least since 1655. But, Biblically speaking, it simply is not a viable theory. It is to Pearce's credit that he does not put any great stress upon his Pre-Adamite interpretation of Genesis 1:26ff.

There is no historical, exegetical, or literary reason for separating Old Stone Age man in Genesis 1:26ff. from a supposed *de novo* New Stone Age man in Genesis 2-3.

Modern Anthropology and the Pre-Adamite Theory

Pearce's key objection to my view of anthropology is that he doesn't accept a continuous line of descent from Paleolithic man to Proto-neolithic man and men of today. I do not subscribe to simple ortholinear evolution, but simply am unable to allow an ultimate break in the descent of man from Paleolithic times to the present.

Since I know of no contemporary anthropologists who believe any differently—at least in the essential point that Proto-neolithic man is descended from Paleolithic man—I cannot understand why Pearce regards my view as a 19th century understanding of anthropology. On the other hand, ironically, it seems to us that Pearce's view with its hiatuses and catastrophes is distinctly reminiscent of the 19th century.[4]

Recent anthropology, according to Pearce, (a) admits the existence of more than one hiatus (in the descent of man), and (b) regards the present races as having a common source not more than 30,000 years ago, and possibly as recent as 12,000 B.P.

Concerning part (a), see below. Concerning part (b), note that the 30,000 B.P. date fits in with my

> on remains (too scanty remains it would seem) of fossil man in China, Java, Africa and Europe, which for him suggest that the modern racial groups of Mongoloid, Australoid, Negroid, Capoid, and the Caucasoid peoples developed independently from a common ancestral species *Homo erectus*, several hundred thousand years ago. In other words he proposes that *Homo erectus* evolved into *Homo sapiens* not once but five times, as each subspecies, living in its own territory, passed a critical threshold from a more brutal to a more sapient state.

Le Gros Clark points out that parallelism in evolution, which is what Coon is proposing, decreases in probability in proportion to the number of parallel lines postulated. He feels it would be difficult to "substantiate so unlikely a thesis."

Coon's approach was rather typical of the supercilious race superiority complex of the Victorian anthropologists who were quite content to think of themselves as derived from the intelligent Cro-magnons, but the Australian aboriginal from the apelike (as it was thought) China or Java man. Anthropologists today are very much against feelings of race superiority, and believe very much in the *Homo sapiens* potential equality of all men.

It might be thought strange that Paul anticipated this opinion of some of the most eminent scientists of our day. His words on Mars Hill to the sophisticated Athenian Greeks were "The God who made the world and everything in it, being lord of heaven and earth, does not live in shrines made by men . . . He himself gives to all men life and breath . . . and he made from one every nation of men to live on all the face of the earth. . ." Acts 17:24-26 (RSV)

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view, but cannot fit in with Pearce's view which has "a hiatus before the Mesolithic". The 12,000 B.P. date, if true, would be equally compatible with my view, but would just barely allow Pearce's view since Pearce's New Stone Age Adam is himself a *de novo* creation of about 12,000 B.P.

That Ten Thousand Year Hiatus

Pearce tells us.

> The older theory that Homo sapiens intermarried with the Neanderthalers is now abandoned after reexamination of Carmel Caves, and a 10,000 year hiatus or unbridged gap between the two species is accepted. This means that Neanderthal vanished about 40,000 years ago, and that modern *Homo sapiens* appeared 30,000 years ago according to revised dating.
> What had caused the disappearance throughout the world of the Neanderthals ten thousand years before? Catastrophe seems to have overtaken them.

This idea—that it was only "until the 1960's" that anthropologists thought there was no break between *Homo sapiens* and *Homo neanderthalensis* (really *Homo sapiens neanderthalensis*), and that it is an old theory that they intermarried—*may* be held by an anthropologist here and there; but, the overwhelming majority of anthropologists both today and throughout the 1960's (as we show below) certainly do not believe in any such hiatus. The dominant question today in anthropology concerning these two subspecies is whether *Homo sapiens sapiens* evolved from *Homo sapiens neanderthalensis*, killed off *Homo sapiens neanderthalensis*, or intermarried with *Homo sapiens neanderthalensis*, or some combination of these hypotheses.[5] No one to our knowledge is concerned with any supposed ten thousand year hiatus between these two subspecies.

In 1964, C. L. Brace wrote his well-known if slightly one-sided paper. "The Fate of the 'Classic' Neanderthals". In that paper he argued that the old view in which *Homo sapiens* evolved as a separate line parallel to Neanderthal man and then about 35,000 B.C. destroyed him, was built on *a priori* thinking and had no genuine evidence to support it. *Homo sapiens*, Brace said, evolved from Neanderthal man; the case he made for his viewpoint was impressive, even if not 100% correct.

The reason why some anthropologists have not agreed completely with Brace is that they are convinced, as he is not, that some skull and bone fragments dated well before 35,000 B.C. evidence signs of belonging to a *sapiens* as opposed to a Neanderthal population. The primary fossils in debate are specifically the skulls and fragments from Fontéchevade, Steinheim, Swanscombe, Kanjera, and the Great Niah Cave.

The comments on Brace's paper from international authorities reveal how authorities in anthropology and related disciplines relate *Homo sapiens* to *Homo sapiens neanderthalensis*. One may easily see in all their comments that, no matter how divided they may be on other issues, no one believes there is a 10,000 year hiatus between these two subspecies.

George Agognino wrote that he was in full agreement with Brace's conclusion and that "many paleo-osteologists already privately accept that Neanderthal forms are direct ancestors of modern man."[6] (*No hiatus*).

Don R. Brothwell was not so easily convinced of Brace's hypothesis. He believed that there were *sapiens* finds contemporary *[no hiatus]* with the Neanderthalers and so obviously not evolved from them.[7]

Malcolm Farmer agreed with Brace's hypothesis *[no hiatus]*. Interestingly he referred to the same ten thousand year hiatus at Shanidar that Pearce is so impressed with, but did not see this *local* hiatus as proof that Neanderthal man and *Homo sapiens* were separated by a 10,000 year hiatus in any ultimate sense—because elsewhere these two subspecies overlap. He said:

> According to recent work by Solecki (1963) there is a break of some 10,000 years in the sequence of occupation in the Shanidar Valley with the Mousterian [associated usually with Neanderthal man] level ending at some 45,000 to 50,000 years ago. Farther west the Mousterian lasted longer and appears to have contributed to Upper Paleolithic [modern man], a situation also indicated at a number of sites in Europe. The best evidence for the overlap of Neanderthal and later men is in the Mt. Carmel caves in Palestine, particularly the Skhul population.[8]

Santiago Genovés saw some Neanderthals as being ancestors of modern man *[no hiatus]*, but many as being unrelated.[9]

F. Clark Howell, who at least agrees with Pearce to the point of saying that he believes there is a cultural hiatus between the Mousterian complex and the succeeding Upper Paleolithic complex *in Europe* (having disavowed the integrity of the Lower Perigordian-Chatelperronian as a distinct and special industrial manifestation, "much to the disapprobation of several colleagues"),[10] made it clear that though he sees a *local* cultural hiatus, he does not see an ultimate temporal hiatus between the existence of these two

Here Paul is making a dogmatic anthropological statement, namely that all the living human races throughout the world are descended from one. This RSV translation corrects the idiomatic translation of 1611 which reads "He made from one blood . . . etc." The word blood (hemoglobin) does not appear in the Greek original. The idiomatic translation became unacceptable when the word "blood" took on a specific meaning related to blood grouping.

How was it that Paul was able to make a statement which would avoid the mistakes of early anthropologists, and harmonize with the more complete knowledge possessed today? We may be sure Paul had not been fossil hunting. He had found his information in the opening chapters of Genesis.

That Ten Thousand Year Hiatus

Why do anthropologists take the view that our present *Homo sapiens* had their origin thirty thousand years ago?

Until the 1960's it was thought that there was no break between *Homo sapiens* and *Homo neanderthalensis,* the long headed peoples. Dorothy Garrod who excavated the caves at Mount Carmel in Palestine thought that one derived from the other.[19] Elsewhere in the world the strata laid down in caves showed a time lapse between the disappearance of Neanderthal man and *Homo sapiens.* The Middle East, however, is a land bridge between the three continents of the Old World and Dorothy Garrod thought that the Carmel caves showed that here the two types inter-

subspecies of man. Rather, the incoming population [from the East] of Upper Paleolithic men replaced or intermarried *[no hiatus]* with the European Neanderthals.[11]

W. W. Howells, like some others, found it impossible to dismiss such finds as Swanscombe, Fontéchevade, and Steinheim. Rather than believing that *Homo sapiens* evolved from Neanderthal man, he believed that *Homo sapiens* killed off Neanderthal man.[12] *[No hiatus.]*

G. H. R. von Koenigswald held that modern man evolved from an earlier type of Neanderthal man, but not the "classic" Neanderthal of Europe.[13] *[No hiatus.]*

Ashley Montague, like Howells, could not dismiss Fontéchevade and Swanscombe—they were certainly more *sapiens* than anything else, yet

> I differ with him (Brace) on a few details only. . . . I have repeatedly made the point that Neanderthal Man was not exterminated by "sapiens" man, but absorbed the latter, indeed Neanderthal should rank among the most respected of the ancestors of contemporary man. *[No hiatus.]*[14]

H. Muller-Beck wrote:

> We are for our part sure at least in one region Neanderthals are to be considered direct predecessors of more modern man . . . *[No hiatus].*[15]

Philip V. Tobias wrote that he had long maintained

> that the South-Central African representatives of *Homo sapiens,* mainly the Bushmen, have arisen from the Rhodesian group, which may be regarded as the African representative of the Neanderthal grade of hominid organization.
>
> In sum, my interpretation of the African evidence supports the view that there is no catastrophic replacement of Neanderthal by *sapiens,* but that the former gave rise to the latter. *[No. hiatus.]*[16]

In 1967 William Howells classified modern anthropological theory into four basic schools: Straight Ortholinear, Presapiens, Preneanderthal, and Preneanderthal with more overlapping. In none of these views do we find any ultimate temporal hiatus between the existence of Neanderthal man and *Homo sapiens sapiens*; rather, these two subspecies are always, at least in part, chronologically contiguous.[17]

In 1969, a paper called "Neanderthal Man and *Homo sapiens* in Central and Eastern Europe" took the stand that the latest data

> bear out the view that the appearance of *Homo sapiens sapiens* in Central and Eastern Europe need not be explained in terms of a sudden migration from East to West, but rather in terms of local evolution.[18]

Some anthropologists agreed and some disagreed, but we find no idea of a 10,000 year hiatus between Neanderthal man and *Homo sapiens sapiens.*

In 1969, Ashley Montague in a revised edition of his book, *Man: His First Two Million Years* took a strong stand that Neanderthal man and *Homo sapiens* had intermarried and that many people alive today "bear traces of their remote Neanderthal ancestry."[19] Obviously, he does not believe there is a 10,000 year hiatus between them.

We cannot burden the reader further with any more references to anthropological theory in the 1960's. Suffice it to say that one will find it virtually impossible to find a reputable anthropologist today who believes that there was an ultimate (as opposed to a merely local phenomenon) 10,000 year hiatus between *Homo sapiens neanderthalensis* and *Homo sapiens sapiens* . . . or any other ultimate temporal hiatus.

Admittedly *some* sites have a hiatus between the industries of Neanderthal man and those of modern man (a hiatus ranging from 1,000 to 10,000 years), but these sites must be interpreted in the total anthropological and archaeological context and not isolated to serve as evidence for novel theories. After all, many sites have transitional industries between Neanderthal and Upper Paleolithic (modern man) times.[20] Many sites present continuous culture sequences right through Pearce's supposed 10,000 year hiatus—someone had to be present to produce those tools.[21]

It seems to us that Pearce's view with its hiatuses and catastrophes is distinctly reminiscent of the 19th century.

The only documentation that Pearce offers for his theory of a 10,000 year hiatus (besides a brief reference to the Shanidar site) are two papers—one by Higgs and one by Brothwell which are supposed to prove that at Mt. Carmel a correlation of Tabun with Skhul cave reveals that 10,000 years elapsed between the Neanderthals and *Homo sapiens.* There was some controversy about this finding, but Pearce claims

> further investigation ensued which convinced the anthropological world that the hiatus was a fact.

If this hiatus is established as a fact *at Mt. Carmel* (and in the light of Asmus' paper in *Anthropologischer Anzeiger,*[22] we doubt that it is established), it is certainly to be noted that even Brothwell and Higgs do not believe that a hiatus exists between the Neander-

married and that *Homo sapiens* superceded. She reached this conclusion not because any one cave in question showed the cultural and skeletal succession without break, but by an interpretation which linked up three caves together.

Then Higgs and Brothwell investigated and gave their findings in 1961.[20] A correlation of Tabun with Skhul cave revealed, they thought, that a period of ten thousand years had elapsed between the Neanderthaloids and *Homo sapiens*. There was some controversy between them and Garrod, so further investigation ensued which convinced the anthropological world that the hiatus was a fact. Le Gros Clark says that the Upper Paleolithic *Homo sapiens* had introduced a skillful new type of tool from flint. This was called the blade tool which was adaptable to variations for all sorts of jobs—skinscraping, knives, skin, wood and bone boring, wood planing and also home implements such as needles, thong strappers, javelin throwers, fish hooks, prongs.

The present consensus is that our present world population was derived from Homo sapiens *stock only from the Upper Paleolithic* 30,000 *years ago and perhaps even later.*

What had caused the disappearance throughout the world, of the Neanderthals ten thousand years before? Catastrophe seems to have overtaken them. They were keen hunters of the mammoth; great mammoth

thals and *Homo sapiens* in any ultimate sense. Rather they believe that the two subspecies have in general overlapped and may even have interbred.[7, 20]

Von Koenigswald in 1962 believed that Mt. Carmel man was a mixture of *sapiens* and Neanderthal man *[No hiatus]*.[23] Grahame Clarke and Stuart Piggot in 1965 understood Mt. Carmel man as a Neanderthal from whom *Homo sapiens* could have emerged (thus bridging Pearce's hiatus).[24] F. Clark Howell in 1965 likewise saw Mt. Carmel man as a neanderthaloid in the process of evolving into modern man.[25]

In 1967, C. Loring Brace, glad to welcome a transitional form, placed the Mt. Carmel Skhul population directly in the middle of Pearce's 10,000 year gap.[26] In 1967 some were convinced (quite contrary to Pearce) that Mt. Carmel man gave clear evidence of interbreeding:

> Repeated examination of Mt. Carmel material has thus substantiated the long-standing claims that this material is evidence for interbreeding between Neanderthal and *sapiens*.[27]

Today the Mt. Carmel finds are still controversial: Are they transitional forms? Evidence of interbreeding? Or what? But, no one sees them as evidence in any ultimate sense of a 10,000 year gap between Neanderthal man and *Homo sapiens*.[28]

The Mt. Carmel evidence, according to most authorities, not only does not substantiate Pearce's 10,000 year gap or hiatus, but it very probably disproves it.[29] In any case we believe it is clear that the overwhelming majority of anthropologists today, if not all of them, would concur in saying that in spite of some sites which show hiatuses, there is no 10,000 year hiatus or any other ultimate hiatus or temporal discontinuity between Neanderthal man and modern man.

A Hiatus Before the Mesolithic

If Pearce's hiatus between Neanderthal man and modern man is very improbable, his hiatus before the Mesolithic is even more improbable. Pearce seems to be aware of this and admits that such a hiatus "has not been voiced before" and "is new to pre-historians."

It seems that the Australian aboriginals,[30] the Bushmen,[31] and the American Indians[32] present no small obstacle to Pearce's theory of a "hiatus before the Mesolithic"—since they span the hiatus. Each of these groups of men have lived most probably in their respective areas from Paleolithic times to the Present. Cro-Magnon man also stands in the way of one's accepting a hiatus before the Mesolithic since he is regarded by most anthropologists as an ancestor—either himself or a contemporary "cousin"—of men living today.[33]

Pearce's research may someday justify belief in a "hiatus before the Mesolithic"; but it seems to us that his chances of success in this endeavor are extremely remote.

Concluding Objections

If some anthropologists doubt that Australopithecines are our ancestors, few if any will go along with Pearce in saying that *Homo erectus* died out leaving no progeny. On the contrary

> It is generally accepted that the genus *Pithecanthropus* [or *Homo erectus*] bears an ancestral relationship to *Homo*, and the fossil evidence so far available is strongly in favor of this interpretation. In the first place there is now a continuous and closely graded series of fossil specimens linking *Pithecanthropus* anatomically with modern man, a gradation which is marked by no perceptible structural hiatus. Second, the geological dating of *Pithecanthropus* fits in quite well with such a conclusion . . . Thus the temporal sequence indicative of an ancestral relationship is in good accord with the evidence of the morphological sequence.[34]

Similarly, as we have shown above, many anthropologists believe that Neanderthal man is our ancestor.

