

Creation Research Society Quarterly

Haec credimus:

For in six days the Lord made heaven and earth, the sea, and
all that in them is and rested on the seventh. — Exodus 20:11

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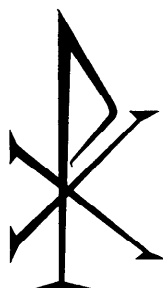
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ERRATA

In Table 2 of the Dr. W. E. Lammerts Letter to the Editor (p. 76, *C. R. S. Quarterly*, June, 1975), the last line should read:

10 1024 1,048,576

with regard to number of character differences, number of heterozygous individuals, and population size, respectively.

Also, in the first line of the left column, above Table 1 in the Lammerts letter, the number 23 should be substituted for 24, and the last line in Table 1 should read:

23 8,388,608

These changes were entered in page 75 of the Second Edition (1960) of the Curt Stern book mentioned in Reference No. 3, which was actually published first in 1949. Further, in lines just below Table 2, the number 24 should be changed to 23, and 16,777,216 changed to 8,388,608. (Reduction in the proper number of chromosomes for human beings from 48 to 46 came as the result of work on lung tissue by Tjio and Levan in Sweden, reported in 1956 in *Hereditas*, 42; and due to work on germ cells by Ford and Hamerton in England, reported in 1956 in *Nature*, 178. — Editor)

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COVER ILLUSTRATION

The cover of this issue, to be a little different from our usual nature pictures, shows impressions of the seven days of Creation, or rather six of Creation and one of rest, prepared by M. Ben Uri for the Natania Synagogue, Israel. The order, of course, is from right to left. For some more about these pictures, and other work by the artist, see page 83 of this issue of the *Quarterly*. — Editor

NEW BOOK ANNOUNCEMENT

Craig Press is planning to release a new book, *Speak to the Earth* (Creation Studies in Geoscience) in September, 1975. This is a symposium of 26 creation geology essays selected by former Editor George F. Howe from the *C. R. S. Quarterly* issued June, 1969 through March, 1974.

These essays are grouped under the following headings: "Paleontology and Origins," "Research in Catastrophism," "Geological Evidence for a Recent Creation," "Astronomy and Origins," and "Thermodynamics and Creationism." The essays are quite readable, heavily illustrated, and contain powerful and convincing evidence in the key area of scientific apologetics with regard to geology.

Retail price is \$12.50 and purchases may be made from The Presbyterian and Reformed Publishing Co., Box 185, Nutley, N. J.

INTEREST IN CREATION WEEK AND IN THE FLOOD IN ISRAEL

M. BEN URI*

The cover picture for this issue shows pictures of windows, illustrating impressions of the Creation week, prepared for the Natania Synagogue, Israel. They illustrate the seven days, from right to left. The captions, which have been enlarged here, are the appropriate parts from Genesis, Chapters 1 and 2.

The captions are, in order: "Let there be light"; "Let there be a firmament"; "Let the earth sprout"; "Let there be lights"; "Let the waters swarm"; "Let us make man"; and "and on the seventh day He rested." ("Let the earth sprout," and "Let the waters swarm" are probably the most nearly literal translations of the respective parts.)

I have also been interested in the Ark, and have made a model according to my interpretation. The model has been in the Maritime Museum at Haifa, and is shown in Figure 1.

*M. Ben Uri is an architect and artist at the Studio for Synagogal Arts, Kiriath Shmuel, Haifa, Israel.

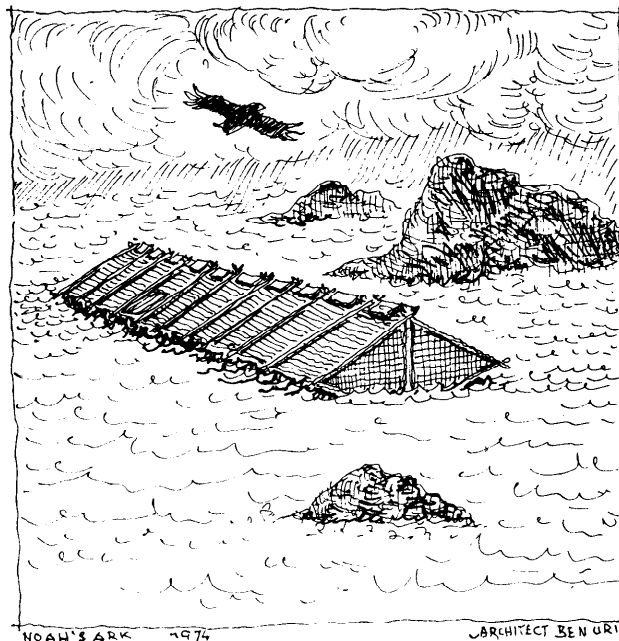


Figure 1. Model of Noah's ark.

CALL FOR ARTICLES

The special theme of the Annual Issue of the *C. R. S. Quarterly* in June 1976 will be "Creationist Thinking in 1976." This is a broad topic, and may include new evidence for Creation, new solutions to problems in Creationism, and ways in which the admission of Creation may simplify problems in various

branches of science.

Authors are asked to send articles intended for the issue of June 1976 to the Editor by early January 1976 at the latest.

Also, pictures for front covers of the *Quarterly* issues are needed.

REPOSITORIES FOR THE *C. R. S. QUARTERLY*

The following Christian colleges have been designated Repositories for the *C. R. S. Quarterly*:

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Complete series of the *C. R. S. Quarterly* will be kept in the libraries of these colleges, and may be obtained by inter-library loan, or, of course, consulted in the libraries of the above mentioned institutions.

THREE C.R.S. DIRECTORS RECEIVE HONORARY DEGREES

Readers of the *Quarterly* may be interested to learn that three members of the Board of Directors of the Creation Research Society were awarded honorary degrees at convocations held in the spring of 1975. Clifford L. Burdick received the degree Doctor of Science from Milton College, Milton, Wisconsin; Wilbert Rusch, Sr., the degree Doctor of Laws from Concordia Seminary, St. Louis, Missouri; and Harold Slusher the degree Doctor of Science from Indiana Christian University, Indianapolis, Indiana.

EVOLUTION, SCIENCE AND RELIGION

GLEN W. WOLFROM*

There are those who object to the mention, in school, of Creation as a possible origin of the world and living things on it. Usually the objection is on the grounds that, while an account according to the evolutionary theory is scientific, to mention Creation is to teach religion. The author shows that any such objection is not well founded. In the first place, no account of origins can be really scientific; for origins cannot be observed, repeated, or subjected to experiment. Moreover, evolutionary theory, as commonly presented, becomes in fact a religion. The only fair thing, in considering origins, is to present both possibilities for comparison. Moreover, it is pedagogically advantageous to do so.

Introduction

A large, and sometimes vociferous, part of the scientific community rejects the teaching of special creation¹ on the grounds that such teaching is not scientific. Those who adopt this position are quick to add that because creation is based on faith and religious beliefs, it has no place in science classrooms or textbooks. For example, concerning the recent California textbook controversy, the American Association for the Advancement of Science (AAAS) passed the following resolution:

The various accounts of creation that are part of the religious heritage of many peoples are not scientific statements or theories. They are statements that one may choose to believe, but if he does, this is a matter of faith, because such statements are not subject to study or verification by the procedures of science.²

Since this is the prevailing opinion of the established scientific and academic community, there will be great difficulty in obtaining a fair presentation of creation in textbooks and public school classrooms. Assuming that evolution³ is scientific while creation is not, a lawyer has recently written that there is no legal basis for teaching a religious theory of creation in the public schools.⁴ What course of action, then, remains for creationists?

The Scientific Case for Creation

As a first essential, creationists must stress the scientific rather than the religious aspects of the creation-evolution controversy. While the problem is basically spiritual in nature, one usually cannot obtain a hearing in secular scientific circles if he maintains a religious viewpoint. In addition, religious presentations in public schools have been severely curtailed by the courts. Therefore, in secular situations, it is essential to use a scientific approach. Three options may be followed.

Creation and evolution may be evaluated first by seeing how effectively known scientific facts may be correlated and explained by each; second, by comparing the potential for generation of accurate predictions; and third, the necessary basic assumptions of creation and evolution may be tested to see whether they are in agreement with known scientific facts. The efforts of hundreds of scientists in these areas have built a tremendous case in which the evidence over-

whelmingly favors creation. Such evidence is the basis for the statement that creation is more scientific than is evolution.

Science and the Scientific Method

Creationists must also be able to demonstrate that not only is the basic postulate of creation nonverifiable by the procedures of science, but evolution, too, is nonscientific, but dependent upon faith and therefore religious. To begin, the reader might consider what is scientific and what is not. The resolution by the AAAS quoted earlier implies that a subject is not scientific: (1) if it "is a matter of faith," and (2) it "is not subject to . . . verification by the procedures of science." In a recent college textbook, Weisz has stated:

*Anything to which the scientific method can be applied, now or in the future, is or will be science; anything to which the method cannot be applied is not science.*⁵ (Emphasis in original)

Thus, the AAAS and Weisz are agreed that, as Weisz has stated, the "scientific method defines the domain of science."⁵ If the scientific method is not applicable, it is plainly not scientific.

Weisz has offered a very clear yet comprehensive discussion⁶ of the scientific method which can be briefly outlined: The first step is OBSERVATION. Observations by the scientist, in addition to being correct and unbiased, must be *repeatable*. The second step is to define a PROBLEM, or ask questions about the observation. The questions asked or problem proposed must be relevant and testable. Thirdly, the scientist formulates a HYPOTHESIS; i.e., he guesses what the answer to the question or problem may be. In the fourth step, the scientist tests the validity of his hypothesis by EXPERIMENTATION, which is the means by which direct evidence is obtained. If really convincing, unquestionably reliable experimental evidence is available in support of a hypothesis, a THEORY is formulated. A theory, then, is a hypothesis for which corroboratory evidence has been obtained.

From the foregoing, the most appropriate points for this discussion are:

1. Observation
2. Repeatability
3. Testing by experimentation

These attributes are essential if a subject is to be termed scientific. Now these criteria may be applied to the subject of evolution.

Evolution Is Unscientific

The importance of proper observation in science is often stressed. Weisz wrote that "something that

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cannot be observed cannot be investigated by science.⁷ Simpson, a renowned evolutionist, has stated:

It is inherent in any acceptable definition of science that statements that cannot be checked by observation are not really *about* anything—or at the very least, they are not science.⁸ (Emphasis in the original).

With regard to the first criterion, observation, it is crucial to ask the following questions: Has evolution ever been observed? Has anyone ever observed the evolution of life from nonlife, a single cell into a multicellular organism, an invertebrate into a vertebrate, a fish into an amphibian, a reptile into a bird or an ape into a man? The answer to both questions is an emphatic NO! Dobzhansky, a world famous geneticist, admitted this when he wrote:

... the occurrence of the evolution of life in the history of the earth is established about as well as events *not witnessed by human observers* can be.⁹ (Emphasis added)

Not only has evolution never been noted by man throughout all of recorded history, but observation of the type of changes proposed by proponents of the general theory of evolution is clearly impossible. Therefore, by the definitions of science offered by Weisz and Simpson, it may be concluded that, since evolution is nonobservable, it is nonscientific.

Suppose, however, that someone were to argue that observations in science do not have to be direct; i.e., it is enough to observe the supposed effects or results of evolution. Granting for the moment that this may be a debatable point, the last two criteria can now be applied: Are evolutionary processes repeatable and amenable to experimentation? An event that is postulated to have occurred over millions or billions of years certainly cannot be repeated, nor can such a process be experimentally studied.

One cannot recreate the events which would have caused evolution to proceed in a certain direction, since such events are unknown. Neither is enough time available for the experimenter to effect the required changes. Dobzhansky has recognized the failure of evolution to meet criteria two and three:

These evolutionary happenings are unique, unrepeatable, and irreversible. It is as impossible to turn a land vertebrate into a fish as it is to effect the reverse transformation. The applicability of the experimental method to the study of such unique historical processes is severely restricted before all else by the time intervals involved, which far exceed the lifetime of any human experimenter. And yet it is just such impossibility that is demanded by antievolutionists when they ask for proofs of evolution . . .¹⁰

Thus, evolution also fails to meet the scientific standards of repeatability and experimentation. It should be noted that at the end of the last quote by Dobzhansky, he seemed to be irritated that antievolutionists dare to demand that evolutionists furnish repeatable experimental proof of evolution. Yet the evolutionists, as in the AAAS resolution, are equally bold in declaring that creation is "not subject to study or verification by the procedures of science" and therefore nonscientific.

Special creation also fails to meet the three criteria

outlined above. It is evident, therefore, from the preceding discussion, that not only is evolution nonscientific, but creation is no less scientific than is evolution. The reader should quickly be reminded, however, that as indicated previously, the creation and evolution models may be evaluated and compared using the known facts of science.

As an aside, something should be mentioned concerning the claims that evolution has been observed¹¹ and is thereby proven. What has actually been noted is limited variation and occasional speciation *within* the basic animal and plant kinds. Oft cited examples are: industrial melanism in Peppered Moths, bacterial resistance to antibiotics, and insect resistance to DDT. Evolutionists suppose that accumulation of such small (or micro-) changes would lead to large (or mega-) changes postulated in the general theory of evolution. However, to state that micro-changes, when accumulated, lead to mega-changes (e.g., evolution of fish into amphibia) is completely unjustified extrapolation since it has never been observed or experimentally demonstrated.

Creationists do not deny that micro-changes occur, but are correct in pointing out the scientifically verified fact that the Peppered Moths are *still* Peppered Moths, Staphylococci are *still* Staphylococci, and flies are *still* flies. Evolutionists are thoroughly misleading when they term micro-changes "evolution," especially since there is no experimental evidence to justify the notion that such minor changes are responsible for the types of broad changes postulated according to the general theory of evolution. Terms such as "adaptation," "genetic variation," and "gene frequency" would clearly be more appropriate and more descriptive.

Evolution Is a Poor Theory

Because evolution is nonscientific, it would be called, more accurately, a postulate rather than a theory. But, since the term "theory" has almost been universally applied to evolution, the question of whether or not evolution is a good theory will be examined next.

Popper, a widely recognized authority on the scientific method, has stated, "A theory which is not refutable by any conceivable event is nonscientific. Irrefutability is not a virtue of the theory (as people often think) but a vice."¹² This concept of the irrefutability or nonfalsifiability of a theory means that no experiments may be conceived by which results could be gained to disprove the theory. Any observations or experimental results may be "explained" by such a theory. Furthermore, everything is looked upon as verification of the theory.

Concerning the irrefutability of the theory of evolution, Eden wrote that no crucial experiment can be proposed to prove evolution either true or false.

This cannot be done in evolution, taking it in its broad sense . . . It can, indeed, explain anything. You may be ingenious or not in proposing a mechanism which looks plausible to human beings and mechanisms which are consistent with other mechanisms which you have discovered, but it is still an unfalsifiable theory.¹³

At the same symposium, Fentress offered an example of the evolutionists' ability to explain anything.¹⁴

He observed the behavior of two species of animals when an object overhead moved. One of the species was native to the woods while the habitat of the other was the open field. When he presented the results to some zoologists friends, he purposely reversed the data, asking why a species living in the field should freeze while the one native to the woods should flee. Even though they were explaining false data, Fentress related that their "evolutionary explanations" were quite impressive.

Popper has explained the need for a scientific theory to be refutable in this manner.

... as long as we cannot describe what a possible refutation of a theory would be like, that theory is outside empirical science.¹⁵

And biologists Birch and Ehrlich have commented further on the irrefutability of evolution.

Our theory of evolution has become . . . one which *cannot be refuted* by any possible observations. Every conceivable observation can be fitted into it. It is thus "*outside of empirical science*" but not necessarily false. *No one can think of ways to test it* . . . ¹⁶ (Emphasis added)

From the above discussion it is seen that because evolution is irrefutable or nonfalsifiable, it is a non-scientific theory which cannot be studied by experimental science. Special creation, we must admit, is also irrefutable and nonverifiable by the scientific method.

Although creation and evolution are both non-scientific, they may be thought of as **models**, each functioning as a conceptual framework which is used to explain and correlate known scientific facts and to make useful predictions. As such, creation and evolution may be compared as noted earlier viz., in terms of: (1) compatibility of basic assumptions with the facts of science; (2) effectiveness in correlating and explaining known scientific facts; and (3) potential for generation of accurate predictions. Not only is creation just as scientific as evolution, but when such comparisons are carried out, it is found that the creation model is superior in each case.

Evolution Is Religious

To demonstrate that evolution is a religion and that belief in evolution is an act of faith, let us first consider just what is meant by the word "religion." The usual connotation is that of the ritualistic worship of a divine being. It is evident that this is the meaning evolutionists are endeavoring to portray when they refer to creation as being religious. However, the study of the creation model does not involve any ritual, nor does it involve indoctrination with any particular set of religious beliefs and practices. And while the teaching of evolution also does not involve worship of God, it is the basis of the worship of man (i.e., humanism).

Furthermore, the current method of teaching evolution does involve indoctrination with beliefs and attitudes. A system of beliefs held to with ardor and faith constitutes, according to Webster's Dictionary,¹⁷ a religion. One may also be religiously devoted to a cause or belief if he accepts it by faith, holds it to be of ultimate importance and is zealous in his devotion. Other characteristics of religious beliefs are emotion-

alism and dogmatism. "Faith," an integral part of any religion, involves a belief or complete confidence in something for which there is no empirical or scientific proof.

If, on the other hand, evolutionists are implying that the source of creationist ideas is the Christian or Hebrew religious literature, it may be argued that the source of an idea is not important scientifically. What is important is how well the creation model is in agreement with the established facts and laws of science. In addition, it may be asserted that a truly unbiased examination of physical and biological phenomena would lead one to postulate special creation.

Also, the main idea of evolution was not postulated by means of modern scientific method. Davidheiser has shown¹⁸ that the history of evolutionary thought may be traced to the ancient Greek philosophers Empedocles and Aristotle.[†]

Macbeth, an agnostic lawyer, has recognized several attitudes in evolutionary thought which indicate that evolution itself has become a religion. Among these are missionary zeal, perfect faith and millenarianism.¹⁹ At this time, only the element of faith in evolution will be pursued.

Concerning the origin of life from inanimate matter, Wald has shown faith, not only in something for which there is no empirical proof, but also in something which he believes to be impossible in the realm of human experience!

One has only to contemplate the magnitude of this task to concede that the spontaneous generation of a living organism is *impossible*. Yet here we are—as a result, *I believe*, of spontaneous generation.²⁰ (Emphasis added)

Kerkut, an evolutionist, has cited two examples of faith exercised by evolutionists: first, concerning the origin of life, and second, the classic example of horse evolution.

It is a matter of faith on the part of the biologist that [a-] biogenesis did occur and he can choose whatever method of [a-] biogenesis happens to suit him personally; the evidence for what did happen is not available.²¹

At present, however, it is a matter of faith that the textbook pictures depicting horse evolution are true or that they are even the best representations of the truth that are available to us at the present time.²²

Many more examples of faith in evolution may be cited. Dogmatic assertions of the truth or factuality of evolution, which are often found in textbooks and popular literature, constitute statements of faith since, as shown in this paper, the postulate of the general theory of evolution cannot be verified by scientific methodology.

Lucas, who described himself as "not a convinced creationist," has pointed out in a letter to *Science* an example in which creationists have facts while evolutionists must resort to faith.

[†]Note, though, that Aristotle disagreed with Empedocles just where the latter was most Darwinian. See, e.g., Aristotle's *Physics*, Book II, Chapter 8; and *On the Parts of Animals*, Book I, Chapter 1 — Editor.

Creationists would predict that the fossil record will show the absence of transitional forms between each of the older, independently created forms. So far creationism fully agrees with the evidence, whereas evolutionists have to have faith in the original existence of the missing transitional forms.²³

Ehrlich and Holm have assessed the status of the theory of evolution in this manner:

Current faith in the theory is reminiscent of many other ideas which at one time were thought to be self-evidently true and supported by all available data . . .²⁴

And Matthews, in his recent introduction to Darwin's *Origin of Species*, has confirmed the faith of evolutionists by writing:

Most biologists accept it as though it were a proven fact, although this conviction rests upon circumstantial evidence; it forms a satisfactory faith on which to base our interpretation of nature.²⁵

In a rather remarkable admission, Fox, proponent of prebiotic evolution through protocoids, made this statement of faith in a recent scientific journal:

Finally, I respond to friendly inquiries about a "faith" that kept one investigator on this research trail through many long years. That faith was a deep conviction that no other process could have resulted in the tremendous array of varied and variegated organisms . . . The *article of faith* is that what is evolvable is solvable.²⁶ (Emphasis added)

Thus we see that faith is inherent in any acceptance of the general theory of evolution, indicating that evolution is just as religious as creation. Conklin has admitted that many biologists religiously adhere to the tenets of evolution.

The concept of organic evolution is very highly prized by biologists, for many of whom it is an object of genuinely religious devotion, because they regard it as a supreme integrative principle. This is probably why severe methodological criticism employed in other departments of biology has not yet been brought to bear on evolutionary speculation.²⁷

What, then, should be the status of evolution in the science classroom and textbook? Does evolution deserve to be elevated to a superior status in comparison to creation? Matthews has nicely summed up the situation.