As to Pearce's statement that earlier *Homo sapiens* such as Swanscombe man "could not be progenitors of modern *Homo sapiens*", we can only note that this idea flies in the face of an entire school of current anthropological thought: the Presapiens School of Vallois, Heberer, Giesler, Piggot, *et al.* It seems noteworthy that even Brothwell apparently belongs to the Presapiens School.[35] In addition, the Lutheran, Wilbert S. Rusch, espouses the Presapiens School, directly contrary to Pearce's theory at every point.[36]

We, therefore, conclude that our original statement is with good reason the common opinion of the overwhelming majority of today's anthropologists:

> There are true men in today's world who descended from Paleolithic ancestors. Their physical and cultural descent has not been interrupted (at least in no ultimate sense). There is no place in their historical descent to insert a Neolithic Adam as their Father.[37]

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[1]Pearce, E. K. Victor, *Who Was Adam?*; The Paternoster Press, 1969. See especially chapter II, "Why Adam Could Not Be Old Stone Age Man".

graveyards are mixed with the bones of Neanderthals.

A Hiatus Before the Mesolithic

In *Who Was Adam?* our object was to take the information available by science and to correlate it to scripture, and to show a resultant harmony. There are, however, always those who look for answers beyond what empirical evidence can supply. Yet frequently it leads us on to further investigation.

One such question is whether Adam had progenitors, or whether in terms of archaeology there was a break between Proto-neolithic man and the Upper Paleolithic.

Such a possibility has not been voiced before, yet investigations in this direction have led to some surprising discoveries. On examining the cave records throughout the Near East, Europe and Britain, it would appear that a good case could be made for a fresh start for Adam's culture.

Such a thought is new to pre-historians, and we would have to remember, too, the problem of cultural succession, and also of Adam's cellular affinity with the rest of creation. But before we dismiss the postulation, we ought to review the evidence which is at hand but has not been assessed before. It is the evidence of a gap or hiatus between Upper Paleolithic and Mesolithic (or Proto-neolithic) cultures.

If such a postulation is a novel thought for archaeologists, let it be remembered that only in the 1960's was the evidence of an earlier hiatus between Neanderthaloids and *Homo sapiens* accepted. The following facts are offered for further investigation.

The data come from several sources: the caves of the Near East; the caves of Europe, with particular reference to Castillo cave, North Spain; from the excavations of Peacock's Farm, Shippeo Hill, Cambridgeshire, England; and also Starr Carr in Yorkshire, England. General evidence also comes from the following Mesolithic cultures: Azilian, Maglemosian and Tardenoisian.

Details of the Near Eastern caves are drawn together by Solecki, who excavated the famous Shanidar Cave in Northern Iraq where early farming by Proto-neolithic cave dwellers is taken back to 8,900 B.C. (or 10,900 B. P.) by radio-carbon dating. First we will analyze the stratigraphy of Shanidar Cave itself.

On Solecki's cross section of the cave two hiatuses

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[2]Young. Edward J., *Studies in Genesis One;* Presbyterian and Reformed Publishing Co., Philadelphia, 1964, pp. 59-61.

[3]Cf. "Image of God", *Interpreter's Dictionary of the Bible;* Abingdon Press, New York, 1962, article section 1a.

[4]Brace, C. Loring, "The Fate of the 'Classic' Neanderthals," *Current Anthropology,* February, 1964, p. 5.

[5]Day, Michael H., *Guide to Fossil Man;* Cassell, London, 1965, p. 41. Valloch, Karl, "Evolution of the Paleolithic in Central and Eastern Europe," *Current Anthropology,* December, 1968, pp. 351-390. Although the two groups are both *Homo sapiens,* we shall follow precedent and use the contrasting terms in this paper: Neanderthal man and *Homo sapiens* or modern man or Upper Paleolithic man.

[6]Brace, *op. cit.,* p. 19. Comments in brackets throughout the paper are my own.

[7]*Ibid.,* p. 20.

[8]*Ibid.,* p. 22.

[9]*Ibid.,* p. 24.

[10]*Ibid.,* p. 25. Many authorities believe that the Lower Perigordian industrial complex shows clear signs of development from the Mousterian to the Upper Paleolithic—thus showing an industrial evolution presumably directly related to the evolution of Neanderthal to modern man. See especially Bordes, Francois, *The Old Stone Age;* McGraw-Hill, New York, 1968, pp. 147-150, 220, 224.

[11]Brace, *op. cit.,* p. 26.

[12]*Ibid.,* p. 27.

[13]*Ibid.,* p. 27.

[14]*Ibid.,* p. 28.

[15]*Ibid.,* p. 28.

[16]*Ibid.,* pp. 30, 31.

[17]Howells, William, *Mankind in the Making;* Doubleday & Co., Garden City, 1967, pp. 241-243.

[18]Jelinck, Jan, "Neanderthal Man and Homo Sapiens in Central and Eastern Europe," *Current Anthropology,* December, 1969, p. 492.

[19]Montague, Ashley, *Man: His First Two Million Years;* Columbia U. Press, New York, 1969, pp. 67, 68.

[20]Brace *op. cit.,* p. 26; Valloch, *op. cit.,* p. 369; Hughes, D. R. and D. R. Brothwell, "The Earliest Populations of Man in Europe, Wester Asia, and North Africa," Cambridge Ancient History fasicle No. 50; Cambridge U. Press, Cambridge, 1966, p. 12; Coles. J. M. and E. S. Higgs, *The Archaeology of Early Man;* Faber & Faber,, London, 1969, p. 220 and chart on p. 36; Clark, John G. D., *World Prehistory: A New Outline;* Cambridge U. Press, Cambridge, 1961, pp. 46, 66, 68.

[21]Reed, Charles A., "The Iranian Prehistoric Project," *Science,* June 23, 1961; Young, Jr., T. C. and P. E. L. Smith, "Research in the Prehistory of Central Iran," *Science,* July 22, 1966.

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[25]Howell, F. Clark and editors of LIFE, *Early Man;* Time, Inc., New York, 1965, p. 127.

[26]Brace, C. L., *The Stages of Human Evolution;* Prentice Hall, Englewood Cliffs, 1967, p. 100.

[27]*Human Evolution,* ed. Noel Korn and Fred W. Thompson; Holt, Rinehart & Winston, New York, 1967, p. 236; Howells, *op. cit., p.* 218.

[28]Montague, *op cit.,* p. 71.

[29]"Mt. Carmel Fossils," *Encyclopedia Brittanica,* Vol. 15; William Benton, Chicago, 1970, p. 960; "Anthropology," *Encyclopedia Brittanica,* Vol. 2; William Benton, Chicago, 1970. p. 51.

[30]Mulvaney, D. J. "The Australian Aboriginal," *Scientific American,* March, 1966, pp. 84-93; Howells, *op. cit.,* p. 336; Coles and Higgs, *op. cit.,* p. 413.

[31]Howells, *op. cit.,* p. 317. Cf. statement of Tobias (footnote 16).

[32]*Ibid.,* p. 305; Bryan, Alan L., "Early Man in America and the late Pleistocene Chronology of Western Canada and Alaska," *Current Anthropology,* Vol. 10, No. 4, pp. 339-365.

[33]"Cro-Magnon Man," *Encyclopedia Brittanica,* Vol. 6; William Benton, Chicago 1970, p. 792; See also radiocarbon dates for cultures going right through Pearce's "hiatus before the Mesolithic" in Clark, *op. cit.,* p. 32 and Coles and Higgs, *op. cit.,* p. 36.

[34]"Man, Prehistoric Types of," *Encyclopedia Americana;* Americana Corp., New York, 1968, pp. 190, 191. See also *Readings in Race,* ed. Stanley M. Garn; Charles C. Thomas, Springfield, 1968, p. 285; Howell, F. Clark and editors of LIFE, *op. cit.,* p. 128; Brace, C. L., *The Stages of Human Evolution;* Prentice Hall, Englewood Cliffs, 1967, pp. 76, 77.

[35]Brothwell, D. R., "The People of Mount Carmel," *Proc. Prehist, Soc.,* 27, p. 157. (1961).

[36]*Rock Strata and the Bible Record,* ed. Paul A. Zimmerman; Concordia, St. Louis, 1970, p. 172.

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are marked. The lower one of 10,000 years is that now generally accepted between Mousterian (associated with Neanderthal) and Upper Paleolithic. Higher up appears the words "15,000 years hiatus" by carbon dating. It is that hiatus which we are considering. The gap occurs between Upper Paleolithic and Mesolithic.

When other caves of the Near East are compared, we find the picture a similar one. There is a similar hiatus in the caves of Libya, Palestine, Lebanon, Syria, Iraq, Iran and Afghan. The tentative chronological correlation by Solecki has been modified to bring in the revision of the Carmel caves.

We now examine the evidence of a remarkable cave at Castillo in North Spain. In this cave the hiatuses are recorded by stalagmitic layers. This is ideal for prehistorians for several reasons. When a cave has long been unoccupied, no human rubble and artifacts have accumulated, and the calcium carbonate drip from the cave ceiling has formed over several thousands of years the hard picturesque stalagmitic layer on the floor. Then the next culture occupies the cave and human rubble containing the domestic impedimenta and tools characteristic of that culture is bedded down under human feet. When the cave is next vacant this culture layer is sealed off again by a stalagmitic crust which cannot be penetrated by burrowing animals. The archaeologist has to discover why the cave was forsaken at various periods. There may be a variety of local causes, but where major hiatuses correlate over a wide geographic area, the main prehistoric picture is built up.

Burkitt's section of Castillo shows among others the two hiatuses by stalagmitic horizons which we have discussed. One is between Mousterian culture and Upper Paleolithic, 30,000 B.P., marking the commencement of *Homo sapiens*. The next is between the Upper Paleolithic and Mesolithic Azilian culture, 12,000 B.P., which marks the beginning of farming.

The Azilians must have known of farming culture even though they did not practice it themselves. This is evident in the Fenlands Peacock's Farm excavation. As Baden-Powell of Oxford says, the microliths fixed by resin on their weapons reveal a derivation from the farmer's sickles, the teeth of which are made with the same technique. At Star Carr, Yorkshire, this Mesolithic technique reveals a connection with the early Natufian farmer-hunters of the Near East. The Maglemosian Mesolithic people reveal like connections.

WHO WAS ADAM*

In this small volume divided into 16 brief chapters, the author seeks to present an apologetic for the Bible and Christian faith by employing the scientific findings from anthropology and genetics. His note at the head of his bibliography at the conclusion of the book states that "It is regretted that the author does not know of any contemporary book on Anthropology and the Bible, which has been written by a qualified anthropologist. It is hoped that *Who Was Adam?* will help to fill the gap" (p. 146). While we may question whether a volume of such brevity and intellectual level will attract the eye of most professional anthropologists, it undoubtedly will prove to be a very useful work for the interested and informed Christian who has wrestled with problems stemming from anthropological propositions and their conflict with traditional interpretations of the Bible. Before turning to a selective analysis of specific statements in the book, I would like to state that I intend to add a copy of the work to my library and recommend the book to Christian scholars who are interested in relating scientific findings to the Bible in general and to the early chapters of Genesis in particular.

It is quite apparent in *Who Was Adam?* that the author holds certain assumptions upon which he rests his proposals and arguments. He will find that many Christian scientists favor most of his assumptions but that these assumptions are unacceptable to the majority of anthropologists who do not identify with evangelical Christianity. He assumes, in the first instance, that the Bible is the infallible and inspired Word of God which is to be considered the ultimate authority for scholars in their quest for origins including man. Secondly, he assumes that science is a valid tool for elucidating the incomplete biblical account as to the creative process and the primeval events in relation to *Homo sapiens*. His third assumption is that materialism among scientists has vitiated their objectivity when they ignore the Bible as a reliable source of information for deriving many sound anthropological explanations. And a fourth assumption is that a study of man must recognize the great age of the earth, the antiquity of man as revealed in the fossil record, the existence of pre-adamic "man," and the fall of Adam.

Pearce's view that God created two forms of *Homo sapiens sapiens* . . . is a very tenuous interpretation of biblical and anthropological data.

Of course the view that pre-adamic men existed is not novel with Pearce since this idea has been suggested by several Christian scholars during the past century, if not earlier. There is abundant evidence to support this view from the Paleontological and archaeological findings as well as the conclusion held by practically all reputable anthropologists that modern man stems from Cro-magnon man who was true *Homo sapiens sapiens* in contrast to the immediate antecedal form of man, *Homo sapiens neanderthalensis* (Neanderthal Man). Unfortunately, Pearce confuses the problem in the taxonomy of modern man and fossil man by accepting the view that Swanscombe Man (which he dates at 200,000 year ago) and Hungerian Man (which he dates at 500,000 years ago) are essentially the same morphologically as Adam, or *Homo sapiens sapiens*, whom he dates at from 10,000 to 12,000 years ago as "a New Stone Age farmer" (pp. 14, 21). There is inadequate evidence to hold such an interpretation.

The author further complicates the puzzle of modern *Homo sapiens* when he writes, "Then comes the last Old Stone Age culture called 'Upper Paleolithic', dating from 30,000 B.C. This is associated with the first appearance of modern *Homo sapiens*, and marks the great advance in techniques" (p. 26). While the

*Who Was Adam? E. K. Victor Pearce, Exeter, Devon, England: The Paternoster Press, 1970. 148 pp., illustrations, notes, bibliography (paper).

Their barbless bone fish hooks resemble those of the Natufian farmers. Furthermore these Maglemosians of Europe made forest clearances by chopping down the trees with flint axes mounted in sleeves of antler and inserted into wooden handles. This style of axe and the practice of forest clearances must show affinity with the Neolithic farmers who made clearances in the woods in which to grow their crops.

Grahame Clark says,[21] "It was the Mesolithic people who, early in Neothermal times and almost certainly somewhere in Western Asia initiated the domestication of animals and plants." The lag between the commencement of the Mesolithic and the full arrival of the Neolithic farming milieu, is relative to the degree of remoteness of the Near Eastern nuclear area whence farming came. This has been taken as a slow process of acculturation. But the term Mesolithic is being dropped or merged into Neolithic as Proto-neolithic, because the tool techniques are now seen to be shared rather than distinctive of each other. It is possible that a better explanation than acculturation is that the earliest "Mesolithic" migration from the Near East came with the knowledge of farming, but without the discipline to practice it, especially as the plentiful game animals of Europe would offer quick rewards but a stultified economy. We know how the Plains Indians forsook farming for full time bison hunting in the 17th century. It could be significant that there is no Mesolithic gradation between the Paleolithic of the coasts of Asia Minor and the Neolithic which starts afresh on the plateau above.

The nearer to the nuclear area, the earlier farming is practiced, and the closer it is to the beginning of the Mesolithic. Shanidar cave shows farming started there by 10,900 B.P., only a thousand years after the Mesolithic began. One day perhaps a cave will

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author is probably justified in concluding that the ape-like features of fossil man beginning with the Australopithecinae have been over-emphasized by some physical anthropologists, he goes to the opposite extreme in minimizing the obvious differences existing between the Australopithecinae, *Homo erectus erectus* and *Homo erectus pekinensis, Homo sapiens neanderthalensis,* and *Homo sapiens sapiens* in his eagerness to link the fossil forms in a single taxonomic category. One cannot help but ponder what Pearce's reaction would be to James Murk's "Evidence for a Late Pleistocene Creation of Man" (*Journal ASA,* 17 (1965) :37-49) in which Murk cogently argues that *Homo sapiens sapiens* was created about 45,000 years ago and represents the last creative act of God insofar as man is concerned. Pearce's view that God created two forms of *Homo sapiens sapiens,* one who became the author of the Upper Paleolithic cultures (Aurignacian, Solutrean, Magdelenian, etc.) and the other the New Stone Age farmer, Adam, is a very tenuous interpretation of biblical and anthropological data.

Another problem emerges when Pearce states that "No type of man had ever reached America before the New Stone Age culture" (p. 61) which follows the highly unlikely notion that the neolithic revolution in America did not originate independently but was the result of diffusion from the ancient Middle East (via China?) and the Aleutian Islands beginning about 8,000 B.C. (p. 61). It seems incredible that agricultural knowledge could have been retained in a migration that covered thousands of miles, much of which was through terrain and climate that made agriculture impossible, over what was perhaps at least hundreds, if not thousands, of years. There is no archaeological evidence to sustain the view that the early migrants to America retained any notion of the domestication of plants and animals. The fact of the matter is that archaeological evidence from numerous sites in the Americas indicate that man entered America before 20,000 years ago and the culture he carried with him was akin to the Upper Paleolithic as witnessed by such tool traditions as the Clovis, the Sandia, and the Folsom—all dating much earlier than 8,000 B.C. and probably as early as 25,000 years ago (Jesse Jennings, "Perspective" in *The Native Americans* edited by Robert F. Spencer and Jesse Jennings, 1965, pp. 16-32). It may be noted that Pearce's argument can be used to refute his own case, for if archaeological findings are the basis for determining that fossil man in the Old World was a hunter-gatherer rather than a farmer (p. 23), how are we to consider the tools and weapons such as the Folsom and others in America, cultures that unmistakably show that earliest man in America was a hunter? Again how are we to understand the striking differences in agriculture, both as to crops grown and techniques used in growing, that occur between the Old and New World types of farming? And, incidentally, it is curious that Pearce proposes the Aleutian Islands as man's migration route from Asia into America. It is quite likely that some migration followed this route but most Americanists hold that the dominant route was via the Bering Strait which was probably a land bridge during the late Pleistocene when man first began to migrate into America.

Pearce's argument is not really based on finding anthropological data to support the Scriptural account, but rather the biblical statement leads to a presupposition in viewing the anthropological evidence.

To support his view that Adam was a neolithic farmer, the author distinguishes two creation accounts in Genesis. He proposes that God created Old Stone Age man in the latter verses of Genesis 1, to which most fossil men are to be associated. God, in due time, created Adam as the "first man" of the family of contemporary mankind about 10,000 to 12,000 years ago. This is the creative account and subsequent events recorded in Genesis, chapter 2-4. If I understand Pearce's interpretation correctly, he is saying that God created the neolithic Adam with physical features almost identical to those of man responsible for the famed Upper Paleolithic cultures, but the neolithic Adam seems to have been endowed with a soul and was held to be morally responsible to his creator. He was also endowed with special insight that enabled him to practice horticulture—"Adam is represented as being formed for the specific purpose of carrying out this New Stone Age gardening" (p. 54). We must leave it to scholars who are expert in Hebrew to accept or reject this view of the early chapters of Genesis; from an anthropological perspective, there are serious objections to distinguishing the *Homo sapiens sapiens* of the Upper Paleolithic cultures from man who initiated the

be found in Armenia near the headwaters of the four rivers of Eden where domestication was practiced at the beginning of Mesolithic, and before which a hiatus indicates the commencement of our Adamic race.

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"neolithic revolution." One scarcely knows what to do with transitional cultures such as the Natufian in Palestine.

Leaving the problem of man and neolithic farming, Pearce finds religion beginning with his neolithic Adam. He admits that Paleolithic man may have had some form of religion (i.e., Neanderthal Man buried his dead to indicate belief in an afterlife) but it is not certain on the basis of Genesis 1 or the fossil record that "pre-adamic men were fallen or unfallen, whether they had a conscience, a soul and a sense of religion" (p. 45). Pearce seems to doubt that pre-adamic men were endowed with religious capacity, at least not to that comparable to neolithic Adam. To support his contention that diverse religions represent a degeneration of man following the fall, the author appeals to the writings of Andrew Lang, Pater Wilhelm Schmidt, and Samuel Zwemer.

> This supports the findings of such as Schmidt, Lang and Zwemer, who found that original beliefs all over the world were in a Supreme Being often called the Sky God or High God. They thought this indicated that God revealed himself to earlier peoples who had handed it down to present day primitives. Polytheism came later as a corruption of the original purer religion (p. 65).

Without giving ourselves to extended statements about the questionable nature of conclusions advocated first by Lang, elaborated by Schmidt, and popularized in America by Zwemer, we may point out quite simply the weakness of this argument from anthropological evidence by quoting Smalley:

> Schmidt . . . left out of his consideration the large number of equally primitive groups who have no 'high God' concepts, and so his sampling is one sided. Like other extreme diffusionists, and like the evolutionists he repudiated, Schmidt was also guilty of comparing the incomparables . . . We agree with Schmidt, but not on the basis of his anthropological premises or method. We agree, a priori of anthropology, because of Scriptural record that Adam and Eve knew the High God and that the original religion must have known Him. We see in Cain and Abel a reflection of that religion. On the basis of the anthropological evidence we cannot agree, however, that all of the most primitive peoples have a recollection of the 'High God' or if they now have such a concept, they have had it all through their cultural history (William A. Smalley and Marie Fetzer, "A Christian View of Anthropology" in *Modern Science and Christian Faith*, 1950, pp. 130-131).

It becomes apparent, then, that Pearce's argument, in following Lang, Schmidt, and Zwemer, is not really based on finding anthropological data to support the Scriptural account (which we accept on the basis of faith as does Smalley), but rather the biblical statement leads to a presupposition in viewing the anthropological evidence.

One can find little to quarrel about in Pearce's views on the fall of man, the origin of marriage, and the duration of innocence in subsequent chapters, and his correlation of Genesis with archaeology and culture sequences are as reasonable and acceptable as any that have been advanced. Furthermore his treatment of the six days, which he accepts as "age-days," agrees with views widely accepted among Christian scholars. The later chapters in his book constitute a study in genetics which lies in a marginal position to my knowledge. However, his use of "factory" as an analogy for the body and sex cells is interesting and informative. But I must rely upon those knowledgeable in genetics to determine the aptness of such an analogy.

When he concludes his book, Pearce betrays yet another assumption acceptable to most evangelical Christian scientists. It is that the Bible depicts God as being active within nature. Perhaps Pearce carries this to an extreme when he quotes Psalm 139:14 which contains the words "And in thy book all my members were written." He links this statement to the DNA code of cell structure in all life. In his words,

> If the code is as old as life itself, God must have recorded His instructions in the first functional unit of life, perhaps four thousand million years ago, or if not then, in view of the lack of fossil evidence. at least in the Cambrian 600 million years ago (p. 131).

The final chapter, "The DNA Code and the Incarnation" is something quite new to me in that I had not read previously any attempt to explain the Incarnation of our Lord Jesus in a genetic consideration. Obviously Christian geneticists must have given considerable thought to this problem, hence I for one will eagerly await their reactions to the contrast in the creative act bringing into being a female, Eve, and the miraculous conception involved in the Incarnation of a male. Pearce dismisses the argument of parthogenesis on the grounds that it fails to meet the requirements of both the Incarnation and the process in biology. What do Christian geneticists say to this comment?

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A Speculative Model

Biblical Evolutionism?

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Evolutionism is a philosophical perspective on life which sees evolutionary process as a dominant mechanism in the unfolding of world history. The impact of anti-Christian evolutionists has been so pronounced that Christians tend to write off any statement of evolutionism as unbiblical and unchristian. Writers such as Teilhard have had some influence to the contrary, but even Teilhard does not make clear the relationship between evolutionary process and Biblical Christianity. It is not necessary for this sharp dichotomy to exist between evolutionism and biblical Christianity, since a model can be constructed which will be reasonably faithful to the perspectives of both disciplines. It is the purpose of this paper to present such a speculative model for comment and criticism.

Traditional Philosophical Evolutionism

Traditional philosophical evolutionism has been so anti-Christian that the very phrase is practically anathema in orthodox or evangelical circles. Anti-evolution Christians attack the validity of the General Theory of evolution and the relevance of the Special Theory primarily because they are convinced that philosophical evolutionism is one of the greatest evils in the world, and that philosophical evolutionism in turn is based on the General Theory.

Traditional anti-Christian evolutionism holds to the following points which are in fundamental opposition to biblical Christianity.

1. *Denial of the importance or reality of divine Creation.* The laws of nature (whose origin is unknowable) are sufficient to account for the origin of life and spirit in its various manifestations.

2. *Substitution of metaphysical for moral evil.* The evil in the world results from the incompletion of the evolutionary process. What appears to be moral evil is only a remnant of man's bestial nature. There is no ultimate right or wrong, no responsible moral choice.

3. *The nature of man is defined by his being a higher evolutionary animal.* If man is not guilty of moral sin, he is also not capable of unselfish love. (This is a double contradiction of Biblical Christianity. It vastly underestimates the exalted position that man has as a creature made in the image of God. It vastly underestimates the debased position that man is in as a creature engaged in moral rebellion against his Creator.)

4. *Man can save himself by taking charge of the evolutionary process.* If there is no such thing as moral guilt, then there is no need for deliverance from moral guilt, for the forgiveness of sins, or for a divine Savior from the bondage and guilt of sin.

5. *Reality is confined to the natural.* Natural processes are sufficient to account for the being and nature of man; it may be concluded that only natural processes are needed to describe man and the universe.

6. *The evolutionary process will deliver all men.* Since the evolutionary process has brought us to the present state of development, it will continue to work until the whole race is brought to a higher state of consciousness and fulfillment. Possibilities of judgment do not exist, unless man frustrates the evolutionary program and destroys himself and his world.

It is true that traditional philosophical evolutionism has generally developed the themes summarized above, and that therefore Christians have been impelled to oppose such a system of thought. What is not true, however, is that *any possible* scheme of philosophical evolutionism *must* be based on these themes.

Christians frequently find themselves in the dilemma of fighting a given perspective because that perspective is used by others to discredit Christianity. It is important to know whether or not the same data or starting points could be used in a Christian perspective to arrive at quite different conclusions that would be consistent both with the data and with the biblical revelation. It is the purpose of this paper to present a speculative model, the purpose of which is to show that the basic concepts underlying philosophical evolutionism can be consistently interpreted in a Christian and biblical framework.

Scientists are accustomed to proposing models simply for the usefulness they may provide in guiding thinking or experiment, without making any initial

commitment about the relationship between the model and physical reality. This is the kind of model proposed in this paper. I do not "believe" it. I propose it as a possible approach to cutting the knot that binds us when we attempt to hold simultaneously the insights from evolution and the Bible.

The purpose of this paper is to show that the basic concepts underlying philosophical evolutionism can be consistently interpreted in a Christian and biblical framework.

Teilhard de Chardin

One of the most thorough attempts to unify evolutionism and Christian faith is that carried out by the French priest-paleontologist Pierre Teilhard de Chardin. He identified the evolutionary process with the triumphant work of God in the world, and sought to show that the previously diverging branches of evolutionary development began to converge when man became conscious of himself and the universe, the final focus of convergence being none other than the Omega Point, God Himself.

Teilhard proposed that the love of God was the driving force of evolution, and that the love of man was the sign of our participation in this process. To hate is to resist the work of God in evolution. Rather man is called upon to oppose every effort that would lead to divergence between men, and to support every effort that would lead to convergence between men.

Teilhard's thought has been criticized as taking little account of the reality of sin and of the necessity of Christ's work of atonement. Because the driving force of evolutionary process so dominates Teilhard's thought, evil and sin are relegated to simple by-products of the uncompleted process of evolution, and appear to have no real importance for the central issues of life. Either all men will arrive at Omega or none will.

In the long run it may be Teilhard's optimism that is the most destructive. In his adoration of the Creation and the Incarnation, he seems to find it difficult to accept the reality of moral guilt and the need for divine forgiveness.

In the model proposed in the remainder of this paper, we attempt to appreciate the efforts made by Teilhard, but also to learn from his shortcomings in coordinating a scheme of philosophical evolutionism with biblical revelation.

Creation of Man

The Bible says that God created man from the dust of the earth.

The intrinsic points that Biblical evolutionism must encompass are (1) God created, (2) He created man as distinct from the animals, and (3) He created man from the "stuff" of the earth.

In biblical evolutionism, the process of evolution is the manifestation of the work of God in nature. The creative work of God may therefore be considered to have two aspects: (a) the foundational aspect in that the finite existence of the natural world depends moment by moment upon the activity of God, and (b) the progressive aspect in that new creatures and characteristics emerge creatively in the process of evolution. Before all else, therefore, biblical evolutionism affirms that *God created.*

The evolutionary process results in the emergence of the human being as distinct from the animals. As God produced a living creature by the appropriate patterned interaction of non-living matter, so He produced a living creature with a soul by the appropriate patterned interaction of living matter. Although all living creatures have attributes of soul, the higher animals more obviously than the lower, it is the unique attribute of human soul to have communion with God, to be able to make responsible choices on the basis of the knowledge of a man-God relationship. Biblical evolutionism certainly affirms that *God made man as distinct from the animals.*

The General Theory of evolution proposes that living matter emerged from non-living matter when the combination of environmental conditions was appropriate to bring about that particular patterned interaction of non-living matter that we recognize as life. In almost a drastically literal sense, therefore, biblical evolutionism affirms that *God made man from the dust or stuff of the earth.*

Nature of Evil

The Bible says that evil in the world results partially from human sin (moral evil—as when one man murders another), and partially from forces not directly related to human sin, although possibly indirectly related even in the case (metaphysical evil—as when an earthquake, flood, or falling tower destroy human life).

Biblical evolutionism recognizes the necessity for the involvement of the human being in order for *evil* to exist, and recognizes the distinction between metphysical evil and moral evil—between an amoral product of the natural environment which assumes the category of evil only when injury to human beings is involved, and the deliberate choice of a human being to harm another human being.

When rocks slide down a hill and kill a rabbit, when volcanoes overflow and kill mice, when a lion kills a deer, or when a cat kills a bird, we do not attribute the category of "evil" to the event at all. When sliding rocks kill a man, or when volcanoes or lions kill a man, we recognize that this is a case of metaphysical evil. It is evil because human life was taken, but it is not moral evil because rocks, volcanoes and lions are not moral agents. Only a man can be guilty of moral evil.

In the process of evolution, therefore, *there is no evil on earth before man appears on the scene.* Since metaphysical evil requires the involvement of man as victim, and moral evil requires the participation of man as both perpetrator and victim, only amoral events transpired among sub-human creatures before man emerged. The analogy with the absence of evil from the Garden of Eden is readily drawn.

When the human being emerged in the process of evolution, both metaphysical and moral evil became possibilities. The creation of the human being in the image of God endowed him with the ability and the responsibility to make moral choices. When he rebelled against his role as a child of God, he became guilty of moral evil. Moral evil requires atonement and forgiveness.

The Entrance of Sin into the World

The Bible says that sin entered the world when man made a deliberate choice to disobey God.

Biblical evolutionism affirms that sin (moral evil) as well as metaphysical evil entered the world when the human being emerged in the process of evolution, and made a deliberate choice to disobey God. The first man sinned. In a common biblical interpretation, sinless man is transformed into sinful man at the sin of the first man. In the perspective of biblical evolutionism, the emergence of the first man made metaphysical evil possible, and the sin of the first man made moral evil a reality. What might have been only metaphysical evil with man as the victim, became moral evil as man's first sin made him the perpetrator. The end result is sinful man with moral guilt.

The Need for a Savior

The Bible says that sinful man needs a Savior from the guilt and power of sin.

Biblical evolutionism affirms in an identical way that sinful man needs a Savior. The human being is in rebellion against God, and since this rebellion is the result of a responsible moral choice, he is also guilty of moral evil. Every aspect of the biblical presentation of the need for the forgiveness of sin and for restoration to the position that a man created in the image of God should have, is present in identical form in biblical evolutionism.

DEVELOPMENTALISM?

It is my impression that one's attitude toward evolution depends a great deal on his educational and religious background. If he is well read in Dobzhansky, Simpson, Stebbins and others he sees biology as a dynamic science revealing considerable possibilities of change. If he is steeped in the anti-evolutionary books of O'Toole, Rimmer, Price, Wilder-Smith and Davidheiser, he is likely to feel his faith is challenged by any implications of the evolutionary scientists. In plain English, there is much prejudice in this whole business of evaluating evolution. So one should be careful to see if it is his preferences or his reason that are dictating his attitudes.

There is much prejudice in this whole business of evaluating evolution.

Just one objection to Bube's evaluation. He says that traditional anti-Christian evolutionism holds that "there is no ultimate right or wrong, no responsible moral choice." This attitude may be true of some, but I think Huxley, Dobzhansky and Simpson, as examples, would believe that moral wrong is any activity that impairs the full development of one's personality. Man has now arrived at a level where he can determine values, and it is morally evil if he does not use his intelligence instead of his urges to provide a good life for mankind. Herman Muller believed evolution has no programs so it was up to man to supply the program, such as disseminating scientific information. G. G. Simpson believes man is the result of a purposeless process that did not have him in mind, but he is responsible to himself and society. He can introduce purpose into evolution. And Dobzhansky comments that "It is up to man to supply the program for his evolutionary developments which nature has failed to supply."

In Genesis 1 the word "soul" means "a living creature" and is not synonymous with "spirit" as used in the New Testament. Animals were called living souls or living creatures (Gen. 1:24) and man was called the same (Gen. 2:7). The same Hebrew word is used in both verses. Man's spirit is mentioned in Genesis 1 as the image of God.

One more suggestion. Since it is true that many of the forty million evangelicals object to the term "evolutionism", why not speak of biblical "developmentalism" instead of biblical "evolutionism". If you call something a rose you expect it to smell like a rose. Any use of the disparaged term will be an offensive odor in the sense of many Christians.