Belief in the theory of evolution is thus exactly parallel to belief in special creation—both are concepts which believers know to be true but neither, up to the present, has been capable of proof.²⁸

Since both creation and evolution are unprovable and must be accepted by faith, Gish has pointed out that the ultimate question is "who has the best evidence for his faith, the creationist or the evolutionist?"²⁹ When one makes an honest effort to evaluate creation and evolution in light of known scientific facts (not theories, hypotheses, postulates and philosophies of men) it can be shown that the evidence is in favor of the case for special creation.

Summary and Conclusions

Evolution is unscientific for several reasons. First, it cannot be subjected to study by the scientific method because it cannot be observed, it is not repeatable (if it occurred at all), and it cannot be tested by experiment. Second, it fails the test of a good scientific theory because, considered as a theory, it is irrefutable, or nonfalsifiable, and can be used to "explain" any observation. For these same reasons, creation is also unscientific. However, creation is no less scientific than is evolution.

Evolution has been shown to be religious in nature. Characteristics of a religion which are evident from a study of evolution are dogmatism, faith, ardor or devotion to a set of attitudes or beliefs, and emotionalism. On the basis of similar characteristics, creation, too, is religious. Therefore, evolution is at least as religious as creation. Indeed, belief in certain aspects of the general theory of evolution requires more faith than to believe the Biblical account of origin.

Creation has been openly denounced as being religious. However, a comparative study of both the creation and evolution models does not involve an act of worship, nor does it involve indoctrination with a set of religious beliefs and practices. On the basis of recent court decisions, such practices as worship and indoctrination in public schools are held to be in violation of the separation of church and state. Clearly, a comparative study of the two models would be appropriate in public schools and not in violation of the doctrine of separation of church and state.

While the current methods of teaching evolution do not involve worship, the practice of teaching evolution exclusively does result in indoctrination of a particular system of beliefs and attitudes. This exclusiveness, together with dogmatism and faith, makes current evolutionary teaching vastly more religious in nature than would be the teaching of both creation and evolution. In addition, there are pedagogical advantages (not emphasized in this paper) to teaching competitive models.

The basis upon which the creation and evolution models may be compared scientifically has been repeatedly emphasized. This aspect of the problem is so vitally important that these approaches deserve to be mentioned once again. First, they may be evaluated by comparing effectiveness of correlation and explanation of known scientific facts. Secondly, they may be compared in terms of potential for generation of accurate predictions. And lastly, the basic assumptions of creation and evolution may be tested by seeing how well they are in agreement with known scientific facts. Thus, a study of both models would not only be appropriate but essential for science classes and textbooks.

The conflict, as presented here, is not between religion and science, but between evolution and science. Rather than pitting the "Bible story of creation" against evolution in the public schools, it is imperative for creationists to stress the scientific aspects of the controversy. Unless it can be shown that creation is at least as scientific and no more religious than is evolution, efforts to obtain the teaching of special

creation will likely be rejected as being nonscientific religious indoctrination.

If evolution is taught, special creation deserves to be taught as well. If creation is prohibited from the science classroom on religious grounds, then evolution, too, must be prohibited. There is no room for a double standard, particularly where "objective" science is concerned.

Acknowledgements

I would like to thank Dr. David Rodabaugh, Associate Professor of Mathematics at the University of Missouri, for his helpful suggestions in the preparation of this paper. In addition, I am grateful to Dr. Duane Gish, Associate Director of the Institute for Creation Research, whose efforts on behalf of creationism have identified many of the quotations used in this article.

Notes and References

- ¹Creation or special creation, when referred to as a theory, refers to the postulate that a few thousand years ago the universe, the solar system, the earth and all basic plant and animal types were brought into existence by special creative processes that are not operative today. Biological variation may be granted to have occurred since the original creation, but such variation has been restricted within the variational limits of each created kind.
- ²Resolutions of learned societies in the textbook controversy, *American Biology Teacher*, 35(1):35-36. 1973.
- ³Evolution refers to the general theory of evolution by which proponents postulate that the universe, the solar system, the earth and all forms of life have come into existence through slow, naturalistic, spontaneous processes similar to those processes which can be observed today. Evolution is claimed to have occurred over billions of years and to be continuing today. All living things are said to have arisen from a single source which itself arose from inanimate matter.
- ⁴LeClercq, F. S. 1974. The constitution and creationism, *American Biology Teacher*, 36(3):139-145.
- ⁵Weisz, P. B. 1965. Elements of biology. McGraw-Hill Book Company, New York, p. 8.
- ⁶*Ibid.*, pp. 4-8.

- ⁷*Ibid.*, p. 4.
- ⁸Simpson, G. G. 1964. The nonprevalence of humanoids, *Science*, 143(3608):769-775.
- ⁹Dobzhansky, T. 1958. Evolution at work, *Science*, 127(3306):1091-1098.
- ¹⁰Dobzhansky, T. 1957. On methods of evolutionary biology and anthropology, Part I. Boilogy, *American Scientist*, 45(12):381-392. See especially p. 388.
- ¹¹Ford, E. B. 1973. Evolution studied by observation and experiment (in) Readings in genetics and evolution, Oxford University Press, London.
- ¹²Popper, K. R. 1963. Conjectures and refutations. Routledge and Kegan Paul, London, p. 33.
- ¹³Eden, M. 1967. (in) Mathematical challenges to the neo-Darwinian interpretation of evolution, P. S. Moorhead and M. M. Kaplan, editors. Wistar Institute Press, Philadelphia, p. 71.
- ¹⁴Fentress, J. C. 1967. *Op cit.*, p. 71.
- ¹⁵Popper, K. R. 1963. Science: problems, aims, responsibilities, *Proceedings of the Federation of American Societies for Experimental Biology*, 22(4):961-972.
- ¹⁶Birch, L. C. and P. R. Ehrlich. 1967. Evolutionary history and population biology, *Nature*, 214(5086):349-352.
- ¹⁷Webster's seventh new collegiate dictionary. G. & C. Merriam Company, Springfield, Mass. 1969.
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HORSE BRAIN, COW BRAIN

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That the brain of the horse and the brain of the cow are basically similar is not surprising, but it may be surprising that the cerebral cortex of the two animals is so similar in detail, wrinkle for wrinkle (fissure for fissure). This is especially surprising from an "evolutionary" point of view since in the alleged ancestry between them there were smooth brains that had no fissures.

The ancestry of the ungulates (hoofed animals) is not even claimed to be clear to the evolutionists. Generally, evolutionists have held that both the Perissodactyla (including horses) and the Artiodactyla (including cattle) arose from ancestral forms called Condylarths, which had five toes, each capped with a small hoof.

However, Alfred Romer of Harvard believed that groups of hoofed animals "evolved" separately from a non-hoofed ancestry. This led him to make the statement that a cow is probably as closely related to a lion as to a horse.¹ William K. Gregory of Columbia University and the American Museum of Natural History followed Romer in this view, and wrote in his article on "Mammals" in the *Encyclopedia Britannica* of 1963, "The Condylarths or primitive ungulates . . .

are not regarded by modern authorities as ancestral either to Perissodactyla or Artiodactyla . . ."²

However, authors of articles in the *New Encyclopedia Britannica* (1974) return to the more usual concept of Condylarth ancestry for hoofed animals: (a) "The Artiodactyls can be traced back to a probable descent from a group of early generalized animals called Condylarths."³; (b) "The Perissodactyla appeared early in the Eocene. . . Together with most other ungulate mammals, they were probably derived from the Condylarthra."⁴

No matter what the "evolutionary" opinion of the origin of horses and cattle, the fossil creature called *Hyracotherium* (which now includes the former *Eohippus*) is included by all specialists between the modern horse (*Equus*) and cattle (*Bos*). Admittedly *Hyracotherium* had a smooth brain without fissures, as the following sampling of statements will attest.

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The brain was small and without convolutions. . . .⁵

Another most unhorselike characteristic of *Hyracotherium* was its brain. Studies of casts of the interiors of skulls (endocranial casts) have revealed that the cerebral hemispheres were small and smooth. . . .⁶

The brain was small and its structure was so primitive that it suggests the most primitive mammal brains, or even the brain of a reptile, more than it does that of living horses or other modern ungulates.⁷

Hyracotherium (including *Eohippus*) is firmly established in the "evolutionary" literature as an ancestral horse. Since the various species of this genus had smooth brains without convolutions—and as was presumably also the case in various other presumed missing links between horses and cattle—it is hardly to be expected that the highly developed brains of horses and cattle would have a striking similarity in the configuration of fissures on the cerebral hemispheres. But they do.

Sisson and Grossman⁸ diagram and/or describe a number of fissures given the same name in horses and cattle:

1. Lateral fissure, with three branches
2. Longitudinal fissure
3. Transverse fissure
4. Marginal fissure
5. Entomarginal fissure
6. Ectomarginal fissure
7. Calloso-marginal fissure
8. Presylvian fissure
9. Suprasylvian fissure
10. Rhinal fissure (called rhinal sulcus in the ox)

Three fissures labeled on a diagram of the ox brain and apparently showing but not labeled on a diagram of the horse brain are the callosal fissure, splenial fissure, and diagonal fissure.

Two fissures are labeled on a diagram of the horse brain, which is an aspect of the brain not diagrammed for the ox. They are the sublimbic fissure and the hippocampal fissure.

Another fissure which is described but not diagrammed for the ox and is not mentioned for the horse is the coronal fissure.

The impression given is that a more detailed description of the brains of the horse and ox would disclose an even greater similarity, with more fissures in common.

It would seem remarkable indeed if the horse and cow with such similar fissures on the surface of the cerebral hemispheres "evolved" from animals with smooth brains. Rather, their similarity is in perfect accord with design, according to one plan for this particular feature, by One Designer.

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FROM ADDISON'S ESSAY "ON ZEAL" IN *THE SPECTATOR*

(FOR "ATHEISM" READ "EVOLUTIONISM"—EDITOR)

. . . I cannot forbear mentioning a monstrous species of men, who one would not think had any existence . . . were they not to be met with . . . I mean, the zealots in atheism . . . infidelity is propagated with as much fierceness and contention, wrath and indignation, as if the safety of mankind depended upon it. There is something so ridiculous and perverse in this kind of zealots . . . they are perpetually teasing their friends to come over to them, although at the same time they allow that neither of them shall get anything by the bargain . . . the zeal of spreading atheism is, if possible, more absurd than atheism itself . . . they are likewise . . . possessed with the spirit of bigotry. They are wedded to opinions full of contradiction and impossibility, and at the same time look upon the smallest difficulty in an article of the faith as sufficient reason for rejecting it . . . I would fain ask . . . supposing all the great points of atheism . . . I say, supposing such a creed as this were formed . . . whether it would not require an infinitely greater measure of faith, than any set of articles which they so violently oppose . . .