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CONTAINS AN UNPROVABLE AND INADMISSIBLE ELEMENT

As I see it, it is very important to examine carefully the creation of man in Bube's model. I say this because the creation of man in the model seems not to be part of what is ordinarily meant by "evolution", i.e., that which is encompassed by the General Theory of Evolution. According to the General Theory, the events in an evolutionary process bear a cause-and-effect relation to one another. Furthermore, the causes are physical, e.g., mutation, and the evolutionary process is held to be not random, but with a favored direction, with improvement or progress; and progress occurs because of the survival of the fittest.

But according to Bube's thesis, man became man when the acts performed by the animal(s) which became man (men) could potentially break the law of God. That is, moral evil entered the universe. At one moment an animal could die, and no evil would be involved. At the next moment, after the creation of man, the same physical event, the death of the animal-become-man could still occur, but now evil—metaphysical evil—would be associated with the event. Furthermore, the animal-become-man was now able to commit moral evil. What happened to bring about the transformation? According to Bube, that which had the attributes of soul in the animal was transformed: the new soul could commune with God. Such a transformation is qualitative, *not* quantitative—the being either communes or does not commune with God, *and there is no half-way point*—and the transformation could only take place instantaneously.

Christian Conversion as an Evolutionary Process

The Bible says that when a man becomes a Christian, he becomes a new creature. He is to be described as the firstfruit of a new order in Christ, as the representative of a coming order that will glorify God and the Lord Jesus Christ.

Biblical evolutionism agrees with the traditional biblical theology which considers the ultimate goal for man to be realized in his restoration to full fellowship with God, forgiven and freed from sin, and engaged in willing and fulfilling service. The way that man is advanced toward this ultimate goal is through Christian conversion, through recognizing his need of a Savior and committing himself to God through faith in Jesus Christ. A man becomes a *better* man when he accepts Christ; he undergoes an "evolutionary" experience that may be rapid or may extend over many years.

Biblical evolutionism is at one with biblical theology is seeing the spreading of the Gospel and the winning of men to Christ as the only effective way of making men truly *men*, made in the image of God. Sometimes we act as if we were little more than animals; yet we are destined to be like Christ.

The universalism of traditional philosophical evolutionism need not be adopted. Biological evolution has never been universalistic, weeding out those forms that did not contribute to the continued flow of evolution. There is no reason to attribute any universality to the

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Can such a qualitative change, such a quantum (but not quantified) jump, be related to the General Theory? That is, can this transformation be caused by that which existed in the physical world before the change? According to the General Theory, changes are indeed related to that which exists in the physical world before the change takes place. But Bube properly emphasizes that man and animal are distinct. Man can commune with God, and the animal cannot. In other words, the change which took place was in the very nature of the being which was changed. With good reason Bube does not attempt to connect whatever happened when man was created, with other events in the hypothesized evolutionary process. He does state that all evolutionary events are caused by God, but he does not show that physical causes are behind the transformation of man in the same way they are involved in other evolutionary steps. I doubt that Bube would suggest that anything like a mutation would change an animal without a soul into a being who is *not* a body-with-soul-added, but something new under the sun, a "body-soul", an image of God. Whatever "vestigial" organs, mutations, etc., tell us, they tell us nothing about the transformation which Bube postulates, the formation of the image of God.

What proof is there that at some point in time an animal was changed to a body-soul, a man?

Let us now turn to the conditions a model must satisfy. A model must not only fit the known facts, but we may not put into a model an unnecessary element. For example, suppose a student performing a typical elementary physical science experiment attempts to declare by weighing, shaking, etc. what an object inside of a "black box" is like. Very likely the instructor will reprove him if he concludes not only something about the shape, density, etc., of the object but also that it is a green object. His experiments just don't answer the question about its color. If the object is a model, i.e., if deductions concerning its nature are to be used to predict the results of future experiments, the student may not specify the object's color as part of the model. Similarly, Bohr put too much into his model of the atom when he described the path of the electron. Had the Principle of Uncertainty been known at that time, the Principle could have been used to prove the Bohr model incorrect, since according to this Principle the path of the electron cannot be known. Bohr's description of the path of the electron was an unprovable, and therefore an inadmissable, element in his model.

If Bube's description of the origin of man is indeed not a part of the evolution referred to in the General Theory of Evolution and any proof of this theory does not apply to his model, then what proof *is* there that at some point in time an animal was changed to a body-soul, a man? First of all, we do know that there were animals before man came on the scene. Although Bube does not explicitly offer Scripture as proof, he does cite Scripture at this point. He says that man was created from the dust of the earth, and that the term "dust" in Gen. 2:7 could refer to the material which produced life and eventually the animal which produced man. Let us assume for the moment that there is nothing in Gen. 2:7 which contradicts this understanding of "dust". Even so, no one holds that the Scriptures tell us that this is *the* interpretation. As far as I can tell, the dispute over "dust" in Gen. 2:7 is only whether or not "dust" as used here *can include* the idea of a living animal, or alternately, the dust from which life evolved.

The student who said that the object in the black box was green knew that the object had *some* color, but he had no right to deduce that it was green. In my opinion, Bube knows that man was created from *some* pre-existing material, dust, but he does not have the right—on the basis of the evidence he presents or refers to—to be as specific as he is about the nature of that pre-existing material. In other words, since the General Theory seems not to be relevant, Bube has apparently introduced an unprovable, and therefore inadmissible, element—the animal origin of man—into his model.

I realize that the element in his model which I call unnecessary is a key element. I do not, however, propose to examine here what happens to his model if the animal-origin question is left unanswered. Rather, I suggest we attempt to decide if we *can* know something about the dust of Gen. 2:7. We read there

> And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul.

I have discussed this question in some detail elsewhere[1], and here I shall make only one point. The Hebrew word which is translated "living soul", *nephesh*, means merely "living creature", used for either animal or man in other passages (see Gen. 1:24 and 9:16). In other words, the soul is not mentioned in Gen. 2:7, but the passage does state *twice* that man was given life—in the sense that both man and animals have life—when he was created from the dust of the ground. The event of Gen. 2:7 was not a soul-adding event, but a life-giving event. Animals have the kind of life re-

ultimate success of the evolutionary process other than the universality of those who have committed themselves to Christ.

To speak of Christian conversion as an evolutionary process ceases to be an offensive phrase if it is remembered that "evolutionary process" means *God's activity* in the world. Certainly it is biblical to view Christian conversion as the product of God's activity.

Conclusions

It is possible to develop a model of biblical evolutionism which includes the affirmation that God created man, that He created him distinct from the animals, that He created him out of the stuff of the earth, that man is the participant in real moral guilt, that sin entered the world through the first man's choice to rebel against God, that man guilty of moral evil needs a Savior, and that the only way to bring man to his creation-intended position is through his acceptance of the Lord Jesus Christ for the forgiveness of his sins.

It is suggested that the intense animosity generated between Christians and traditional philosophical evolutionism may be only a special case, and that careful consideration of the possibilities of this speculative model of biblical evolutionism be given before Christians make any kind of ultimate decision on what kind of model may or may not be consistent with the biblical data.

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ferred to here—since *nephesh* can refer to them— and they cannot receive the life which they already have. Thus, the dust in Gen. 2:7 could not have had life before it was changed into man. I conclude that although there is a question concerning what the dust was, the dust could not have been alive. Bube does suggest that the dust was the material from which the first life was made. However, if my contention that man in his model cannot be logically associated with the General Theory of Evolution, there is then no more reason to expect that man was made from non-living dust via animals, than that he was made from non-living dust without intermediate animals. Relating man to this pre-life dust would be another way of including an unprovable, and therefore inadmissible, element in the model.

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Reply to Maatman

1. I am concerned primarily with the philosophical and theological implications of evolutionism. In speaking of evolution I do not therefore feel constrained either to accept or defend currently proposed scientific *mechanisms* for the evolutionary process. The possibility that what I propose is or is not fully expressible in terms of currently understood evolutionary mechanisms does not bear on the issue I raise.

2. In the two great areas of evolutionary emergence (if this view is to be held): the area of the emergence of life from the appropriate patterned interaction of non-living matter, and the area of the emergence of human soul from the appropriate patterned interaction of living matter, there must of necessity—or so it seems —be gray areas where it *is* not possible to ascribe with certainty the specific state of matter. I do not know in detail how to describe this; I believe it is justifiable on the basis of our present knowledge however, to hold this position with respect to the non-living to living transformation, and I do not see *a priori* why the same should not be held of the non-human to human transformation.

3. Although Maatman is correct in assuming that I would not imply that anything as simple as a single mutation would change an animal with animal "soul" into a man with human soul the implication that I would not attribute this transformation to physical causes at all is not correct. First of all, when I speak of physical causes, I mean God's activity. Second in my model emergence of the human soul results from a multitude of processes concerned primarily with the size and complexity of the brain and nervous system, processes and matter interacting according to a pattern appropriate for the manifestation of human soul as a systems property. I have discussed this question at much greater length in my book, *The Human Quest: A New Look at Science and Christian Faith.* (Word Books, Waco, Texas 1971).

4. The type of argument from Genesis 2:7 by which Dr. Maatmen derives the conclusion that the "dust" from which God "made man" could not be alive when God "made man" is curious indeed. It is based on the assumption that the phrase "God made man from the dust of the earth" must have a literalistic interpretation in terms of *an* event that occurred on *one* day. The model of biblical evolutionism maintains that God made man from the dust of the earth, by a process which started with the dust of the earth literally and then proceeded through a series of evolutionary developments until man was produced. The kind of exegesis proposed by Maatman, in which it is *assumed* that the Hebrew devotional literature of Genesis 2 was written to reveal subtle scientific chronology and mechanisms, has long been the source of confusion.

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(See pp. 153 and 157 of this issue for a continuation of this discussion. Watch for the Maatman-Bube Dialogue on "Inerrancy, Revelation and Evolution" in next year's Journal ASA.)

TRUCE OR CONSEQUENCES?

"Blessed are the peacemakers, for they shall be called sons of God." True. But we are likely to be called other things as well for trying to reconcile opposing people or opposing ideas. To stand in the middle, where an effective peacemaker has to stand, often means catching it from both sides, since to each we appear to be out in front leading the vanguard of

the other side. And trying to identify with both sides simultaneously (wearing a green beret with a Viet Cong outfit) may make us look to both like half-traitor, half-spy. Recently I circulated among my university departmental colleagues a paper on "A Christian View of the Origin of Life" prepared for a symposium at a conservative Christian college. To one group this paper identified me as something of a fundamentalist, to the other as a theological "rad-lib."

Perhaps that question mark in the title of Bube's "Biblical Evolutionism?" is the white flag intended to keep both sides from firing on a truce parley going on in no-man's land.

Many of the battle-weary will welcome Bube's attempt to bring together ideas and people that never should have been at odds in the first place. Even his discordant nomenclature (Viet Cong Americanism?) may help the combatants reexamine their categories. On the other hand, it is quite a gamble to expect the undesirable connotations of the two terms to cancel each other out. I acknowledge the features of Bube's speculative model as being part of my own thought over the years, but I have reservations about being identified as a "biblical evolutionist."

If we have a biblical theology of discontinuous supernatural acts only, and a biological science of continuous natural processes only, the twain never meet—except on the battlefield.

Bube points out the present atheistic connotations of philosophical evolutionism that make many of us hesitate to call ourselves evolutionists, even though we embrace evolution in biology. When forced to choose between "evolutionist" and "anti-evolutionist" camps, we have tried to insist on being "theistic evolutionists" to negate atheistic accoutrements. At times I have borrowed the terminology of the "special creationists" and called myself a "general creationist and special evolutionist." What designation is appropriate to indicate "belief" in evolution as a concept useful for some purposes but of no use for others?

The same difficulty faces us with the Bible. The Bible is useful for some purposes ("for teaching, for reproof, for correction, and for training in righteousness") but not for others. We often hear the Bible described as the answer to all of life's questions, even to questions undreamed of when its contents were written. Trying to be "biblical" is thus pushed to ridiculous extremes of wringing from Scripture what was never intended to be there. With that connotation, some of us are also reluctant to be known as "biblical" even though we are certainly not "anti-biblical." Does taking the Bible seriously but not always literally make one biblical? Does taking evolution seriously as science but not as atheistic philosophy make one an evolutionist? Then perhaps I am a biblical evolutionist, after all.

For me at present, to take the creation narrative in Genesis seriously means to consider it a parable, as thoroughly inspired and as "true" as New Testament parables. The parables of Jesus about seeds and weeds and soil contain a commonplace agricultural wisdom along with their religious message, but hardly form a basis for a science of agronomy. References in the rest of the Bible to the Genesis creation account all seem to me to focus on its religious message: the relationship of God to nature, of man to nature, and of man to God. Bube's model shows that these same relationships fit into a conceptual framework emphasizing God's continuous creative activity just as well as into a framework of discontinuity. Both aspects can be subsumed under the biblical category of *fiat* creation. ("let it be done") but only the continuous mode seems amenable to scientific understanding. Hence a model such as "biblical evolutionism" is necessary for rapprochement. If we have a biblical theology of discontinuous supernatural acts only, and a biological science of continuous natural processes only, the twain never meet—except on the battlefield.

It is worth holding our fire to see what kind of truce this new parley may bring us. Admitting that a biblical view of creation can include far-reaching but gradual change is not really much of a concession to make in the 20th century. Making it in the right spirit, at a time when science is under fire from other quarters, might lead to the concession that mechanistic explanations of biological processes do not exclude the possibility of divine purpose beyond the scope of science. If divine purpose is possible, then so is moral responsibility. If moral responsibility must be faced, then so must the possibility of failure, of guilt, of sin. If men (theologians, philosophers, scientists) have sinned, then we have need of atonement—and so on to the gospel of Jesus Christ.

> For he is our peace, who has made us both one, and has broken down the dividing wall of hostility, by abolishing in his flesh the law of commandments and ordinances, that he might create in himself one new man in place of the two, so making peace, and might reconcile us both to God in one body through the cross, thereby bringing the hostility to an end.

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Contracting Bentley's (1692) argument into one sentence one might say: there is no scientific cosmogony, and therefore there must have been creation. In a classical manner the argument opposes the two ideas of creation and cosmogony, and induces us to understand them as representing two similarly opposed general tendencies: a religious and a scientific explanation of the world. . . . By opposing the two explanations in such a manner the religious interpretation of the world had already made its own defeat inevitable.

C. F. von Weizsäcker
The Relevance of Science, Collins, London (1964), p. 24

Anatomy of a Confrontation*

(An Interview with Vernon L. Grose)

HARALD BREDESEN

Minister, Reformed Church in America

Early in the fall of 1969, the Board of Education of the State of California was considering the question of whether or not the theory of evolution should be presented as the only explanation for the origin of the universe in the study of science in the public school classroom. Members of the Board of Education were divided on the issue. Pressure was being exerted by various groups representing both sides, and the issue had become the subject of wide public concern.

In October an editorial appeared in the prestigious Los Angeles Times *which suggested that the State Board of Education had members on it who did not believe in the "accepted fact of evolution." Dr. Vernon L. Grose, vice president of the Tustin Institute of Technology in Santa Barbara, a physicist, a Christian and an ASA member, objected to this use of the word "fact."*

"I reacted on the grounds that the creation of the universe by a Supreme Being was altogether as logical as that of an evolutionary start of all things. To present evolution alone as an explanation for origins violated the very principles of science," he said.

Christian Life: What was your reaction when you read the *Los Angeles Times* editorial asserting that "evolution is a fact"?

Grose: There were several specific things in that editorial to which I objected as a scientist. The most significant one was the statement that evolution is a fact. This is not true. Evolution is hardly a hypothesis, let alone a theory. In addition, the editorial pointed out that the California Attorney General had ruled in 1963 that evolution could be taught in public schools provided the teacher did not indoctrinate. This was obviously a contradiction. For if you taught only one theory for origin you could hardly help but indoctrinate. So I suppose my cosmological perspective as a member of the kingdom of God played an important role in my reaction to the editorial.

Christian Life: You said evolution is not even a hypothesis. Will you explain what you mean?

Grose: I said it is "hardly" a hypothesis. Science is an organization of knowledge. This knowledge can be categorized several ways, based on how much faith we can put in it. Perhaps the loosest category is the *hypothesis*, defined as something assumed because it seems likely to be true explanation. Something a bit more certain could be called a *theory* which is explanation based on observation and reasoning. Only when we have removed all doubt do we dare call something a *fact*, because a fact is something known to be true or known to have really happened. I became disturbed when it appeared that evolution was being passed off as a fact.

Christian Life: Do you think evolution should be taught in public schools?

Grose: Certainly, evolution should be taught in the schools. Some of the scientific data, for example the regular absence of transitional forms, may be best explained by a creation theory while other data, for example variety within species, substantiate a process of evolution.

Christian Life: How did you express your objection to the editorial?

Grose: Well, I sat down and wrote a letter to the *Los Angeles Times*. I also sent this letter to each member of the California Board of Education. As a result, I was invited to appear before the Board and express my opinion.

Christian Life: What happened when you appeared before the Board?"

Grose: My reception before the Board was very good in the sense that they allowed me to speak for 25 minutes, and then I made a proposal that they adopt a modification into the Science Framework under consideration. And this they did.

Christian Life: Why did the press and TV give such wide coverage to the adoption of your work into the Science Framework?

Grose: Possibly because the Board's action in this case will affect the teaching of science in public schools throughout the U.S. I have here a clipping from a news article which was distributed by United Press International. It reads: "The Science Framework (a 205-page rationale to govern the teaching of science in California public schools) is an essential element used by pub-

*Reprinted by permission from CHRISTIAN LIFE Magazine, Copyright 1970, Christian Life Publications, Inc., Gundersen Drive and Schmale Road, Wheaton, Illinois 60187. November 1970, p. 30.

lishers in putting together science textbooks for California. Since California buys 10 percent of the textbooks sold in the U.S., publishers are willing to tailor the textbooks to fit California guidelines. The text also will be sold throughout the rest of the U.S. Therefore, the changes made by the Board will have a nationwide effect on the teaching of science."

Christian Life: Do you feel that the press gave fair coverage to your confrontation?

Grose: I do not. As I indicated earlier, the Los *Angeles Times* editorial was inaccurate. After I had made my statement to the Board of Education, newsmen and TV reporters tried to identify my objections with a religious bias. When I was interviewed by a writer from *Time* magazine I made a special point of asking him to clarify the issue—that I was not interested in introducing religious teaching in the name of science in the science classroom. Quite apart from that, I was saying that there are scientists who are atheists who endorse creation.

Christian Life: Do you mean to say that creation is a scientific theory?

Grose: Yes I do. There are several creation theories that are prominent, the continuous creation theory for example. It is not enjoying as much repute today as it has in the past. Nevertheless, it has been postulated. In the textbook used at Massachusetts Institute of Technology, which was published only last year, the word "creation" appears many times. Therefore, it was unscientific so fas as I was concerned, to continue to use the monolithic, bigoted and biased idea of evolution as the only explanation for origin. I wasn't so much a foe of evolution as I was a man crying out in the wilderness for liberty and objectivity in the teaching of science.

Christian Life: In other words, this was a sort of Scopes trial in reverse?

Grose: It was, because in the Scopes trial 44 years ago, in which Clarence Darrow and William Jennings Bryan opposed one another, the issue was whether or not any theory besides that of creation could be taught. Today only one theory is taught. That is evolution.

Christian Life: You say there is almost a "religious" bigotry about evolution?

Grose: Yes, My field is physics, so I had to do a little digging in the field of biology before I could make my presentation. As I got into it I discovered that evolution is more than a biological theory. It has ramifications in the field of sociology, ethics, politics and religion. It certainly played a role in the church of the 1920s and 1930s when we said man was getting better and better, evolving to a higher status, and that all men were coming to some sort of utopia. This was evolutionary thought. It also appeared in the theories of Karl Marx and Adolf Hitler.

Christian Life: How can you say that Hitler endorsed the theory of evolution?

Grose: When I visited Dachau concentration camp just outside of Munich last year, it occurred to me that Hitler stood firmly on the theory of evolution because he endorsed the cornerstone of evolution—the survival of the fittest. He considered the Germanic race to be the fittest and thereby rationalized their right to murder all those who could not stand up against the fittest. Further he felt justified in persecuting them and using them in horrible experiments. But how anyone can

I was not interested in introducing religious teaching in the name of science in the science classroom.

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speak of the dignity of man and still hold to the theory of evolution is a bit beyond me.

Christian Life: But didn't you say that you thought scientific data verifies evolution?

Grose: Yes I did. Without getting too technical let me say that there are two aspects of evolution. The first is what is commonly known in scientific circles as the special theory of evolution. This describes the variety that we see within species (for example, that all men do not look alike) and is variation due to natural selection and survival of the fittest in that sense. On the other hand, what the lay public recognizes as evolution and what I was referring to concerning Adolf Hitler is the idea that everything we see in the universe has come originally from one speck of matter. This is the general theory of evolution and is the one I object to.

Christian Life: How did you present this to the members of the Board of Education?

Grose: Well, I asked them if they could imagine the impact on the logic required for justice in our courts if we were forced to amend the Declaration of Independence to read. "We hold these truths to be self-evident that all men arose as equals from a soup of amino acid-like molecules, and that they by virtue of this common, molecular ancestry are endowed with certain inalienable rights, such as life, liberty and the pursuit of happiness."

Christian Life: You said earlier that the press and TV tied religious overtones to your confrontation or presentation. How did you reply to them?

Grose: I said it was just as appropriate to ask my religious belief as it was to ask my political persuasion or my sex behavior. As far as I was concerned all three were equally relevant. And if the press were that much interested, why weren't they asking the proponents of the monolithic idea of evolution as to what their religious views were. Actually, I maintained a strict neutrality on the subject of religion because I saw no reason to introduce the religious aspect. The problem was purely scientific. We were talking about the origin of the universe, matter, life and man himself.

Christian Life: Yet you do have Christian convictions, do you not?

Grose: Yes. When I was 17 years old I gave my life to Jesus Christ, and have endeavored since that time to serve Him as my Lord and Savior. I certainly won't deny that.

Christian Life: What role did your belief in God play in your presentation?

Grose: I believe that Paul was writing in the book of II Corinthians about the fact that even though we live a normal Christian life, we should also view things as having a perspective larger than this. This is evident to me when I remember Stephen's stoning. He was able to look beyond those who were doing their best to destroy him. That is when he saw God. I think of dual citizenship. I certainly am a citizen of the United States. I'm interested in the defense of my country, for instance, as an Air Force Reserve Officer. But on the other hand, my citizenship really is in heaven. And even though I wasn't trained in biology, when I got

into the issue I believe I must have felt something like Jesus did when He overthrew the tables and the moneychangers in the temple.

Christian Life: So it was in righteous indignation that you wrote to the *Los Angeles Times* and to the members of the Board of Education.

Grose: Yes, I suppose you could say that.

Christian Life: How did the Board respond to your suggestions?

Grose: They were very courteous to me. But of course the issue had become a heated one by that time. Dr. Ralph Gerard of the University of California, who had worked with 15 others for four and one-half years on the 205-page Science Framework for the Board, was incensed. He claimed that my proposal was equivalent to telling children that babies are brought by the stork.

Christian Life: Then the Board of Education actually amended the Science Framework submitted by Dr. Gerard's curriculum committee by including in it your recommendation?

Grose: Yes. I had written more, but they inserted two paragraphs. These paragraphs now are a part of the Science Framework which will affect the teaching of science in most schools in the U.S. These paragraphs read: "All scientific evidence to date concerning the origin of life implies at least a dualism or the necessity to use several theories to fully explain the relationships between established data points. This dualism is not unique to this field of study, but is also appropriate in other scientific disciplines such as the physics of light. While the Bible and other philosophical treatises also mention creation, science has independently postulated the various theories of creation. Therefore creation in scientific terms is not a religious or philosophical belief. Also note that creation and evolutionary theories are not necessarily mutual exclusives. Some of the scientific data, for example the regular absence of transitional forms, may be best explained by a creation theory, while other data, for example transmutation of species, substantiate a process of evolution."

Christian Life: How do you view the time and effort you spent on this project? Do you believe it was worthwhile?

Grose: So far as I am concerned, I am amazed at some of the things God has done. The odds were extremely high against success. Yet I believe because my trust was in the Lord and because the issue was a significant one, that He honored the effort.

Christian Life: Would you encourage other Christians to speak out on issues in which they may be concerned?

Grose: Definitely. I see this as only a single issue, but I believe many more issues will be raised which will call for concerned action on the part of Christians. And here I don't mean Christians brought together in churches or denominations—but Christians acting as individuals. In fact, I am rather tired of the resolutions passed at annual church conventions and conferences. I think the time has come to make our impact and force felt as individual human beings. I believe as Christians we should be speaking out about music, art, politics and other disciplines as well as science.

Christian Life: Do you see this as a New Testament pattern?

Grose: Without question. I also see it as the "wave of the future." I see a triumphant church, even in these last days, against which the gates of hell shall not prevail. I am inclined to think that too often we consider the church as a cowering, intimidated remnant that's barely hanging on. Even now there are some who appear to be hoping that Jesus Christ will return before they run out of gas. I don't see that type of church in the future. In fact, I really see the forces of evil being met in these last days with an aggressive, explosive reaction of men who are led and filled by the Spirit of God.

Christian Life: You mentioned earier that your discipline is physics rather than biology. Yet you felt so strongly about the issue that you were willing to expose yourself. Were you afraid of the consequences?

Grose: When I received the invitation from Sacramento to appear before the Board of Education I felt quite inadequate. As I mentioned, my discipline is physics while the subject involved biology. So I requested the elders of the church which I attended to set me apart for this task, just as in apostolic times men were set apart by the church for a specific ministry. You will remember this is recorded in the 13th chapter of Acts as happening in the church at Antioch.

I was disturbed if educators were so insecure regarding the validity of the evolutionary theory that they were afraid to allow any other theory to be taught or to be compared with what they may have already decided to be a "fact."

Christian Life: Are you saying then that Christians today should view encounters or confrontations in the area of politics, the military or science as opportunities for God to work through them, and that they must be empowered by the Holy Spirit to meet them?

Grose: Yes. I see the need for Christians to rise to the cause. The world is talking about violence. Ralph Nader talks about the violence of pollution, the violence of auto safety. Yet as Christians we often appear to be reciting nursery rhymes. I think that what we need to do is to consider that we are in a warfare, as Ephesians 6 indicates. And when we see a confrontation coming even though it might not be as consequential as the one I got involved in here, I believe we must ask God to give us an anointing of the Holy Spirit to confront the forces of evil. . . . Not simply to withstand their attack, but to attack them. And if I sound excited, I guess I am.

Christian Life: Will this change the nature or program of the church as we know it today?

Grose: I believe the time has come for both individual Christians and the church to step out from the comfortable role of acceptance by American society. We should move out into the mainstream of life in the dynamic, powerful and unquenchable fire of the Spirit of God. The day of effectiveness of the staid, comfortable church has passed. We are in the midst of conflict today. And this conflict is like the separation process through which metals go to be purified. I believe we as believers will be tested and tried, but as we allow ourselves to be filled by the Holy Spirit, as believers were in the book of Acts, God will enable us to do things that will even surprise us. Remember, David was alone when he met Goliath. Gideon started out with big numbers, but God cut him down to a few. It was less than a dozen men whom Jesus chose who rocked the world with their testimony. God appears

to deal with individuals or at least small groups of individuals. He is after quality rather than quantity.

Christian Life: Earlier in this interview you alluded to your own experience as a sort of "Scopes trial in reverse." In other words, you used the same argument against evolution, as the attorney Clarence Darrow did against creation 44 years ago. Do you think it's probable that Christians today can employ this same tactic, much as Jesus did when He defeated Satan in the wilderness at the time of His temptation? In other words, when Satan quoted Scripture inaccurately to Him, He retorted with correct Scripture which undercut Satan's argument altogether.

Grose: That's an interesting observation. Last year I visited 15 countries in Europe while I was teaching there. On the surface, it appeared wherever I went that the visible church was declining. Yet invariably in the countries where the church appeared to be the weakest on the surface, there I met small groups of believers who operated on sheer faith and were seeing astonishing miracles of God performed. In other words, those who are really in intimate contact with Jesus Christ are on the upswing. They are coming on, and I believe there is going to be a dramatic demonstration of the power of God in these last days. It is being felt right now by the rediscovery and widespread renewal of gifts of the Holy Spirit in the lives of believers. There is an analogy in jujitsu, wherein the Japanese take the strength and weight of the opponent and use it against him in the principle of leverage. I believe God is going to allow us to use all of Satan's weaponry right back against him.

Christian Life: Can you think of an example of how you used this technique in your presentation to the Board of Education?

Grose: Possibly. I said I was disturbed if educators were so insecure regarding the validity of the evolutionary theory that they were afraid to allow any other theory to be taught or to be compared with what they may have already decided to be a "fact."

Christian Life: There may be a scriptural parallel for this in the experience of Haman who was hanged on the very gallows he had erected for Mordecai. Or as the Psalmist says, "In the snare that he has set for another is his own foot taken." Is this what you mean?

Grose: Yes. As C. S. Lewis has put it, we who believe in Jesus Christ are little Christs. Just as Jesus "directly interfered in the affairs of men" by His coming to earth, so we believers today must continue to interfere with Satan's well-laid plans. (An effective example of carrying the offensive to the enemy is Pat Boone's new album, "Crisis America.") For two decades Billy Graham has been saying that "Christ is the answer." There may be all kinds of problems—war, poverty, pollution, prejudice, narcotics, over-population, etc.—but simmer them all down, and if each individual person involved in these problems would commit himself wholly to Jesus Christ, the larger problem would be completely solved.

1971 *ASA Annual Meeting*
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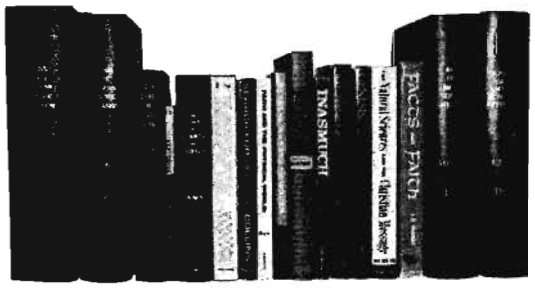
BOOK  REVIEWS

BIOLOGY: A SEARCH FOR ORDER IN COMPLEXITY. J. N. Moore and H. S. Slusher (eds.) Zondervan Publishing House, Grand Rapids, Michigan, 1970.

Biology: A Search for Order in Complexity is a high-school biology textbook produced by the Creation Research Society in an attempt to produce a book which will ". . . serve effectively in teaching the actual facts of biologic [*sic*] science and will also acknowledge the creation concept as the most acceptable underlying explanation of these facts".

This text is original and unique in that its presentation and interpretation of biological data is from a creationistic viewpoint. To our knowledge this represents the first attempt to produce a science textbook with Christian overtones which could be adopted by secondary schools. It can be positively stated that the text does raise significant questions which the evolutionists need to answer, but unfortunately, it has many shortcomings, as indicated in the following discussion.

The subject matter is divided into ten units which we will review systematically. The first unit is a commendable approach to the scientific method and its application, but the word "theory" is defined unconventionally as a "conceptual theme" which usually "includes some imagined unit or aspect, such as a gene, molecule, atom or electron. Thus, because of such imagined aspects, *no theory can be tested directly.*"

Units 2 and 3 are devoted to laying a chemical foundation for the subsequent study of biology. They are organized in quite an uninteresting and traditional manner. The conciseness of text and overuse of chemical structure make it doubtful that any real understanding of biology at the molecular level would be achieved. This, however, is a problem of any biology textbook. The book does have a serious shortcoming when compared to others,[1] for it practically neglects modern biology and the molecular and cellular experimental concepts that have currently captured the interest of many practicing biologists. Chapter 6 confirms this by using token diagrams and discussions of the cell, chromosome replication and the DNA-RNA-protein synthesis story. There is also a noticeable absence of any cellular electron micrographs or discussions of critical topics such as cancer research, tissue culture, drugs and chromosomes, nuclear transplantation, etc. There is a supplement on the "chemical basis of gene action," but there is no unifying conceptual diagram on how DNA, RNA, etc., are really involved in the cell's life history.

The chapter on genetics contains adequate diagrams, pictures, and discussion of Mendelian genetics and eugenics. It appears that the importance of mutation and selection to current evolutionary theory is deemphasized, by the omission of examples and mechanisms of genetic change that could be beneficial to an organism and the role of environment as a selecting factor.[2] In line with this, a point made several times in the text is: that all mutations are harmful since an overall decrease in viability of the organism is experienced. This of course is true, but without appropriate amplification, may tend to leave the reader misinformed concerning the real mechanism of natural selection and its genetic basis.[3-6] One example statement, representative of several made in this section is: "Data show that human cells have less total DNA content than cells of some so-called 'primitive' organisms. This contradicts the idea that all heritable factors are spelled out in the genetic code." This is misleading since most informed biologists recognize redundancy of genetic material and attach no phylogenetic significance to it whatsoever.

The chapter on development has several attractive diagrams and pictures on classical embryology, but is severely lacking in its presentation and discussion of the now-important experimental field.