THE CANOPY AND GENESIS 1:6-8

STANLEY V. UDD*

Genesis 1:6-8 is the primary source of information concerning the earth's early canopy. This portion of Scripture has been abused by proponents of the three-storied universe concept. Close scrutiny of that concept shows that the Biblical text cannot be cited as supporting such a theory.

The second day of creation speaks of the creation of the atmosphere, the location of the atmosphere, and the function of the atmosphere. The text also clearly and repeatedly indicates that the initial canopy was composed of water in the liquid state. Other passages such as 2 Peter 3:5-6 confirm the liquid nature of the canopy. This understanding also brings to life the figures used in describing the Noachic Flood.

The second day of creation (Genesis 1:6-8) is vital in the study of creationism and flood geology because it is the primary source of information concerning the "waters above the firmament." This portion of Scripture has been widely abused by proponents of the three-storied universe concept.¹ Such critics contend that the Genesis narrative reflects an early Hebrew understanding of cosmology in which the sky was over-arched by a ponderous, hemispheric bell called the "firmament." This supposed vault supported the "waters above the firmament" and was equipped with trap-doors through which rain might descend. From this imagined structure were then hung the sun, moon, and stars on the fourth day of creation.

Recently, this concept has been given a new place of prominence in pictorial form in Figure 1 in *The New American Bible*. Authors of two other recent translations use the word "vault" in Genesis 1:6-8. These are *The Jerusalem Bible* (1966) and *The New English Bible* (1970). The substitution of the word "vault" for "firmament" reflects the editor's opinion that the ancient Hebrew concept of the universe was that of a three-storied complex.

Septuagint Translation

The foundation stone upon which the three-storied universe concept rests is the definition of the word "firmament" (*rāqīʾ*). The notable Hebrew lexicon of Koehler and Baumgartner, for example, supplies this definition: "the beaten out (iron-) plate, firmament, the solid vault of heaven."² Support for this position is often sought in the Septuagint (LXX) translation. Almost uniformly,³ the LXX writers translated with some form of the word *stereōma*. While this word often means "firm, solid,"⁴ there is at least one occasion where it has the meaning of "sky, heaven." This latter usage is evident in the translation of Deuteronomy 33:26: "There is none like the God of Jeshurun, who rides the heavens to your help, and through the *skies* in His majesty." The Hebrew word for sky is translated in the LXX as *tou stereōmatos*.⁵

Now, in the case of Genesis 1:6-8, which nuance did the LXX translators intend to convey by the use of *stereōma*—the idea of a solid object or the idea conveyed by our word "sky"? The answer to this question is a matter of conjecture. The Septuagint, therefore, does not contain independent evidence which supports a solid dome concept.

Cognate Verb

As so frequently happens in Hebrew, the idea

conveyed by a particular noun can be elucidated by an examination of its cognate verb. The noun *rāqīʾ* is derived from the verb *rāqaʾ*,⁶ and this verb is used 11 times in the Massoretic text of the Hebrew Old Testament.

An examination of the usages of *rāqaʾ* will demonstrate that the main concept conveyed by the verb is "spread out, stamp, beat out."⁷ At times the action is a vigorous pounding (2 Samuel 22:43), or stamping (Ezekiel 6:11, 25:6).

At other times this verb is used to describe the more subdued hammering involved in the art of expanding and shaping precious metals (Exodus 39:3, Numbers 17:4 [English—16:39], Isaiah 40:19, and Jeremiah 10:9). The shaping of the ground and the overspreading of it with vegetation (Psalm 136:6; Isaiah 42:5, 44:24) is also an action describable by this verb. Finally, in Job 37:18 this verb is used to depict the action of expanding and spreading out delicate clouds.

This latter passage has been cited by Paul H. Seely as "dramatically establishing the solidity of the firmament."⁸ A proper understanding of Job 37:18, however, will demonstrate that such a conclusion is unwarranted. The verse is: "Can you, with Him, spread out the skies, strong as a molten mirror?" (Job 37:18)

In the first place the noun *rāqīʾ* is not employed in this verse. Instead Elihu used the verb *rāqaʾ* to describe an action and the action is one of spreading and extending. The noun receiving the action is a "(thin) cloud,"⁹ not the firmament. And surely the three-storied universe concept of the solid dome would not involve a dome constructed of fluffy clouds!

Secondly, the time element does not support Seely's conclusion. This verse is concerned with "present meteorological phenomena, not the activity of God in creation."¹⁰

Thirdly, Elihu's point of comparison was a molten bronze mirror. What do mirrors and clouds have in common? Solidity? Certainly not. Rather both are susceptible to spreading or expansion. The mirror image was not chosen because it was the most solid, impregnable object which Elihu could think of. Instead, it produced a mental concept of something expanded or continuous, something solid in the sense of unbroken.¹¹

A translation of Job in the Aramaic language has been discovered in Cave XI at Qumran. This document, called a targum, has been dated to the second century B.C.¹² While the text is fragmentary, it does contain pertinent segments of Job 37:18. This ancient translation includes an Aramaic word which means "to blow, to swell"¹³ and would certainly fortify an

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understanding of this verse such that the verbal idea of *rāqā'* means "to expand."

This brief examination of the verb upon which the noun translated "firmament" is built shows that the main concept conveyed is to expand or to spread out. The result of the action of this verb does not produce an object which is characteristically solid. Rather it uniformly describes an action in which the resultant product has the characteristic of "thinness or tenuity."¹⁴

It seems therefore in the best interest of exegesis to conclude that the noun should be understood as denoting something extended, expanded or spread out.¹⁵ This understanding is confirmed by Ezekiel's use of "firmament." This word is used five times (Ezekiel 1:22-26, 10:1), and the first occurrence is followed by an explanation of what the prophet Ezekiel intended by the use of this term. He did this by means of a comparison.

The "expanse was like the awesome gleam of crystal (1:22)." The comparative term¹⁶ employed in this verse is used four other times in this chapter (1:4, 7, 16, 27) and in each of these cases it is used to describe the "looks" of the glowing object or area. So Ezekiel understood "firmament" as a proper term for describing an expanse or area of brilliance.¹⁷

Genesis 1:6-8

It should be noted that the firmament in Genesis 1:6-8 is considered to be a substance. First of all, the firmament is referred to as the subject of God's creative activity. "And God said, 'Let there be a firmament.' And God created the firmament." Secondly, the firmament was given a task. "And let it separate the waters from the waters." And that task was completed. Finally, the firmament was given a name. "And God called the firmament heaven."

These three statements, taken together, would strongly suggest that the firmament ought to be viewed as a physical substance. The present day understanding conveyed by the word "atmosphere" is a concept capable of answering to the various functions described in these three verses. In the remainder of this article, therefore, the term "atmosphere," which describes an expanded area of material substance, will be used in place of the word "firmament." What are the details, then, which have been revealed concerning the creation of the atmosphere?

Statement of Creation

"And God created the atmosphere." (Genesis 1:7a) Some have contended that this verse does *not* refer to creation proper but rather to "a making visible."¹⁸ This interpretation is based upon a supposed distinction between the two Hebrew words *bara'* and *asah* (the latter being used in Genesis 1:7).

Under close scrutiny, however, this sharp distinction between these two verbs cannot be maintained. John C. Whitcomb has demonstrated some of the impossible exegesis which is achieved by a consistent application of this supposed distinction.¹⁹

It is better, therefore, to conclude that these close synonyms are actually "equivalent"²⁰ in this creation narrative. Genesis 1:7 contains, therefore, the mean-

ing that the *atmosphere* was created on the second day.²¹

Locus of Creation

Location of the creation of the atmosphere is given in Genesis 1:6. "And God said, 'Let there be an atmosphere in the midst of the waters.'" The waters mentioned here must be the same waters mentioned in Genesis 1:2. It is understood that these waters were in a liquid phase.

The Hebrew term translated "in the midst of" is a general term which often means "among (not necessarily of the actual middle)."²² The precise location of the creation of the atmosphere is not delineated in Genesis 1:6. There is no necessity for seeing the locus of creation as the medial plane of the terrestrial ocean. The only concept in verse 6 is that the creation of the atmosphere occurred somewhere within the liquid portion of that original ocean of water.

Initial Function of the Atmosphere

And further in verse 6: "And let it divide the waters from the waters." The function of the atmosphere, then, was to act as a divider between two bodies of water. The Hebrew text contains a preposition (*bēn*) which is generally left untranslated, but which indicates the relative positions of the atmosphere and the waters. The layering would be first water, then atmosphere, and finally water, with no intervening gaps. The atmosphere was to form an interface with the water at both extremities. This is also brought out very clearly in verse 7. "And God created the atmosphere and separated (divided) the waters which were below the atmosphere from the waters which were above the atmosphere; and it was so."

The author of Genesis must have anticipated that this concept would be difficult to grasp, for this is now the third clear statement in which the concept is presented that the atmosphere was encompassed with water. There is no difficulty in understanding what is meant by the expression "the waters which were below the atmosphere." It is obviously a reference to the global ocean which covered the surface of the young earth. However, there is no unanimity of interpretation of the next phrase.

"Waters Above the Atmosphere"

Certain writers have felt that the Biblical text in cosmological areas is "pre-scientific" and hence, "not capable of a systematic construction with reference to cosmology."²³ The present writer, however, is convinced that the Bible is historically and scientifically true.

It is also quite common to view the activity of the second creative day as a putting into operation "the physical laws that cause clouds and keep them suspended."²⁴ But proponents of this view do not properly interpret such words as "create," "atmosphere," and "above." What then does the phrase mean?

It is obvious, according to the text of Genesis, that God placed water above the atmosphere on the second day. Now was the water in the gaseous phase or is it possible that it was in the liquid phase? Due to

the subsequent destruction of this canopy at the time of the Flood, the Biblical text is the only source of information. And there are a number of Biblical indicators which point to a liquid canopy.

(1) *The use of the term "water"*

The word "water" is used in Genesis 1:7 with "no specific qualifications."²⁵ No understanding other than the liquid phase seems logical. A word is employed in the Hebrew Bible in other passages which is properly translated "vapor" or "rising mist,"²⁶ but such is not the case in Genesis 1:7. This fact is especially crucial because this is the point in time when this vaporization would have occurred, if indeed it ever occurred.

(2) *The use of the term "above"*

The upper water is clearly placed in a position distinct from the atmosphere. The term translated "above" is made up of two Hebrew prepositions meaning "from" and "upon."²⁷ "Above" is a good translation, but the meaning is more like "beyond it."²⁸ To see the canopy as "in the upper troposphere, below the stratosphere"²⁹ does not technically satisfy the language of Genesis 1:7.

In order to be *above* something, as opposed to being *in* something, there needs to be a line of demarcation, an interface like there is between the terrestrial ocean and the atmosphere. It is difficult to see how there can be such a clear distinction between two bodies, both in the gaseous state.