The problems of classification of organisms are quite well outlined in Unit 4 which includes a rather lengthy biography of Linnaeus. We feel that it would have also been instructional to include a section on current concepts of what data should be used in taxonomic positioning.[7]

The text lacks overall integration, is classical and out-of-date in terms of information presented in several sections as well as many bibliographical and chapter references, and is heavily biased in many areas, leaving the reader with a confused picture of biology.

"Small Plants and Little Animals" are covered in Unit 5 which points out some of the groups' taxonomic problems. Discussion of microorganism control, importance of algae, and the supplement on malaria add to the unit's relevance and timeliness.

Unit 6 on animal life is weak. There does not seem to be any unifying criterion for discussion of the invertebrate phyla in their arrangement in the text (i.e., Arthropoda, Annelida, Platyhelminthes, Nematoda, Porifera, Mollusca). This appears to defeat the stated purpose and title of the book as a "Search for Order in Complexity." Annelida lacks the designation of phylum when discussed, and is not illustrated in any way. There is a need for diagrams to show an overall design in the animal kingdom and to help clarify some of the life cycles (e.g., parasitic flatworms and nematodes).

Chapter 14 ends with a well-written supplement on *Peripatis,* explaining in some depth its similarities to the annelids and the arthropods. This is one of the commonly proposed "links" between two different phyla, yet the only comment is that it is a "very strange creature."[8]

The discussion of *Archaeopteryx* is quite misleading. Diagrams of this fossil and skeletons of a modern bird and reptile should have been presented so that the students could see for themselves the similarities and dissimilarities. They are quite fair in their discussion of the Coelacanth and in its evolutionary importance. We also found the snake-bite section in chapter 15 interesting and relevant—all-important qualities when writing for high school students.

There are many interesting and relevant paragraphs in Unit 7 on the biology of man, such as eye defects, vitamins, drugs and behavior; still, the discussion of hormones and their importance is far too simplistic (even for high school). Due to the lack of adequate diagrams and discussion of hormonal relationships and general reproductive processes, the entire section on reproduction appears to be irrelevant to the age group for which it is intended.

We believe Unit 8 on Plant Life to be the most outstanding of the text, in terms of organization, illustrations and objectivity, and there is sufficient detail to interest the more advanced students. Captions for all illustrations and photographs are consistent with the text, and attempt to explain what the reader is seeing (a problem in other units.).

Unit 9, dealing with Geology and Evolution, contains several interesting arguments which favor the creationistic point of view. The chapters contain several unique interpretations of the scientific evidences mentioned. For instance, the text states that the fossil layers were probably ". . . laid down by the flood in Noah's time. As the flood waters rose, less complex forms, being less able to escape, would be buried first. More complex and more mobile forms could move to higher ground."[9] Another example is a photograph of a tiny horse which the caption, "These midget horses never get much taller than 17 inches. Are scientists justified in placing horse skeleton findings of various sizes in an evolutionary time sequence?"[10] We believe that the point being made is that size alone is not sufficient criterion for the phylogenetic arrangement of horses. We question whether a modern horse with one toe should be used as an example when the discussion pertains to multiple-toed fossil horses. However, the text does indicate that the evidence for the horse series is difficult to ascertain.

It may be instructive to note that one of the more effective discussions of evolutionary problems in terms of scientific writing was a supplement, "Comparative Study of Fossil and Living Vascular Plants," located in Unit 8 on plants.

Chapter 22 states that biochemical inconsistencies do exist, thus defying phylogenic relationships. It should be noted that current research in computerized sequence analysis of biological molecules appears to reinforce established phylogenetic systems.[11] The text does indicate, however, the future importance of these new research methods for classification.

Several valid arguments were given in this unit to refute various evidences for evolution. For example, anatomical and embryological similarities of organisms could be evidences for a common creator as easily as for a common ancestor. The weaknesses of using so-called "vestigial organs" as evolutionary evidence was clearly pointed out. There was also a reasonably good argument on the "problems of establishing a new trait" such as the vertebrate eye.

Other Books Received and Available for Review

(Please contact the Book Review Editor if you would like to review one of these books.)

David Bakan, *Disease, Pain and Sacrifice: Toward a Psychology of Suffering,* U. Chicago (1958.

R. W. Burhoe (ed.), *Science and Human Values in the Twenty-First Century,* Westminster Press (1971.

W. E. Lammerts, *Why Not Creation,* Baker (1970).

D. O. Moberg (ed.), *International Directory of Religious Information Systems,* Marquette Univ. (1971).

P. A. Zimmerman, *Rock Strata and the Bible Record,* Concordia (1970).

C. F. Henry (ed.), *Christian Faith and Modern Theology,* Baker (Paperback Reprint), 1964-1971.

In Chapter 24, "Problems for Evolutionists," the text maintains that "some organisms are still in existence today that by all 'rules' of evolution should have been either extinct or evolved into something else long ago." We are not familiar with these "rules of evolution" and would indicate that many fossil forms probably extend into present-day distribution because they live in a stable environment or unchanging ecological niche, e.g., marine protozoa, etc. It is also stated that "one obvious difficulty is that any mechanistic theory of the origin of life violates the law of biogenesis" (life begets life). This is true if one assumes that past conditions were similar to those of the present. Other problems appropriately examined in the text are the absence of fossil or living transitions between invertebrates and vertebrates, and the uniqueness of man.

The unit is terminated with the reassertion that an explanation of first causes is outside the realm of science, and that evolution and special creation are mutually exclusive theories of origins. If this is so, it would also have been instructive to have a chapter in this unit on "Problems of Creationists."

It is disappointing that the subject of ecology and conservation (Unit 10) which is of such great importance in the thinking of young minds today is relegated to the end of the text (also true of other textbooks). The information presented is classical, with no mention of actual data or experiments (old or new) on food webs, pyramids, pollution, population dynamics, etc. The terminology used in the discussion of interrelationships (e.g., antagonistic and reciprocal nutritive conjunctive symbiosis) is cumbersome, not in common useage, and would tend to confuse the reader when other texts are consulted.[12] The magnitude of man's effect on the environment and his responsibility to it are practically ignored.

Technically, we found the illustrations in the text to be excellent artwork with only two exceptions;[13] however, we judged nearly one-fourth of the more than 350 photographic reproductions to be either too small, dark, out of focus, or poorly captioned. The table of contents is hopelessly long; yet it is similar to those of the previously-cited texts.[1] We must mention the antiquity of the bibliographies which precede each unit, and would recommend lists of up-to-date suggested readings at the close of the chapters, to which the interested student could refer for expanded information.

In conclusion, we believe that the text lacks overall integration (a fault of many edited texts), is classical and out-of-date in terms of information presented in

several sections as well as many bibliographical and chapter references, and is heavily biased in many areas, leaving the reader with a confused picture of biology. We are left asking the questions: Is a textbook built around negating supposed evolutionary evidences going to be effective in 1) communication of biological science as it now stands, 2) teaching a student to think analytically and experimentally on his own, 3) giving him an effective current base of knowledge and understanding, and 4) guiding him in his consideration of Christian truth?

We agree with the authors that most modern biology texts are not honestly approaching the question of origins by presenting only evolutionary theory, and feel that the book is a step in the right direction in its attempt to show two different views.

It is unfortunate that neither the philosophy of evolution nor creation is defined at the beginning of the text, and that they are never clearly defined. Since the text often refers to what creationists believe about specific topics, it would have been instructional to quote chapter one of Genesis, and list the various ways in which different "creationists" interpret this scripture. For in reading this text, one can only conclude that all biologists either believe that creation is true and no aspect of evolution is true, or they are atheists and believe that the process of evolution can account for all life forms, past or present.

It should be stated to the book's merit that it is a first edition and that a time of evaluation (i.e, second edition) may correct many of the difficulties mentioned in this review. We agree with the authors that most modern biology texts are not honestly approaching the question of origins by presenting only evolutionary theory, and feel that the book is a step in the right direction in its attempt to show two different views. We believe, however, that what is needed in our educational establishment is a biology textbook which will present unbiased facts about the evidences pertaining to origins along with several possible interpretations of those facts.

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[8]Text, p. 245.

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[11]Text, p. 426; see M. O. Dayoff, 1969, "Atlas of Protein Sequence and Structure," National Biochemical Research Foundation.

[12]C. P. Read, 1970, *Parasitism and Symbiology,* Ronald; Weisz, P. B., 1966, *The Science of Zoology,* McGraw-Hill.

[13]Text, pp. 230, 271.

Reviewed by L. C. Eddington, Department of Zoology, University of California at Los Angeles; R. R. Payne, Department of Biological Sciences, University of California at Santa Barbara; and P. H. Kuld, La Mirada, California.

WHERE ARE WE HEADED? ***A Biologist Talks About Origins, Evolution, and the Future,*** by Jan Lever. Wm. B. Eerdmans (1970) 54 pp.

This very brief book, which can be read in little more than an hour's time, is composed of nine short talks on the general subject of the Bible and science by the Professor of Zoology at the Free University of Amsterdam presented at the invitation of the Netherlands Christian Broadcasting Society. It has been beautifully translated into English from the original Dutch by Walter Lagerwey.

The principal thesis of the book can be seen by examining the introduction to the fourth chapter.

> In the preceding chapters an attempt was made to show what confusion resulted because Christians for so long failed to understand that the writers of the Bible accepted as a matter of course the picture of reality prevalent in their time. It was stated emphatically that the acceptance of the data and insights of the natural sciences, and thus of the present scientific picture of reality, is no more than an extension of the general acceptance of the fact that the earth is a sphere and revolves around the sun. Next, these conclusions were focused on the creation account in Genesis 1. We should not regard this story as an interesting account of historical events, but rather as a confession about God, who is the creator of all things in this earthly reality, and who therefore determines their being, their nature, their place, their meaning, and thus also their history. Moreover, it became evident, I trust, that in listening to the message—revelation—in this manner, nothing of the first chapter of Genesis is lost. On the contrary, the message can now be experienced in faith without the old tension between science and the Bible, since it clearly is valid for all times and is no longer obscured by conflicts between changing pictures of reality.

The author is convinced that the Bible is not "concerned with scientific knowledge," and any attempt to read such scientific insights into the text can only do damage to the message of the Bible. Our forefathers were able to combine their description of the natural world with their literal acceptance of the Bible record, but this has not been possible in fact for any of us who no longer believe the earth to be flat, or who no longer believe that the sun revolves around the earth. Modern scientific insight into the age of the earth, the history of organisms, and the dying of organisms, makes it necessary for us to "give up the picture of reality held by the writers of the Bible." But this is no loss, Lever argues, but rather gain; for now "the fact is that we can understand its message all the better."

Lever is a thorough-going evolutionist, and when he reaches topics of this area in later chapters on the origin of life, the origin of man, consciousness, the dominion of man, and the answer, he becomes rhapsodic a la Teilhard de Chardin.

> For those who believe that God is the creator of this entire earthly reality, the process of evolution described by the natural sciences in the present-day picture of reality becomes a grand manifestation of God's intentions and activities.

Or again,

> The more our knowledge of the reality about us increases, the more clearly we understand that we are living in a world that is caught up in an all-embracing process of evolution.

Having sketched the evolutionary process according to currently held theory, Lever goes on to emphasize the change in evolution which occurred with the emergence of man. "Now it was no longer a biological development, but rather the unfolding of latent potentialities in man of a wholly different kind." His evolutionary faith is evident as he writes,

> We are living in the midst of a transition to an entirely new period, in which man will know and control in a very detailed and fundamental manner the functioning of matter, the inanimate environment on the earth, and in part even outside of it, of living creatures, and of himself. Increasingly, man holds in his hands the future development of this earthly reality.

Much, if not all, of what Lever proposes can be accepted as a *possibility* by this reviewer. What is most troublesome, however, is the dogmatic assurance with which Lever states what can only be an article of faith at this time. A few examples will illustrate this tendency to overclaim:

> The only conclusion to which we can come is that quite obviously these chapters (Genesis 1 and 2) do not aim to give a report of events that took place then and there.
>
> We have seen that the writers of the Bible . . . expressed their divinely inspired view of this earthly reality in words and notions that were strongly influenced by the prescientific picture of reality of their time. We have also ascertained that this picture of reality has proved to be wrong on nearly every point.
>
> I know that the central thrust of this answer is right, simply because I believe in it.

When we finally do come to The Answer with Lever, the presentation falls somewhat short of what an evangelical Christian might hope for as the climax of such a discussion. Eighty percent of this final chapter deals with the development of the thesis that man's inhumanity to man can be traced back to his animal origin. The gospel of our Lord Jesus Christ is upheld as relevant, but in context apparently primarily as a guide as to how to live in order to be contributors to the ongoing strides of evolution. Does the author mean more than this? Does he believe that the restoration of the individual to fellowship with God through faith in the atoning sacrifice of Christ is the essential first step to social progress? Perhaps, but one cannot tell. This uncertainty is heightened by the closing words of the book,

> When you gaze at the stars some dark night, the stars that are so infinitely far away, and think back to all the generations that have lived on this earth since life first moved in the oceans billions of years ago and realize that all of this reality rests in the creative hands of God, and you worry and wonder about the conditions in the world today, and in your own short life, and ask again and again *Where are we headed?* then there is, I believe, but one answer.

THE BIBLE, NATURAL SCIENCE, AND EVOLUTION by Russell W. Mattman, Reformed Fellowship, Inc., Box 7383, Grand Rapids, Michigan (1970). Paperback, 165 pp. $3.50.

Dr. Maatman is a devout Christian, committed to defend the integrity of the Bible. He believes that the nature of man is at stake in debates on evolution. He rejects the hypotheses that life emerged from inanimate matter, that evolution produced plants and animals from the simplest forms of life, and that man evolved from animals. He offers no quarter, affirming from the start that he is not presenting *a* Christian position, but rather *the* Christian position, *the* Biblical position.

The reading of this book by Dr. Maatman, who is Professor of Chemistry and Chairman of the Division of Natural Science at Dordt College, is simultaneously stimulating, frustrating and disturbing. It is stimulating because Maatman shows clearly that he has thought long and deeply about many problems related to the interaction of science and Christian faith, and he shares these insights with his readers. It is frustrating because the readability of the book is reduced through the frequent use of a quasi-logical, multi-hypothetical, face-all-the-possibilties approach intended, one imagines, to emphasize the objective thrust of his arguments. It is disturbing because one sees the author strained to the breaking point, offering personal and cultural preference as absolute truth in the attempt to keep one foot firmly planted in the anti-scientific biblicism of Protestant Fundamentalism, while at the same time he fights free of many of the fallacies of this position and plants his other foot firmly in his own vital Christian experiences as a modern scientist.

First let us consider some of the cases in which Maatman comes through clearly for a relationship with science based on understanding and integrity. Among his contributions are the following: (a) we need not seriously consider hoaxes or conspiracies as a factor in modern science; (b) the marvelousness of creation is not proportional to the brevity of the period required to accomplish it; (c) the Bible nowhere teaches that Adam's sin brought death into the natural world except for man; (d) in those large areas where scientists agree, it is not fruitful to doubt the essential correctness of their science; or again "Wherever there is broad agreement within a well-developed discipline, such as astronomy, there is virtual certainty that the conclusions agreed upon are correct (p. 103);" (e) supporters of the apparent age theory of creation are inconsistent to argue that the scientific evidences for great age are faulty; (f) Bible believers must accept the principles of uniformitarianism; (g) it is unreasonable to argue that age determinations are in error by factors of thousands because of non-uniformity in natural law with time; (h) age considerations can be carried out independent of those dating methods that might be affected by some kind of catastrophism; (i) "vitalism" is not a viable option for the description of life; (j) the modern idea of evolution is not to be equated with the historical notions of "spontaneous generation;" (k) in the course of God's creative activity, it is possible that some things were derived from pre-existing things; (l) the Bible does not tell whether the appearance of the first life was instantaneously created or whether or not life arose from nothing; (m) the question of starting materials for the creation of the simplest life or of new "kinds" is quite unimportant; (n) arguments levelled against evolution by use of the Second Law of Thermodynamics are invalid; and (o) the discussion of evolution can more profitably be made by discussing the scientific question before the philosophical questions.

The first seven chapters set the foundation upon which the specific discussion of evolution, as a kind of case history, is based in the next seven chapters. One of the key conclusions of these early chapters is that "man has no means of finding a contradiction in the Bible (p. 23)." Maatman argues that any means by which a man could judge an error in the Bible would itself be raised to a level equal to or greater than the Bible; such a possibility is denied by the basic presupposition that "Christian theology cannot depend ultimately upon man (p. 23)." The argument is reminiscent of Anselm's classic argument for the existence of God, and probably suffers from some of the same difficulties. The correspondence can be made as follows:

> The Bible, being the Word of God, is a book than which a more perfect book cannot be conceived. Suppose that imperfection is found in the Bible. In order to find imperfection in something we must of necessity have something more perfect. Then that by which we judge the Bible imperfect must be more perfect than that book, than which a more perfect book cannot be conceived. This is impossible. It follows that no imperfection can be found in the Bible. (*The reviewer is responsible for this proof; Dr. Maatman should not be blamed.*)

As an example of the application of this line of argument, Maatman considers the "three-story universe" (see also *Journal ASA* 21, 18 (1969)) implied in Genesis 1 and such passages as Philippians 2:10. First he concludes that if Moses and Paul really believed in a three-story universe, we would have no way to declare this belief of theirs tangential to the Biblical content until the necessary extra-Biblical evidence were available. He prefers to argue that such verses never did indicate the author was thinking of a three-story universe, and if early readers got that impression, they were mistaken. What science could show was that the readers of the Bible couldn't understand it, not that the authors of the Bible didn't present a scientifically accurate picture of the universe.