(3) *Psalms 148:4*

In a context praising the creative achievements of God, the psalmist spoke of "the water which was above the heaven." And in light of the fact that God named the atmosphere "heaven" in Genesis 1:8, this passage may be appealed to as evidence that the psalmist understood Genesis 1:6-8 as a reference to a liquid canopy.

Some might wonder whether this passage indicates that the psalmist considered that water might still have been above the atmosphere in his day. A glance at the Hebrew text shows clearly that apart from the creation context, no time indicator is present. Even the verb "was" is not in the Hebrew text and must be supplied only to complete the thought in the English translation.

According to Psalm 148:6: "He has also established them forever and ever; He has made a decree which will not pass away." Does this verse mean that the canopy, once it was established, could not be removed? No, it is simply a statement indicating that God not only created the items mentioned in verses 1-5, but he also established the course or the destiny of his creation. The surety expressed in this verse does not relate to the unchangeableness of the created universe, rather it speaks of the unfailing obedience of God's creation in carrying out his divine plan.

(4) *2 Peter 3:5, 6*

Another important passage which relates to the second day of creation is 2 Peter 3:5, 6: "For when they maintain this, it escapes their notice that by the word of God the heaven existed long ago and the earth was formed out of water and by water, through

which the world at that time was destroyed being flooded with water."

Translation of the two prepositions *ek* and *dia* is a bit difficult. But, by his commentary on Genesis 1:6-8, Peter clearly allows for the understanding that there were *two* bodies of water associated with the earth prior to the Flood. And the recombination of these two bodies of water at the time of the Flood resulted in the destruction of the earth.

The fact that the word "water" is used in the text three times, and that twice the word must be understood to mean *liquid* water, would strongly suggest, if not indeed establish, that the third occurrence be also understood in that manner. This is further strengthened by the fact that the usage under question is in no way distinguished grammatically from the other two.

(5) *The account of the Flood*

The great Deluge began on the day that "all the fountains of the great deep burst open and the floodgates of the sky were opened." (Genesis 7:11b) The supernatural intervention of God in the destruction of the world is described in this verse. Some interpreters feel that they can use this passage to construct trap-doors in the solid hemispheric dome of their ancient Hebrew reconstruction. The more conservative opinion is to view phrases like "floodgates of the sky" as purely figurative language.

If it is correct to conclude that the meaning of the text is that there was liquid water above the atmosphere at that time then this figure becomes much more appropriate and, in fact, may be an accurate description of what occurred on that awful day. There is no need to postulate "the passage of the earth through a meteorite swarm or the sudden extrusion of large amounts of volcanic dust into the air."³⁰

Incidentally, the liquid canopy interpretation would also allow for a specialized or controlled descent of the water. There would be no need for any wasting of this destructive water over the open ocean. Strategic placement of the "windows of heaven" over land areas would have greatly increased the destructive potential. Nothing with regard to this is contained in the Biblical text, and this suggestion is certainly not germane to the thesis being presented. But the fact is mentioned twice (Genesis 7:14, 12) that 40 days were required for the descent of this water; and, therefore, this descent was carefully controlled and was not a one-shot collapse of the water above the atmosphere.

Conclusion

The revelation from God, as recorded in Genesis 1:6-8, has been examined in this brief work. It is clearly evident that the solid metal dome concept of a three-storied universe is not taught in the Bible. Absolutely no support for this idea may be drawn from the word *rāqī'*. The English word "atmosphere" is in reality the concept contained in the Hebrew word *rāqī'* in this portion of Scripture.

The author of the narrative of the second day of creation, as well as other selected passages, clearly and repeatedly states, that the atmosphere was encompassed by a liquid canopy of water. How is this fact

to be translated into a workable model of the early atmosphere? That project is beyond the scope of this work. But it cannot be repeated too often that the primary source of information concerning the canopy (i.e., Genesis 1:6-8) definitely contains the concept that that body of water existed in the liquid state.

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SCIENTISTS EVALUATE THE EXCEPTION

WILLIAM J. TINKLE*

Science, by its very nature, must be centered on the type—the universal, as the philosophers say. But the fact that scientists study individuals should never be forgotten. Every individual, while typical, is also exceptional in some respect. Thus the exception should never be ignored or denied. Herein lies the error of uniformitarianists who are bound by a dogma and deny exceptions, although there is clear evidence to show that exceptions have happened and have been important.

Scientists, although doing valuable work, tend to downgrade the individual, especially the exception.

This tendency is often evident in teaching survey courses in botany and zoology. If all individual specimens were dissected, drawn, and described just as they were observed there would not be time to learn about many kinds of living things. Or perhaps there would be only a glance at each animal or plant and the whole study would be superficial.

The accepted method is to take a species which is chosen as a type, make a thorough study of it, and then note how some other species of that class are somewhat different in minor respects. Thus an ameba, an earthworm, grasshopper, clam, frog, and cat are chosen and studied as types.

Louis Agassiz, who influenced early biological instruction in the United States more than anybody else, said, "Facts are stupid things until they are brought in line with underlying principles."¹ In other words, how an animal breathes, digests food, or escapes enemies should be detectable from the parts of the animal. By such study researchers should be able to draw conclusions as to how animals live, and how even human life is carried on successfully.

Conclusions in science are established by repetition. If one animal is unusually small, has a scar, or otherwise is different from all like animals, then the scientist says that this difference is contingent; that it merely happens to be as it is, and this difference is not typical nor significant, for it might just as well have been different.

When specimens have a high degree of likeness, when experiments are performed by different persons and give the same result, then scientists conclude that they have discovered scientific principles and are not dealing in contingencies.

A Significant Problem

Yet a significant problem must be faced when scientists realize that some occurrences cannot be repeated! Such important occurrences are: the creation of the world and the advent of living things. Some persons have tried to make life but have succeeded only in making amino acids which occur in living things. To see creation repeated, scientists would have to see living things appear *without the help of man*. This was attempted during many years and finally scientists agreed in the late nineteenth century that life does not start of itself but comes only from pre-existent life.²

The scientific method is a good tool to use in establishing truth of some kinds but is not the only criterion, and often this method is not applied fully.

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An investigator is supposed to have in mind some way in which events occur naturally, which has not been proved. He gathers data which are relevant to his problem and which are chosen without prejudice; two requirements which are so high, which demand so much judgment and honesty, that they run counter to human nature.

If the findings of an investigator fit his world view, the tendency is to accept them without confirmation by repetition. If the findings do not fit that view they are rejected.

Every investigator must exercise judgment as to which data are significant and which are only contingent. It has been said that no two blades of grass are alike, but the difference may be only an accident or only due to the environment. Seeds from the grass plants which bore the different blades might not reproduce the observed differences.

Such lack of reproduction was proved by Wilhelm Johannsen (1857-1927) in his pure lines of beans.³ Although the beans he planted had descended from a single plant, some plants were bigger than others. When seeds of the different plants were planted, however, they bore beans of the same average size. This showed that the difference in size of the seed beans was contingent. Such careful work has shown that much of the older data which was accepted as proof of evolution was poorly founded.

Fifteen years ago, when grants for research were easy to obtain and publication of articles was easy, scientists seemed to act on the assumption that every datum had value; that if any investigation were careful enough and long enough it was bound to help solve the problems of mankind. The result was many pages of useless data. Scientists need to cultivate the insight to look ahead and choose titles of significance.

Importance of the Exception

And scientists should learn that often it is the exception which rules the outcome. Most often scientists look for some individual, usually the mean or median, which will represent the group. But there are individuals which are significant *in themselves*. It is not the average but the unusual person who makes history. The range of a plant species is not determined by the usual season but by the early frost or cold January.

Jesus Christ was the greatest exception who ever appeared. The Son of God came to the world in the person of a carpenter of Galilee. His influence was so great that history is divided into two periods: Before Christ and the Years of Our Lord (Anno Domini). The lives of many men have been turned around entirely by meeting or learning of the Christ.

And the miracles of Jesus and other Biblical characters are exceptions to the ordinary acts of God. To

persons in our day they are either problems or signs of authority. If one assumes that only average occurrences are real, a miracle is a problem; if he believes God rules the world it is a confirmation of his belief in God.

The scientific method is a high ideal, in fact too high for many persons to follow consistently. But since it casts doubt upon single occurrences and insists upon repetition for proof, although this often is impossible, we must recognize values other than science. When a teacher starts a course in science he sometimes states that the course will not involve study of the whole, but only a part, of reality.⁴

The available facts, when observed without prejudice, fit the world view of administration by a personal God rather than the working of cold and immutable laws.

Yet persons who believe in "general evolution"

from molecules to man hold their article of faith above any other world view. This preconceived idea, that living things *had to arise and develop gradually*, is the chief reason people believe in evolution. If certain observed facts do not fit this belief they are held to be accidental and contingent. But if scientists observe facts carefully and without prejudice, then the preferable world view of creation followed by diversity and degeneration may be comprehended.

References

¹Cooper, Lane. Louis Agassiz as a teacher. Comstock Publishing Co., Ithaca, N. Y., p. 48.

²This consensus was reached following the exhaustive experiments of Louis Pasteur of France. Many others, however, had made similar proof. Now there are evolutionists who try to prove the opposite but have not done so.

³Snyder, L.M., and P. R. David 1957. Principles of heredity. Heath, p. 223 f.

⁴The present author has made such a statement.

ARGUMENTS AGAINST SYMMETRY AND DESIGN FROM CHANCE EVENTS

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The theory of evolution, whether in Darwin's original form or in the modern form since the introduction of mutations, amounts, in the final analysis, to saying that the forms of all of the living creatures in the world have come about by chance. The obvious objection is that, in cases in which scientists can follow what is happening, intricate designs do not come about by chance. The author emphasizes this point by reference to the sand paintings made by some tribes of Indians. It might be claimed that, if sand of different colors were mixed and scattered at random, a painting might result. But nobody in his right mind would wait for such a thing to happen. Since living creatures are more intricate than any sand painting, how much less could they have come about by chance?

Introduction

The lesson of the ages is that lasting institutions must be based upon truth; to state the matter negatively, human institutions cannot be based upon lies, misconceptions, ignorance, or superstitions, nor upon only fragments of truth. But the discovery of truth is most difficult: man's senses are limited, memories are weak and deceptive, intellectual powers are frail, the world is vast and enormously complex, and lives are short. Men are often mistaken.

The child has much to learn and little time for learning before he becomes an adult. From a few hasty observations, he makes vast generalizations, which, though they often contain serious errors, yet become habits of thought. He may not find the errors during his lifetime, but still he communicates his generalizations to the generations of the future.

As a result traditional knowledge is a mixture of truth and error, and often it is most difficult to distinguish between the two. Often error is mistaken for truth with disastrous consequences. And while men search for past errors, they sometimes add more errors for the generations of the future to correct.

The present generation has inherited from the past the Darwinian theory of evolution, which appears very convincing when judged superficially, but which may be shown to be hopelessly contradictory in the light of well-established facts and principles.

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In this article, I develop an argument based upon sand paintings which shows that designs cannot be produced by chance.

The Origin of Darwinism

Let us consider a bit of history: when he was a young man, Charles Darwin, being greatly impressed by changes in plants and animals which breeders had produced by selection, tried to extend the principle of selection, conceived as a purely mechanical process, as an adequate explanation for the origin of species in natural environments. He had no adequate explanation for the causes of variations in organisms.

Darwin failed to realize that the superior organism must somehow be produced before it can be obtained by selection, whether natural or artificial. His followers recognized this defect in his thinking, and after their discovery of sudden variations, which they called mutations, they claimed that such changes were caused by chance. It did not occur to them that the odds against producing designs by changes at random are so exceedingly great, that evolution, if it exists, cannot be explained in this way.

Why did Darwin try to develop a mechanical theory? Sir Isaac Newton had discovered laws of mechanics; and his followers tried with great success to extend his basic ideas of quantitative descriptions to other things. Reckless generalization gave the idea that the universe is a mechanism, and Darwin, like many others, accepted this.

A scientific theory, of course, should be judged critically, and not according to the education of the

person who presents it. But in searching for errors and their causes, matters of education are important. Darwin left an autobiography which shows that his education was completed at less than the early age of twenty-three, that he was educated to be a clergyman, and that he had only a smattering of science. He was especially weak in mathematics, and this means that he could not have had a good understanding of the physical science of his time. His education was such that he could not have been a sound critic of his own ideas.

The Argument From Sand Paintings

Let us consider a powerful argument against Darwin's ideas, based upon sand paintings. In some places in the West, sands of various colors are readily available, and some American Indians discovered that they can be used in making beautiful sand paintings, exquisite works of art. Let us consider the use of sands of only two colors, black and white. Experiments will be suggested that can be done cheaply and easily to test in a limited way the theory that chance can be the cause of designs. Even quite young children can do them and grasp their meaning.

In order to have something definite in mind, let us start with 950 cubic centimeters of white sand and 50 cubic centimeters of black sand. These exact amounts are not essential, but they are reasonable amounts with which to work. The size of the grains of sand is not essential, but they should be so small that the eye does not distinguish them as individuals. So let us assume that their size is quite uniform, and that they have an average diameter of one hundredth of a millimeter. The total number of grains according to these assumptions is one million million (1,000,000,000,000).

It is a fact of experience that any shade of gray can be made by mixing black and white pigments. So, if a surface, one meter square is first covered with white sand, then black sand and mixtures of black and white sand can be used to produce a copy of any page of any book in any language or in any handwriting; a copy of any black and white photograph of any person, animal, plant, object, scene, manufactured article, or anything whatsoever that can be photographed; a copy of any engineers' drawings and specifications; or a graph of any mathematical function.

Let us recognize that any language means not only any existing language, which includes the Chinese, but also any past language, which includes ancient Egyptian, and in addition any new language that may be invented; and it even includes the sign language of American Indians. The letters of any written language are geometrical forms, and in theory the number of possible forms is infinite.

In practice, it can be very great, as Chinese children know to their sorrow, for their language involves some 60,000 symbols. The formation of words from letters is arbitrary, and association of words with ideas is also arbitrary. On the basis of these facts, an enormous number of languages is possible.

The same thing is true for different pictures, drawings, and diagrams; their number obviously is enormous. Not only can whole pictures be shown, but also parts of pictures, and small parts of many pictures

mixed up in an enormous number of ways. Disregarding human limitations, an infinite number of distinguishable things can be shown, one after another, or a few at a time.

Let us assume an area one meter square divided into square centimeters by horizontal and vertical lines, and that these small squares are used for writing numbers, reading from left to right and from top to bottom as usual, with one digit per square. In this manner, one could show in black sand all numbers from zero to one less than 10 multiplied by itself 10,000 times, that is, $10^{10,000}$ different numbers.

It is obvious that the number of things that can be shown with black sand far exceeds this enormous number. A far greater number may be shown by using 100 symbols for digits instead of 10, and a 100 as the basis of the system of writing. Moreover this does not include the infinity of pictures and of scrambled parts of pictures.

In man's ordinary affairs, he never uses very large numbers; thus persons do not really comprehend them. It is not difficult to write a number with 10,000 digits, but it is impossible fully to comprehend the meaning of such a number. Sir Arthur Eddington proposed a theory by which he calculated that there are 3.145×10^{79} particles in the entire physical universe.

The mass of the sun is known; and if the sun is composed of protons and electrons, one would have to multiply their number by about ten thousand billion billion to reach Eddington's number. It is not important to the present argument whether or not his theory or his number are correct; in any event the number is vastly greater than the number of atoms of which the earth is composed. It is interesting to notice that if each particle in the universe was a being who had to have a Social Security number, the largest number any being would have to use would contain only eighty digits.

Let us suppose that all of the matter of the entire physical universe were in the form of wood pulp suitable for making paper, and that it were made into an enormous thin flat sheet upon which numbers are written so small that a good magnifier would be needed for anyone to read them. This enormous sheet would obviously be far too small for writing at one time all the numbers from zero to $10^{10,000}$; for this number is vastly greater than Eddington's number. There appears to be no way in which one can show, in intuitive terms, the meaning of this enormous number. But with black sand, a vastly greater number of things than this can be shown.

What Can Be Produced By Chance?

Let us try to depict numbers, pictures, and so on by chance: first mix the white and black sands, and then sift the mixture over the area. To obtain pictures, figures, and so on is merely a matter of having the grains of sand fall into suitable positions. An enormous number of designs are possible. If the sand grains are sifted over and over again, it is theoretically possible by this random procedure to obtain page after page of the whole Encyclopedia Britannica in the exact order that the pages have been printed. But are the pictures, printed pages, and so on sufficiently probable for even one to be obtained?

It is proverbial that it is hard to find a needle in a haystack. If the whole earth was made of white sand with only one black grain, it would be difficult to find the black grain, but not exactly impossible. If all of the waters of the earth contained only one fish, that fish would be difficult to find and catch. Where the possibilities are enormous in number, the probability of finding a particular thing is extremely small.

One's experiences in mixing things and scattering them at random is that only a uniform shade of gray will be obtained by scattering a mixture of white and black sand over a selected area. This illustration from sand paintings shows the great difference in meaning between possible and probable. The pictures, writings, numbers, and drawings are all possible, but it is not practically probable that any one configuration will be obtained by random procedures. Evolutionists have been teaching that almost every possibility might occur in the natural environment during the long period of the earth's existence. The present argument shows that this is not the case: an infinity of things cannot be tried by a finite number of things in finite time.

The reader is familiar with odometers which record the number of miles automobiles are driven. The little wheel on the right records tenths of a mile, the next on the left records miles; then come tens, hundreds, thousands, and ten thousands. It is clearly possible to make a similar device with 10,000 wheels, but it is not possible to make such a device to show the number of all of the different things which may be shown by black and white sands, for this number is infinite.

Symmetry

Let us suppose that an Indian obtains colored sands for making a large painting of the left wing of a beautiful moth, and that a record is kept of the amounts of the various colored sands which he uses. Now let us suppose that the same amounts of each colored sand are mixed, and then someone tries to obtain, by sifting the sands over an area, the symmetrical painting of the right wing of the same butterfly. The probability of obtaining this symmetrical painting by chance is obviously extremely small. But it is not exactly impossible, at least in the sense that the Indian could certainly paint it with the sands before they were mixed.

Let us consider this matter of symmetry in organisms from the mathematical point of view. A painting may be divided into horizontal colored lines, so let us consider that a line is composed of 1,200 grains of sand, using 200 grains of each of six colors. It is a problem in permutations to calculate the number of possible color patterns along this line. Exchanging grains of the same color does not change the pattern. According to calculations, there are about 10^{926} different patterns, a number which is vast in comparison with Eddington's number for the particles in the physical universe.

Thus the odds against producing symmetry by chance are so vast that the numerous symmetries in nature, such as wings, eyes, ears, and hands, constitute far more than enough evidence for the conclusion that

some cause other than chance is acting to produce designs.

What Can Be Accomplished In a Finite Number of Trials?

The fact that infinitely many designs are possible means that it is only infinitesimally probable that any one of them will be discovered in a finite number of trials. The use of numbers might make this clearer. Let us assume a collection of 100 pictures each composed of 5,000 parts in the form of little squares, all of the same size. The parts of a single picture may be identified by writing the same serial number on each part, and using different serial numbers for different pictures. Assume further that the parts for each picture are kept in separate bins.

Random selection of the parts is desired, and for that purpose it is practical to have identical balls numbered from one to 100, and to number the bins similarly. Then place all of the balls in a bag, mix them; and without looking, draw a ball from the bag, and take a part of a picture from a bin of the same number.

Under these conditions, the chance of selecting a part from a particular bin is exactly $1/100$, and therefore from the laws of the mathematical theory of probability, $(1/100)^{5,000}$ is the probability for selecting all of the parts for a picture in 5,000 trials. This is an extremely small number. Instead of obtaining all of the parts for one picture, it is far more probable that some of the parts for all of the pictures would be obtained.

It is not even possible to fit together by chance more than a few things to form designs. In order to illustrate this point, let us assume a picture one meter square which is cut into squares, 10 centimeters each way, making 100 equal squares. It is assumed that these squares will form a picture, without disharmonies, only when they are placed together in the original manner, a condition which is obviously true for many pictures, but not for all. Since there is only one place for each square, they can be arranged without rotation in 100-factorial different ways. This is a vast number, about 10^{158} , which is far greater than Eddington's number.

In the case of the sand grains, the usual result of scattering the sand grains at random is a confusion of an exceedingly great number of possible things: pictures, letters, diagrams, drawings, figures, and small parts of these things are all so confused that no designs are visible. The experiment shows that the number of the arrangements of the sand particles which do not form designs is vast in comparison with the number of possible designs. It may be true that the non-designs form an infinity of higher order than that of designs.

Random Change Does Not Cause Improvement

From practical experience in working with things, one may conclude that almost every change in a good design makes the design worse. No knowledge or skill is required to change most machines so that they cease to operate properly. A baby can easily destroy a watch or camera. On the other hand, it is almost always difficult to change good designs to make them

better, and making such improvements requires much knowledge and skill.

The lenses of an excellent microscope can be removed, and they can be rearranged in no great amount of space in infinitely many ways which do not give an image of a small object. It is indeed easy to change a well-written article so that it is worse, but it is difficult to make it better, and this applies also to all works of art.