Maatman's dilemma in this, and many other instances throughout the book, is his narrow and generally simplistic view of Biblical hermeneutics. Like the proverbial bull-in-a-china-shop he thrashes about determined to preserve the integrity of the Bible, using a sledge-hammer where a gentle and informed hand is required. Upon occasion, as in the case just cited above, he realizes that the correct interpretation of the Bible poses some problems, but his general approach is that what the Bible has to say can be known with certainty by simple inspection of the text without the intervention of any other influence. What he does not realize is that in almost every case of conflict, the resolution is produced by his own personal extra-Biblical position carrying the day. Sometimes his approach leads to humorous results, as when Maatman discusses the meaning of "day" in Genesis 1.

> The Bible is indeed to be taken literally, but the literal meaning of a passage is sometimes difficult to obtain. Understanding "day" in Genesis 1 is not easy, even though the word is to be taken literally. (p. 88)

Not only does Maatman argue that it is impossible for man to discover an error in the Bible by extra-Biblical evidence, he maintains further that "No words of the Bible are to be taken as symbolic, or as non-symbolic, just because extra-Biblical information seems to demand it (p. 135)." Furthermore, even if a man wishes an answer to a scientific question, he must consult the Bible before making any other inquiry, for "if this is not done, and one uses another source first, he might sin by contradicting what God states in the Bible (p. 75)." The possibility that it is not the purpose of the Bible to supply scientific mechanisms through revelaton is condemned as "a clear example of putting the mind of man, as he decides what the Bible teaches, above the Bible (p. 76)." Even "whether or not man can ultimately understand a Biblical passage is not a criterion that may be used in interpreting any passage of the Bible (p. 80)."

This position fails because it does not properly discriminate the categories involved in the interaction of science and the Bible. It is *never* a choice between "believing science" or "believing the Bible;" it is *always* a choice between believing science and believing someone's interpretation of the Bible. The Bible as the completely authoritative and reliable special revelation of God is in the same category as the natural world, the reliable created revelation of God. If we are to exhort someone directly to "believe the Bible," we must also be willing to exhort him directly to "believe the natural world." One is no more possible or meaningful than the other. In both cases the data must pass through a system of interpretation. The system of interpretation of God's natural revelation, we call science; the system of interpretation of God's special revelation, we call theology. Maatman equates *his* theology with the revelation of the Bible. It is as inappropriate to demand for our theology the authority we give only to the Bible, as it is for us to demand for our science the authority we give only to physical reality. Let it be clear that our disagreement with Maatman does not concern the authority or the reliability of the Bible in conveying God's revelation to us, but rather that it concerns the authority or reliability of Maatman's theology and the methods he has used to develop it.

Maatman does not appear to realize that it is not possible for him to develop his theology without bringing extra-Biblical influences into action. When Maatman decides what is or is not symbolic, what is or is not understandable in the Bible, he is exercising a fallible rationality conditioned and shaped by his training, personality, culture and world perspective. He is not to be condemned for *this;* none of us can do anything else. But where he does lead us astray is in contending that he is *not* doing this. An examination of the exegesis set forth by Maatman on several controversial points shows clearly the kind of extra-Biblical criteria which affect his judgment. The solution can be found only in as careful a study of the foundations of Biblical hermeneutics as has been invested in scientific hermeneutics.

In arguing that the interpretation of the word "day" in Genesis 1 cannot be made by considering the opinions of the original readers of that book as normative, Maatman states, "Neither present-day science nor the ideas that the Israelites had may be normative in determining the meaning which God intended as he inspired Moses to write 'day' (p. 95)." On the following page, however, he is concerned to argue that death did occur prior to Adam's Fall; he does this by citing the fact that Adam and Eve are said to have *eaten* before the Fall. But why must eating in the perfect Garden involve death? Maatman replies,

> The eating which was allowed caused the death of fruit cells and bacteria in the digestive tract. There is

> no reason to suppose that Adam's eating differed from our own. Since the Bible speaks of those who live after Adam's fall, it should be assumed that the Bible means 'eating' in the sense that post-fall man understands this term. Why should deep mystery be ascribed to eating? (p. 96)

In the same context he argues that meat-eating animals shows that death occurred before Adam's sin.

> Eating meat would of course cause death. There are many animals that were created with claws and large, sharp teeth, giving them the ability to kill other animals and tear flesh for eating. One would hardly expect claws and fangs to be used on vegetation alone. It is a peculiar view of death which distinguishes between the death of plants and the death of animals. (p. 97)

How do we know that eating in the Garden meant death? How do we know that animals as created had claws and large, sharp teeth? How do we know that such animals lived by killing one another in the perfect Garden? The only answer that we can draw from the above exegesis is that it seems reasonable to Maatman. The reasonablenss of the interpretation, guided by its relationship to his whole system, enables him to make difficult decisions which he denies others have the right to make on similar extra-Biblical grounds.

Maatman's interpretation of Genesis 1 never takes into account the *purpose* of the author as being anything else than conveying factual information. He assumes without support or discussion that the six creation days of Genesis 1 are chronological days. By his own criteria, such a passage as Exodus 20:8-11 should constrain him to accept the seven days as literal solar days of 24 hours each; he is able to avoid this (scientifically objectionable) conclusion, however, by arguing that God's rest on the seventh day (from the work of creation) has lasted for all time.

Although Maatman admits that the term "kind" in Genesis 1 "cannot be defined accurately," he is nevertheless able to conclude in spite of this that there can be no doubt but that " 'creeping things' did not by any series of evolutionary changes produce 'cattle' (p. 134)." He is also certain that these passages teach "that unlimited change, from 'kind' to 'kind', is not possible (pp. 134,135)." How are such conclusions possible?

Maatman is prompt to emphasize that there is absolutely no problem in determining whether or not Genesis 2:7 is to be taken symbolically. "The passage which contains Genesis 2:7 is virtually labeled, 'This passage is not symbolic.' (p. 153)." Such a dogmatic affirmation is offered about a passage that occurs in the middle of a context including a tree of life, a tree of the knowledge of good and evil, and a talking serpent—a picture of the past cast into the same language as the great heavenly picture of the future described in the closing chapters of Revelation, and generally conceded by all to be symbolic!

A concept much mentioned but little defined in Maatmen's discussions is the concept of miracle. Now a miracle is generally agreed to have at least two characteristics: (a) it must either appear to violate the laws of nature as they are currently known, or it must appear as an extremely improbable coincidence of diverse elements; and (b) it must have a deeper significance than simply being a rare and unusual event for the persons involved, i.e., it must have deep religious, ordinarily redemptive, significance. In general, Maatman ignores the second of these characteristics completely, and equates a miracle with any highly improbable occurrence which did nevertheless occur. Thus he implies that the purpose of miracles is to show the power of God and neglects any interpretation in terms of God's redemptive activity. At no point does he define what he means by "miracle," and in one place brushes aside the whole question by asserting " 'miraculous' to mean just what it usually means when it is used in connection with Biblical miracles (p. 128)." If Maatman had indeed done this, he would have recognized the redemptive content portrayed by most Biblical miracles and hence would not have entered into a long and tortuous attempt to show that the natural man really accepts a miracle when he accepts the highly improbable natural development of life and human spirit by an evolutionary process. If God brought life into being through natural processes, our wonder and awe at the accomplishment is by no means diminished; we are guilty of inexactness, however, if we continue to speak of the process as a miracle. Maatman also misunderstands the nature of the problem when he attributes the rejection of miracles by natural man wholly to their improbability; it is not their improbability that causes the basic trouble, but the necessity to admit their divine origin, an admission that can be withheld as long as one does not think too deeply about the foundations of the natural world.

In treating "theistic evolutionism," Maatman discusses three aspects of this position. He states that theistic evolutionists (a) emphasize that man's body and not his soul evolved from animals, (b) maintain that the word "dust" refers to an animal, and (c) maintain that God added a soul to a previously existing animal body. Now I cannot say that *some* theistic evolutionists may not hold these views, but it can certainly be affirmed that theistic evolutionists *need not* hold these views. A much more defensible and consistent position is to view the creation of man from "dust" as a statement of the whole process of evolution from inanimate matter through to man, and to view the creative activity of God in producing man's soul as a continuous evolutionary process that took place concurrently with the evolutionary development of man's body, for the simple reason that body and soul are intimately and inextricably related.

A word of protest should also be lodged against the common practice of emphasizing that if evolution is true, then Christian faith is false, or of pointing with alarm at the inevitable connection between acceptance of biological evolution and such political excesses as Naziism, racism and Marxism. The scientific question of evolution is far from settled, but the evidence sits somewhat heavily at the moment in its favor. It hardly seems a wise tactic to argue for the rest of the world that they cannot accept the Christian faith, and that they must accept one of a variety of inhumane philosophies. A much more positive approach is to see what possibilities there are for seeing evolution within the context of Biblical faith, so that excesses derived from misapplications of evolutionary ideas may be counteracted.

This has been a critical review. Let me close on a positive note by quoting a passage by Maatman from the end of Chapter 10, with which we can all agree.

> God teaches that animals and plants reproduce after their kinds. It is one thing if this promise of continuity

> has been demonstrated for a period of thousands of years. It is quite another matter if the continuity has existed for hundreds of millions of years. Perhaps this picture of the universe is a picture so magnificent that we are moved even more than before to prase our creator God. (pp. 113, 114)

(*This review was also published in the* Reformed Journal. *For a reply by Dr. Maatman, see p. 157 of this issue.*)

SCIENCE AND CHRISTIAN FAITH by William H. Davis, Biblical Research Press, Abilene, Texas (1968) Paperback, 96 pp. $1.00.

This little study guide is part of an adult series called the Way of Life, edited by J. D. Thomas. It features a discussion of the major issues relating science and the Christian faith by Dr. William H. Davis, Ph.D. in philosophy from Rice University in 1965 and Assistant Professor of philosophy at Auburn University. Thirteen lessons set forth a rational and evangelical exposition of the subject, and each chapter is provided with several questions to further stimulate discussion. The two chapters devoted to Science and Evolution emphasize in a moderate way some of the difficulties with the General Theory: origin of complex organs, origin of complex instincts, phenomenon of metamorphosis, absence of transitional forms of life, exact mechanism of evolution. Unfortunately the author offers no balance by way of positive evidence for evolution, and even more unfortunately no discussion at all of the theological relevance of evolution for the Christian. The series in the Way of Life contains thirteen other titles.

WE BELIEVE IN CREATION by Charles C. Ryrie, Word of Life Fellowship, Inc., Orange, N.J. (1967) Pamphlet. 28 pp. 0.15.

Almost every classic error in the debate on creation and/or evolution is repeated in this presentation with the imprimatur of modern evangelical authority. Acceptance of the Biblical creation account is set in opposition to acceptance of the theory of evolution as a valid scientific approach to the question of the origins of life and man. An incredible statement accompanies the discussion of alternatives to the theory of evolution:

> A fourth possibility is to accept the Bible fully and plainly with the necessary consequence of rejecting evolution. This alternative would involve accepting the detailed facts of Genesis and it would require discovering basic fallacies in the tenets of evolution *in order to have an intelligent basis for rejecting them.* (Italics mine).

Quotations from standard or pseudo-scientific texts are interspersed without discrimination with quotations from the *Saturday Evening Post* or from an unnamed "medical doctor," who thought that Neanderthal men might be ordinary men with rickets.

In a final discussion on the time of creation, Dr. Ryrie rejects the Ussher chronology, but feels that verses 1 and 2 of Genesis 1 leave room for "an indeterminably long period of time." He argues that the results of the flood must be taken seriously as essential to the total picture of creation, and supports the notion that "apparent age" is to be expected from a *fiat* creation process and cannot be taken as indicative of "true age."

We also believe in creation. We fervently wish that creation could be upheld firmly by all Christians without such negative and ultimately self-destructive tactics.

BIBLICAL COSMOLOGY AND MODERN SCIENCE by Henry M. Morris, Craig Press, Nutley, New Jersey (1970) Paperback, 146 pp. $2.50.

MODERN SCIENCE AND CHRISTIAN LIFE by Stanley D. Beck, Augsburg Publishing House, Minneapolis, Minnesota (1970) Paperback. 157 pp. $2.95.

These two books represent about as great a difference as one could expect to find between two Christian analyses of the relationship between modern science and the Christian faith. Dr. Henry M. Morris, hydraulic engineer and zealous conservative Christian, has long since chosen to reject a large portion of modern science in order to defend what he considers to be the only permissible interpretation of the Bible. Dr. Stanley D. Beck, Professor of Entomology at the University of Wisconsin, eagerly embraces what he considers to be the perceptive insights gained through modern science. Of the opening chapters of Genesis, Morris states

> If these first eleven chapters are not historical, then our entire Biblical foundation has been removed.

On his part, Beck says,

> To interpret this writing as a source of factual scientific information rather than a powerful statement of religious faith is to greatly underestimate its true significance.

It is no surprise, therefore, when Morris flatly rejects evolution, and Beck considers the evolutionary process to have been established "beyond reasonable doubt."

In his book, Morris continues to pour old wine into old wineskins, and once again runs the risk of leading astray that group of devout Christians who look to him as the voice of modern science. What he offers is an almost unbelievable manual of pseudo-scientific esoterica. Flatly rejecting the modern stance of several of the major sciences, with the words

> Thus the Biblical cosmologist finally must recognize that the geological ages can have had no true objective existence at all, if the Bible is true. There must therefore, be some better explanation for the geological strata and the fossils which they contain.

Morris goes on to offer his "better explanation:" (1) the *fiat* creation of the world in six literal days a few thousand years ago; (2) a universal flood as the cause of all geological or paleontological evidence that indicates an aged earth, with sedimentation rates in turbulent fluids as the mechanism for the observed distribution of fossils among the strata ("no geologic difficulties, real or imagined, can be allowed to take precedence over the clear statements and necessary inferences of Scripture"); (3) the occurrence of miracles during the present age of uniformity in nature through the intervention of mighty angels who control and modify natural processes and who may well dwell in the stars; (4) a pre-tribulation-rapture pre-millennial return of the Lord and the creation of the 1400-mile-on-a-side new Jerusalem as the dwelling place of the saints ("this still leaves over one-sixth of a cubic mile for the estate and mansion of each of the four billion people dwelling there").

It is Beck's purpose to "seek a common ground or basis of reconciliation" between modern science and Christian life. He feels the modern conflicts arising out of man's new ability to do for himself many things that previously could be and had to be left in the hands of God. He argues that science can lead to a better life in the future only if it is coupled to and guided by a religious concern and understanding more powerful and effective than anything demonstrated in the past. He emphasizes that

> Within the past seventy years we have come to realize that science does not lead to the ultimate human understanding; there are other legitimate pathways to real knowledge.

Beck argues that former notions of a sharp difference between living and non-living systems cannot be maintained, nor can notions of a sharp difference between man and the rest of the natural world. "Human evolution has been demonstrated beyond reasonable doubt," but "the meaning, purpose, and joy of living cannot be explained in terms of DNA."

Carried away with the presentation of a particular perspective, Beck seems to drift at times into statements not obviously reconcilable with evangelical or Biblical Christian faith. Marvelling at the wonder of life in a universe of law, he says

> Our world is not a vale of tears and sorrows through which we strive to pass unstained by evil, that we may enter an ultimate world to come.

He tends at times to speak as though man's sin were only "the pull of his biological heritage." And he indicates that he would probably hold a mythological view of such concepts as resurrection, ascension and the second coming, as well as feel that atonement and redemption are "abstract theological concepts." He advocates a "Christian humanism" without always showing clearly why it should be called "Christian."

If Beck's book shows such signs of not fully appreciating the depth of the Christian message, his book is still to be recommended over that of Morris for the average reader as far as the stated subject is concerned. Beck does present by and large a reliable and accurate picture of the relationship between modern science and Christian faith. If Beck's theology must be taken *cum grano salis*, Morris' science must be taken *cum monte salis*.

Reviewed by Richard H. Bube, Professor of Materials Science and Electrical Engineering, Stanford University, Stanford, California 94305.