When changes are made in good designs by accidents, it is practically certain that the designs will be damaged or destroyed. Automobiles are not made better by accidents. Everything that man makes, such as buildings, roads, dams, bridges, houses, clothes, communication systems, and machines becomes more disordered, according to the second law of thermodynamics. The second law of thermodynamics in a most general form, as stated by Lewis and Randall in their text *Thermodynamics* is as follows: "Every system which is left to itself will, on the average, change to a condition of maximum probability." A large amount of evidence in physical science is consistent with this law, and there is no known evidence against it. Since all things man makes are destroyed eventually, they must be considered improbable arrangements of matter at the time when construction is complete.

So Species Cannot Originate By Chance

From the above evidence and discussion, it is evident that Darwin and his followers have been wrong in thinking that any upward trend in organic evolution, if it exists, can be explained by mutations at random, and the survival of the fittest. A search should be made for a different explanation.

Alfred North Whitehead, in his little book, *The Function of Reason*, stated his conclusion that Reason is the cause of the upward trend in evolution. He appears to have been the most competent mathematician among the philosophers of the world. Actually his explanation of the nature of things has a very long history: Anaxagoras, an ancient Greek who lived from an uncertain 500 B.C. to 428 B.C. taught that Reason is the cause of all things.

There Is No Universal Principle of Evolution

It is now certain, moreover, that a universal principle of organic evolution does not exist: in 1938, the coelacanth, a fairly large marine fish, was discovered near Madagascar. Before that important discovery, paleontologists thought that that species had been extinct since the Cretaceous period. The unchanged existence of the coelacanth for a vast period of time is sufficient evidence for the conclusion that there is no universal principle of evolution. Since this is the case, the evolution of a species could be established only by some proof of descent.

The Bad Effects of Philosophical and Scientific Error

Let it be clearly understood that philosophers and scientists, who think and write about the most profound matters, are affecting, for better or worse, the destiny of mankind. Human affairs form a vastly complex system of interlocked elements such that trouble with one thing can cause near and remote troubles with many things. It is necessary to be on constant guard against error.

Darwin was badly prepared to be a philosophical leader of mankind; but he has been listed through mistaken judgment as one of the world's greatest thinkers. He was not a broadly and deeply educated person; he was like a child playing with a loaded machine gun, the mechanism of which and the dangers of which he did not understand. In his autobiography, he stated, "but I was also ambitious to take a fair place among scientific men,—whether more ambitious or less so than most of my fellow-workers, I can form no opinion." In pursuit of his ambition, he tried to destroy, and believed that he had destroyed, the validity of the extremely important theological argument from design; and many people accepted his use of evidence and reasoning as valid.

The mistaken acceptance of his theory of the origin of species caused many people to abandon belief in mankind's greatest thought, that the entire universe with its enormous number of stars and nebulae, with an earth of vast beauty and marvelously constructed organisms forming an intricately interlocked world of life, was created by an Intelligent Being, vastly greater than man.

The Inadequacy of the Materialistic World-View

Progress in lifting the human race to a higher level depends largely upon the discovery of profound truth, such as mathematics including the calculus, combined with quantitative experiments and Newton's laws of motion. On the contrary, one of the worst things that can happen to mankind is mistaking a serious error for profound truth, for this causes mistaken judgments about matters of the greatest importance. Darwin's theory should be considered one of the greatest blunders ever made.

Before Darwin's time for many centuries, it was generally accepted that the universe was composed of mind and matter. The meanings of many of the words used in casual conversation and in formal writing are based upon this philosophy of dualism, but mind and matter are not defined in the philosophy of materialism to which Darwin's theory appeared to give powerful support. The result has been that man has tried to make important decisions according to inconsistent general ideas, and he has brought about a seriously divided world. Thinking men should now recognize that Darwin's theory is erroneous, and start the reconstruction of ideas.

DARWIN'S LAST HOURS

WILBERT H. RUSCH, SR.*

Some have stated that Charles Darwin, toward the close of his life, repudiated evolution and was enthusiastic for Christianity. In Christian charity, one could wish that this were true; but according to the evidence nothing of the sort happened. Some investigation into what Darwin wrote, and presumably believed, in the last two years or so of his life is described by the author.

About 10 years ago, a pamphlet entitled, "Darwin's Last Hours" came to my attention. Essentially it con-

tained the account that follows—

Last Days of Charles Darwin

(from *The Collapse of Evolution* by Luther Townsend)

Lady Hope, a consecrated English woman, speaking before a Northfield audience, August 15, 1915, on Mr. Darwin's religious life, gave the following account of a personal interview that subsequently was published in the *Watchman Examiner*. The article as published was written by her own hand, and this is what she says:

"It was on one of those glorious autumn afternoons that we sometimes enjoy in England when I was asked to go in and sit with the well known professor, Charles Darwin. He was almost bed-ridden for some months before he died. I used to feel when I saw him that his fine presence would make a grand picture for our Royal Academy, but never did I think so more strongly than on this particular occasion. He was sitting up in bed, wearing a soft embroidered dressing gown, of rather a rich purple shade. Propped up by pillows, he was gazing out on a far-stretching scene of woods and cornfields, which glowed in the light of one of those marvellous sunsets which are the beauty of Kent and Surrey. His noble forehead and fine features seemed to be lit up with pleasure as I entered the room. He waved his hand toward the window as he pointed out the scene beyond, while in the other hand he held an open Bible, which he was always studying.

"What are you reading now?" I asked, as I seated myself by his bedside. "Hebrews," he answered. "The Royal Book, I call it. Isn't it grand?" Then placing his finger on certain passages, he commented on them. I made some

Apparently the above account was published first in an American publication entitled, "The Watchman Examiner." After a search through available issues of that publication neither a history of the origin of this account nor the actual account have been found. Even a search for any information on Lady Hope has

allusion to the strong opinions expressed by many persons on the history of the creation, its grandeur, and then their treatment of the earlier chapters of the Book of Genesis. He seemed greatly distressed, his fingers twitched nervously, and a look of agony came over his face as he said, "I was a young man with unformed ideas. I threw out queries, suggestions, wondering all the time over everything, and to my astonishment the ideas took like wild fire. People made a religion of them" Then he paused, and after a few more sentences on the "holiness of God" and "the grandeur of this Book," looking at the Bible which he was holding tenderly all the time, he said, "I have a summerhouse in the garden, which holds about thirty people. It is over there. I know you read the Bible in the villages. Tomorrow afternoon I should like the servants on the place, some tenants, and a few of the neighbors to gather there. Will you speak to them?" "What shall I speak about?" I asked. "CHRIST JESUS" he replied in a clear, emphatic voice, adding in a lower tone, "AND HIS SALVATION." "Is not that the best theme?" And then I want you to sing some hymns with them. You lead on your small instrument, do you not?" The wonderful look of brightness and animation on his face as he said this I shall never forget, and he added: "If you take the meeting at 3 o'clock this window will be open, and you will know that I am joining in with the singing." Lady Hope closed the article with these words: "How I wished that I could have made a picture of the fine old man and his beautiful surroundings on that memorable day!"

ended in failure. Finally I have failed to find any other reference to the Townsend account.

Regrettably several other versions of this account have appeared recently, such as the following, which was received with accompanying homily:

Charles Darwin's Deathbed

In 1871 was published Charles Darwin's famous book, *The Descent of Man*, which created a furore in the religious world.

It presented his speculations on the probable ancestry of man. He traced the descent of the human race back to an ape-like creature, and still further back until he reached the speck of protoplasm containing in itself, as he supposed, all those evolutionary potentialities, which after centuries of advancement resulted in man. However, with strict honesty he pointed out that with all his research there was a "missing link."

Till every link was indisputably proved and the "missing link" discovered, the theory remained a speculation. Alas! the human heart is predisposed to believing anything put forward against the Word of God, and Darwinism became the popular thing. Tens of thousands were swept into skepticism. Hundreds of preachers proclaimed this doctrine from their pulpits, doing incredible harm.

Whilst this theory did not deny God as Creator—for who created the speck of protoplasm?—yet it brushed aside the truth of man's creation as set forth in Genesis i and ii. And if that account is mythical, what sure foundation have we for any statement in God's word? Darwinism also

denied the fall of man, and if that is denied where is the necessity of the atoning work of Christ?

Years have rolled by since *The Descent of Man* appeared, and today Darwinism is an exploded theory in the estimation of many who are competent to judge.

In 1882 Darwin, the apostle of evolution, died, and was buried in Westminster Abbey. We quote from an article in *The Gleaner*.

"Darwin is propped up in bed. Out of his window stretches a beautiful view. The sun is setting, lighting up with its soft radiance the face of nature. The dying man is reading—*The Bible!*"

Lady Hope, a well-known Christian worker, says: "I made some allusions to the strong opinions expressed by many persons on the history of the creation, its grandeur, and then their treatment of the earlier chapters of the Book of Genesis.

"He seemed greatly distressed, his fingers twitched nervously, and a look of agony came over his face as he said:

"I was a young man with unformed ideas. I threw out queries, suggestions, wondering all the time over everything; and to my astonishment the ideas took like wildfire. People made a religion of them."

True, his book appeared only eleven years before his death, but it contained the "unformed ideas" of his early manhood, as he himself confessed.

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Was there ever a more tragic scene? Darwin with Bible in hand, speaking with glowing enthusiasm about "the grandeur of this Book," deploring the modern evolutionary movement in theology which resulted in covering Protestant lands with the blight of scepticism; confessing that his "unformed ideas" as a young man were the basis of evolutionary theology.

What a challenge to every modernist! What a rebuke to all who neglect the Bible?

And, further, Darwin revealed his sense of the absolute necessity of the Lord Jesus to every man.

Right glad were we to read this account of Darwin's closing hours. He exalted the Bible and Christ. He could not have done better.

The Bible contains the revelation of God in Christ, and presents Christ as the only and all-sufficient Saviour.

Reader, suppose the death-bed had been yours. How would you have fared? Will your present views of the Bible and Christ stand the acid test of a death-chamber?

One day such a test will come upon you. A few years and your pleasure-loving, money-making opportunities will be over, and what then?

How glorious is the gospel. It presents God specially in two ways: as *love* — "God is love" (I John iv: 16) — as *righteous* — "to declare His righteousness" (Rom. iii: 25). If the gospel were founded on love, divorced from strict righteousness, there would be no solid foundation to rest

Apparently the second pamphlet is based on the first account. So I will deal with the former since it is more complete. If this account of Darwin's last days were true it has been thought that it might move some to reconsider acceptance of evolution.

Actually, I doubt its efficacy in conversion, since, as Norman Macbeth has so ably demonstrated, the world of evolution today has departed from almost all of Darwin's views on the origin of species. Therefore I doubt that his conversion would cause any of his adherents to change their position.