Reply to Book Review of *The Bible, Natural Science and Evolution*

(*See page* 153 *of this issue.*)

Two things about Dr. Bube's review I like. He does say some nice things. And I do wish I could turn a phrase as well as Dr. Bube does. It isn't everyone who can produce polysyllabic punches like "quasi-logical, multi-hypothetical, face-all-the-possibilities."

Time after time Bube does not reflect accurately what I said. It is not practical to quote my book as much as I would like in refutation of what he says. I do, however, want to discuss four questions in connection with the review.

1. It would be very easy to discredit what I wrote if I implied (as Bube suggests I imply) that we must *choose between* "believing science" and "believing the Bible". In fact, I put heavy emphasis in the book on the idea that conflict between the Bible and science, both perfectly understood, is impossible. Our understanding is not perfect, and so the situation is just as Bube says it is: We must work with someone's interpretation of the Bible and (he seems to say) someone's interpretation of scientific data.

We cannot leave the matter at that point, as if we can never know anything. In my book I discussed specific cases. I believe that each case that arises should be discussed on its own merits, and that with each case we should examine both the Bible and science. (Of course, we are not to hold off all conclusions until all the evidence is in—at the end of time—and we are to understand the context of questions being asked in understanding the approach I suggest. Furthermore, we might in the future have a better interpretation of the Bible and scientific data. Such a possibility can hardly be a reason for saying *nothing* at the present time.) Such an approach is probably seen by Christians as the correct approach. Yet the method of examining both the Bible and science is not used enough. Instead, we see over and over in the present discussion of this question an argument that runs something as follows: "Modern scientific results have proved that [insert here: "the earth is not flat", "the three-story universe does not exist", "devils cannot possess a person", or another similar statement], and yet the Bible states that [insert here: "the earth is flat", "the universe consists of three stories", "devils can possess a person", etc.] Therefore, the Bible cannot be used in scientific questions. We must conclude that the Bible speaks to us only about our faith, and not about our science."

In such an argument there is no serious attempt to examine both the Bible and science. Instead, real or supposed scientific conclusions are used to limit what the Bible can tell us. In my book it is suggested

that there are answers to the argument given in the previous paragraph. It can be shown that the Bible cannot state that the earth is flat or that the universe is three-storied. It can be shown that modern scientific results cannot preclude the possibility that devils did indeed possess certain persons. My disagreement is with those who wish to discard either parts of the Bible by using science, or parts of science by using the Bible. (For some reason, no one has yet answered my rather detailed discussion of the three-story universe question.) We ought to discuss these matters, and we ought in all seriousness and good faith to go forward in an effort to see the Bible in the light of science and science in the light of the Bible, with the belief that both are ultimately infallible and without error.

2. Bube attempts to make quite a point out of the (correct) idea that Biblical miracles have redemptive significance. He suggests that it is therefore incorrect to speak of miracles in connection with events some of us believe took place instead of the evolutionary process. In a sense he is correct. But what term should one use if he wants to discuss the concepts of creation-from-nothing and the instantaneous production of a living thing thing from something different? Surely "miracle" best approximates what is meant.

3. Bube implies that I admit "kind" is not an accurate term, but that I conclude the term is definite enough to preclude the possibility of evolution of one kind from another. He gives only part of the story and thereby changes the sense of what was said. I said, "*Perhaps, given only our present knowledge,* 'kind' cannot be defined accurately." (p. 134) (I have for the present purpose italicized the words not quoted by Bube.) The limitation concerning "kind" is only on our *present* knowledge. The quoted sentence occurs in a discussion in which it was shown that "kind" *was* a definite, a precise, concept for Noah and for the Israelites. This is part of the argument used to show that kind-to-kind evolution did not occur. Suppose someone read Bube's review but not the book. Would he understand that in the book I offered Biblical proofs that "kind" was once a precise concept?

4. Bube may, of course, define theistic evolution in his own way. But surely he is aware of the many discussions over the years concerning whether or not the "dust" of Gen. 2:7 was organic (which means "living" to many people) or "inorganic". The question in these discussions would not arise in quite the same way if theistic evolutionists generally identified, as Bube suggests, "dust" with the matter from which life evolved through the various stages. In any event, the question of what theistic evolutionists mean by "dust" is not essential to my argument.

It seems to me that Bube stumbles in one important place. One thing in particular he ought to explain. He says man's soul is produced "as a continuous evolutionary process." It would not be difficult to prove from Bube's writings that he considers man, but not the animal precursers of man he thinks existed, to be the bearer of the image of God. Man can sin; animals cannot. In holding to this position, Bube seems to believe that man is qualitatively different from animals. Assuming that we are to use the words "continuous" and "qualitatively different" in a precise fashion, I would like to know how a *qualitative* change can take place by a *continuous* process, a process which must be—if words mean anything—a process involving only a series of *quantitative* changes.*

In this connection, Bube too easily discounts the interpretation I gave to Gen. 2:7, describing the creation of man. He discounts my interpretation because of other elements in the passage, such as the account of the talking serpent. In Numbers 22-24 we are told how the Israelites were saved on the plains of Moab. Are we to take the story as symbolic because in the story there is a talking donkey?

Theistic evolutionists have the same problem here that they have with the idea of the instantaneous creation of animals from non-living matter. They are certain such a creation cannot be the kind of creation referred to in Genesis 1, even though such a rapid transformation is described in Exodus 4 as Moses' rod became a serpent. With both the talking serpent and the creation of animals it seems better to the theistic evolutionists to put the first chapters of Genesis in a category different from the rest of the Bible.

Dr. Bube and I know each other quite well, and we have discussed many of these matters face to face. I am sure he has enjoyed these discussions as much as I have. And so I shall be thinking not only of what he has said in personal discussions, but also of what he has written. I am afraid that I shall keep thinking of the terrifying bull-in-a-china-shop which Bube describes. The reader of Bube's review will note that his bull (which he discusses after he is finished with Anselm) is much more dangerous than the usual kind of bull. His bull, as he describes it, not only thrashes about; it also wields a sledge hammer.**

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**Transformation of water to steam by continuous increase of temperature? RHB.*

***We all get carried away. Forget the sledge hammer. RHB.*

Evidence for Evolution from the Fossil Record

(For background on this exchange of comments by Cuffey and Moore, see Journal ASA 22, 82 (1970) *and* 23, 38 (1971). *Watch for the Moore-Cuffey Dialogue on "Scientific Evidence For and Against Evolution" to be published next year in the* Journal ASA.)

The general acceptance of the idea of organic evolution by the scientific comunity today rests upon evidence derived principally from the fossil record. The evidence which has been of primary importance in this regard consists of sequences of transitional fossils, found in the rocks of the earth's crust, between earlier simpler forms of life and later more complex forms of life. These transitional fossils have been found between different organic groups, some at relatively low taxonomic levels (such as species) and others at relatively high taxonomic levels (such as classes).

Many examples of evolution at lower taxonomic levels can be cited. For example, as one examines successively younger populations of tabuliporid bryozoans in the late Paleozoic rocks of the North American Midcontinent, he finds that the animals change gradually and continuously from forms which are clearly the species *Tabulipora ramosa,* through intermediates, to forms which are clearly the species *Tabulipora carbonaria.* (University of Kansas Paleontological Contributions, Bryozoa, Article 1, 1967.) Other examples include brachiopod lineages (described by Boucot and

Johnson), graptolite lineages (described by Berry). lineages among the cribrimorph bryozoans (described by Lang), lines among the echinoid *Micraster* species (noted in several elementary textbooks), lineages among the plectogyrid foraminifers (described by Zeller), and lineages among Eocene gastropods of the Texas coast (also described in elementary textbooks).

Because there are far fewer higher-level taxa than lower-level ones, the number of transitions which we can study is much more limited; however—particularly among the vertebrates—several good examples exist. First, note the large number of synapsid reptile forms which bridge the gap between typical reptiles and typical mammals over a long period from the Permian into the Triassic (described by Romer in his vertebrate paleontology textbook). Also, note that the fossil *Archaeopteryx* sits squarely on the dividing line between the class Reptilia and the class Aves (birds), as is shown by its morphology being a complete mixture of traits which are still typically reptilian, others intermediate, and still others being already typically avian, as again Romer's text points out.

The evidence from the fossil record is to be found in several sources. A number of elementary textbooks are available—such as those by Weller, Easton, Jones, and Beerbower. Advanced texts and references are also readily available in most university libraries; books such as those by Romer, Moore Lalicker and Ficher, Shrock and Twenhofel, and the *Treatise on Invertebrate Paleontology* are examples. In addition, the ongoing research projects of actively working paleontologists are reported in several journals, of which the most widely circulated are the *Journal of Paleontology, Palaeontology,* and *Micropaleontology.* These journals are also found in most major university libraries. I would urge and encourage anyone interested in questions concerning evolution and the scientific evidence for it to examine the articles in these journals particularly; he will be impressed, I believe, with the great weight of evidence favoring the conclusion that evolution has indeed been God's means of creation.

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Reply by Moore

May I comment on each paragraph of the preceding letter by Professor Roger Cuffey?

In paragraph 1, Cuffey does *not* point out that the "evidence derived from the fossil record" (and as well the points about comparative morphology, geographical distribution, rudimentary-vestigial-organs, developmental anatomy, and blood or protein analyses), are *purely circumstantial,* as far as primary importance to acceptance of the idea of organic evolution is concerned. Not one of these groups of data afford any scientist one iota of empirical evidences of the change of one animal type into another animal type (which is the necessary degree of change required or involved in the amoeba—or molecules—to man thesis that truly subsums the theory of organic evolution). Not one of these groups of data can be used to establish any genetic connections (these alone are subject to empirical test) between or across phyla lines or basic types (i.e., bats, snails, roses, or birds per Ernst Mayr, 1963, *Animal Species and Evolution,* p. 588).

In paragraph 2, when Cuffey refers to "many examples of evolution at lower taxonomic levels," he commits a basic confusion of terminology because the changes in *Tabulipora* mentioned are *nothing more than* speciation or variational changes *within* limits of the type organism called *Tabulipora,* and *not* evolution in the degree of major changes in phylogeny. This is true of *all* the other types of organisms (brachiopod, graptolite, cribimorph bryozoan, echinoid *Micraster,* etc.) mentioned. These organisms can properly be said to have *varied within* limits of type, but *not* to have evolved, or changed into another type of organism which is necessarily the degree of change involved in the "idea of organic evolution".

With regard to higher taxonomic levels mentioned in paragraph 3, interpretations of the synapsid forms depend completely upon *imagined* transitions of skeletal remains. It is very difficult to tell a reptile from a mammal from the skeleton *alone,* but *all* ideas of transitional forms are *imagined.* Some writers mention the "gray area" of transition. Yet, no researcher has ever demonstrated a *genetic* connection, and thus all imagined transitions are the results of *post ergo propter hoc* reasoning. Concerning *Archaeopteryx* (paragraph 3), in not a single case of the four supposed independent evolutions of the ability to fly (insects, birds, bats, pterasaurs or flying reptiles) are any intermediate forms found in the fossil record—no transitional forms going back to non-flying forms are available. (See E. C. Olson, 1965, *The Evolution of Life,* Mentor Book MT 648, pp. 180-182.)

Summation: The point that needs to be emphasized is that minor changes can and do occur in living organisms, but the changes are always within bounds of a certain type, form, or kind. This is in exact agreement with the pattern we read about in Genesis 1: "after their kind", "after his kind". All of the known evidences can be fitted into the Genesis account in great consistency with all the best scholarship. The theory of natural selection relates to supposed "means" whereby the presumed "ends" of evolutionary change of one form or kind into another kind supposedly occurred. (Note that leaders of evolutionary thought offer *natural selection* as the supposed *means* in contrast to the last sentence of paragraph 4.) It is intellectually desirable to avoid mixture of means and ends. On the basis of the most rigorous scholarship the conclusion is inescapable that *no* transitional forms of true *genetic* relationship or connection can be established in the fossil record; hence, evidences from the fossil record can better be fitted into the Genesis account.

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Disagrees with Cuffey

In the *Journal ASA* September 1970, are several valuable articles that were written by honest scholars with differing and conflicting conclusions. Some of these different views can be the result of chosen preferred evidences that leave out the unwanted; while other views may be more inclusive and more valuable. It is helpful to compare them. I am glad this issue of the *Journal ASA* contains a good assortment of these differing and opposing views. Otherwise my opinion of the basic purpose of the American Scientific

Affiliation at the present time would be restricted to the label "Clever Propaganda by Theistic Evolutionists."

The article on "The Dying of the Giants", written by William A Springstead, and the accompanying "Critique" by Roger J. Cuffey show the need for more information by both writers; especially by the geologist who said "I think it needs to be pointed out there is no physical or geomorphologic evidence for a world-wide deluge," (page 96). Dr. Cuffey would not make a statement like that if he had read my concluding article of a new series of four, whose titles are: *"Our Moon Was a Hot and Brilliant Midget Sun," "The Earth Enjoyed an Ideal Climate," "Our Moon's Extinction and the Great Dinosaur Disaster," "The Earth Is Another Asteroid Battered Planet."*

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(Mr. Butler was kind enough to include a copy of his last-mentioned article. Dr. Cuffey's reply follows.)

Reply by Cuffey

Remarking upon my critique, Butler suggests that I chose favorable and ignored unfavorable evidences; however, he proceeds throughout his paper to do just that, continually and grossly. For example, he completely ignores the tremendous quantities (literally mountains) of geological material which clearly indicate that the building of mountain systems like the Appalachians and Rockies occupied very long periods of time, and thus could not have been the result of one or two pulses of up-heaving as a side effect of asteroid impact. Also, Butler (like so many others with his ideas) does not realize that the early geologists too thought that mountain-building was a rapid violent process, but that the continued accumulation of evidence (evidence which was undeniable and could be observed by anyone regardless of their religious orientations) forced abandonment of such ideas—for *scientific*, not philosophical, reasons—by about 1840.

Butler states that there "is now good evidence" for believing that all the various kinds of fossil organisms were living simultaneously on the earth right up until a recent catastrophic deluge. Nothing could be farther from the truth; unpleasant though it may be for some to contemplate, my impression is that it is as certain as any scientific conclusion can ever be that the overall picture of different forms of life at different times in the past history of the earth is essentially correct as the modern historical geologists have portrayed it. Again, historically, it has been verifiable observations of phenomena in nature, rather than potentially debatable religio-philosophical considerations, which have undergirded our certainty concerning this conclusion.

Like so many, Butler too fails to realize that, had a world-wide deluge actually occurred, it would have left unmistakable signs. For example, in desert regions, soils develop which are extremely sensitive to alterations in the moisture content of their environment over time. Such soils record minor events like small variations in the annual rainfall of some regions through time, but nothing like a major submergence in recent times. Similarily, many terrestrial regions exhibit various deposits (such as loess) which would be extremely susceptible to disturbance by even a tranquil submergence, let alone a violent flood. It is highly noteworthy that features of such deposits do not suggest such disturbances. The biogeographic distribution of fossil spores and pollen, as well as of other types of organisms, also shows none of the effects which would be expected from a universal deluge. (Advocates of "Flood Geology" sometimes attribute to a single flood formation of the entire stratigraphic sequence, rather than merely the last formed or uppermost layers; but, doing so is not legitimate, for the reasons already noted above in discussing mountain-building. Moreover, historically, *scientific* evidence forced the early geologists to abandon this idea too as more was learned about the earth.)

Still another point betraying the pseudo-scientific character of Butler's paper is a complete lack of understanding of the vast amount of evidence which shows that ice sheets waxed and waned several times during the last million years of earth history. In undisturbed deposits in which the order of deposition can be clearly determined without any possibility of doubt, we find that as time passed, as the ice sheet grew and approached the locality of study more closely, warmer-weather plants and animals gradually disappeared and are replaced first by cool-temperate, then sub-polar, and finally polar-climate species. The same sequence is repeated in reverse above the glacial till deposit, reflecting the receding off into the distance of the ice front.

Butler tries to set up an artificial conflict between geologists on the one hand and astronomers on the other, suggesting perhaps that as someone dealing with astronomical events, he can explain geological phenomena better than can all geologists. Having myself received training as an astronomer as well as a geologist, I know that much professional interchange goes on between these two disciplines. Moreover, it seems to me that Butler's use of astronomical data is as suspect as is his geological reasoning.

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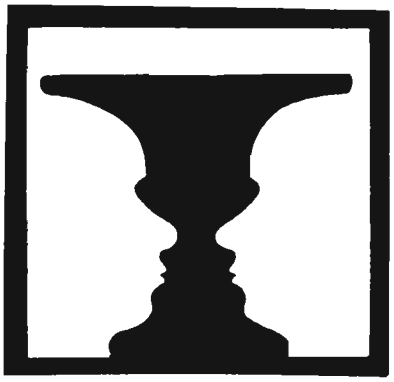

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