In addition, as Matthews points out in his preface to the new Everyman's Library edition of Darwin's *Origin of Species*,

Belief in the theory of evolution is thus exactly parallel to belief in special creation—both are concepts which believers know to be true but neither, up to the present, has been capable of proof.¹

Since support for evolution rests not on pure reason, I am sure those of evolutionary persuasion would continue to have faith regardless of any backsliding on the part of their "prophet."

Nevertheless, I regard the dissemination of this material purporting to record Darwin's last hours as highly dangerous when distributed to the youth; and to the scientific laity, at whom it seems aimed; and therefore I feel I must condemn these pamphlets. For one thing, creationists do inestimable harm when erroneous material is presented as factual. And I would brand this story as apocryphal and a figment of the imagination.

My first clue in reaching this conclusion came in reading that Darwin's meeting with Lady Hope took place "on one of those glorious autumn afternoons." She then says that "he was almost bed-ridden for some months before he died." Since reference is made to outside readings in a summer house, the season seems to have been early fall. Charles Darwin died April, 1882. This event, then, would have occurred in the early fall of 1881, a good half year before he died.

upon. If righteousness alone were carried out there could be no gospel, for "ALL have sinned, and come short of the glory of God" (Rom. iii: 23).

But the gospel tells us "God is love" so that we can trust His heart, His nature, and it tells us it is *righteous* love so that we feel assured of its immutable basis.

Man is a sinner, the worst of us, aye, the very best of us — hopeless, undone sinners. *Sin carries a penalty! The wages of sin is death.*

Hence the necessity of Calvary. If God is to pardon the sinner, and yet punish the sin, there must be a Substitute, and that Substitute must be voluntary and sufficient.

As to voluntariness Christ could say, "Lo, I come (in the volume of the book it is written of me) to do thy will, O God" (Heb. x: 7); as to sufficiency, it is enough to point out that He, who was God and became Man (and yet was One divine Person), exclaimed on the cross, "IT IS FINISHED" (John xix: 30) God raised Him from the dead, proof of His satisfaction in His work as meeting all the claims of His righteousness; that the apostles uniformly proclaimed that simple faith in the Lord Jesus as Saviour suffices for salvation.

Search and see, there is abundant proof of these statements in the scriptures.

"Believe on the Lord Jesus Christ, and thou shalt be saved" (Acts xvi: 31).

—Gospel Publications, Golden, Colorado

Thus verification of the story would be expected in correspondence by Darwin during that period.

Several individuals, Darwin's son among them, have compiled collections of Darwin's letters. When the first pamphlet was drawn to my attention, I went to the University of Michigan graduate library and searched the various collections of Darwin's correspondence. From these I selected a number of letters written by Darwin to various individuals in the last years of his life. The reader should note three letters were written from ten to seven weeks prior to Darwin's death. The pertinent excerpts reveal that the role assigned Darwin from the early fall of 1881 to his death in April, 1882, in the Hope account cannot in any way be reconciled with the tone and flat statements in his letters. The reader may make his own comparisons.

from *The Life and Letters of Charles Darwin*, edited by his son, Francis Darwin, Vol. I, New York: D. Appleton and Co., 1919.

I. I believe that his reticence arose from several causes. He felt strongly that a man's religion is an essentially private matter, and one concerning himself alone. This is indicated by the following extract[†] from a letter of 1879:

"What my own views may be is a question of no consequence to any one but myself. But, as you ask, I may state that my judgment often fluctuates . . . In my most extreme fluctuations I have never been an Atheist in the sense of denying the existence of a God. I think that generally (*and more and more as I grow older*), but not always, *that an Agnostic* would be the more correct description of my state of mind." (Emphasis added)

II. Thus in answer to a Dutch student he wrote (April 2, 1873):

"I am sure you will excuse my writing at

[†]Addressed to Mr. J. Fordyce, and published by him in his "Aspects of Scepticism," 1883.

length, when I tell you that I have long been much out of health, and am now staying away from my home for rest.

"It is impossible to answer your question briefly; and I am not sure that I could do so, even if I wrote at some length. But I may say that the impossibility of conceiving that this grand and wondrous universe, with our conscious selves, arose through chance, seems to me the chief argument for the existence of God; but whether this is an argument of real value, I have never been able to decide. I am aware that if we admit a first cause, the mind still craves to know whence it came, and how it arose. Nor can I overlook the difficulty from the immense amount of suffering through the world. I am, also, induced to defer to a certain extent to the judgment of the many able men who have fully believed in God; but here again I see how poor an argument this is. The safest conclusion seems to me that the whole subject is beyond the scope of man's intellect; but man can do his duty."

Again in 1879 he was applied to by a German student, in a similar manner. The letter was answered by a member of my father's family, who wrote:

III. This, however, did not satisfy the German youth, who again wrote to my father, and received from him the following reply:

"I am much engaged, an old man, and out of health, and I cannot spare time to answer your questions fully,—nor indeed can they be answered. Science has nothing to do with Christ, except in so far as the habit of scientific research makes a man cautious in admitting evidence. *For myself, I do not believe that there ever has been any revelation.* As for a future life, every man must judge for himself between conflicting vague probabilities." (Emphasis added)

IV. The passages which here follow are extracts, somewhat abbreviated, from a part of the Autobiography, written in 1876, in which my father gives the history of his religious views:

"During these two years² I was led to think much about religion. Whilst on board the Beagle I was quite orthodox, and I remember being heartily laughed at by several of the officers (though themselves orthodox) for quoting the Bible as an unanswerable authority on some point of morality. I suppose it was the novelty of the argument that amused them. But I had gradually come by this time, i.e. 1836 to 1839, to see that the *Old Testament was no more to be trusted than the sacred books of the Hindoos.* The question then continually rose before my mind and would not be banished,—is it credible that if God were now to make a revelation to the Hindoos, he would permit it to be connected with the belief in Vishnu, Siva, &c, as Christianity is connected with the Old Testament? This appeared to me utterly incredible. (Emphasis added)

V. Dr. Aveling has published an account of a conversation with my father. I think that the readers of this pamphlet ("The Religious Views of Charles Darwin," Free Thought Publishing Company, 1883) may be misled into seeing more resemblance than really existed between the positions of my father and Dr. Aveling; and I say this in spite of my conviction that Dr. Aveling gives quite fairly his impressions of my father's views. Dr. Aveling tried to show that the terms "Agnostic" and "Atheist" were practically equivalent—that an atheist is one who, without denying the existence of God, is without God, inasmuch as he is unconvinced of the existence of a Deity. My father's replies implied his preference for the unaggressive attitude of an Agnostic. Dr. Aveling seems (p. 5) to regard the absence of aggressiveness in my father's views as distinguishing them in an unessential manner from his own. But, in my judgment, it is precisely differences of this kind which distinguish him so completely from the class of thinkers to which Dr. Aveling belongs.

from *More Letters of Charles Darwin*, Vol. I, edited by Francis Darwin (his son) and A. C. Seward. London: John Murray, Publisher, 1903.

VI. To W. Horsfall. Down, Feb. 8th, 1882

In the succession of the older Formations the species and genera of trilobites do change, and then they all die out. To any one who believes that geologists know the dawn of life (i.e. formations contemporaneous with the first appearance of living creatures on the earth) no doubt the sudden appearance of perfect trilobites and other organisms in the oldest known life-bearing strata *would be fatal to evolution. But I for one and many others, utterly reject any such belief.* Already three or four piles of unconformable strata are known beneath the Cambrian; and these are generally in a crystalline condition, and may once have been charged with organic remains. (Emphasis added)

from *More Letters of Charles Darwin*, Vol. II

VII. To D. Mackintosh. Down, Feb. 28th, 1882

Though no evidence worth anything has as yet, in my opinion, been advanced in favour of a living being, being developed from inorganic matter, yet I cannot avoid believing the possibility of this will be proved some day in *accordance with the law of continuity.* I remember the time, above fifty years ago, when it was said that no substance found in a living plant or animal could be produced without the aid of vital forces. As far as external form is concerned, Eozoon shows how difficult it is to distinguish between organised and inorganised bodies. If it is ever found that life can originate on this world, the vital phenomena will come under some general law of nature. *Whether the existence of a conscious God can be proved from the existence of the so-called laws of nature (i.e. fixed sequence of events) is a perplexing subject, on*

which I have often thought, but cannot see my way clearly. If you have not read W. Graham's Creed of Science, it would, I think, interest you, and he supports the view which you are inclined to uphold. (Emphasis added)

Certainly the whole tone of these various letters, which cover the last years of Darwin's life, completely rule out any conversion and resultant Christian faith of the type which the tracts report. Nowhere do you pick up any kind of tone or feeling in them that would harmonize with the picture of Darwin presented in "The Last Days."

In 1876 Darwin wrote (extract IV) that in 1836-1839 he had come to see that "the Old Testament was no more to be trusted than the sacred books of the Hindus." He still held that opinion in 1876, and nothing in the 1882 letters indicates any change in position. On February 28th, 1882, less than two months before his death, he wrote,

Though no evidence worth anything has as yet, in my opinion, been advanced in favour of a living being being developed from inorganic matter, yet I cannot avoid believing the possibility of this will be proved some day in accordance with the law of continuity" (part of evolutionary theory).

This statement is utterly incompatible with the picture drawn by Lady Hope. Hence we assume that she (or whoever is responsible for the account) offers a completely false story, very beautiful and moving but still false, although presented as factual and proposed as evidence for creation.

I would have to regard this story as unfortunate from another viewpoint. Those I have encountered in connection with the distribution of these tracts have proposed that they be widely distributed to young people of high school age. The hope is that the students will then stun their high school teachers with this information during a discussion of evolution. As graduate scientists, such teachers would undoubtedly do the same library research reported here. They would find the same documentation. What damage then would be done in terms of confidence in that

Christian pastor, teacher, or parent who had so misled young people into such a ridiculous position?

A question comes to mind: What is the origin of this tale? Or who wrote it originally and what did that individual have in mind? A possible clue lies in a footnote found on page 12 in *The Evolution of Life*, Vol. I, of the Darwin Centennial work, *Evolution After Darwin*, edited by Sol Tax and published by the University of Chicago Press in 1960. The entire footnote follows:

Mrs. Darwin was very antipathetic to the idea that all human morality has 'grown up by evolution' (see *Emma Darwin*, by Mrs. Litchfield [Privately printed edition; 1904] II, 360) and was anxious to avoid any suspicion that Darwin regarded spiritual beliefs as no 'higher' than their animal origins. She persuaded Francis Darwin to cut out various passages on the subject from the MS. of the autobiography which his father had left for posthumous publication (see *Nora Barlow*, *passim*, where the excised passages have been restored).

This may suggest the beginning of the story; the "last hours" account may be anchored in the efforts of Mrs. Darwin indicated. However, it should be remembered that Mrs. Darwin was a Unitarian, which makes one hesitant to claim that she had a direct connection with the presentation of Darwin as a Christian and therefore a Trinitarian.

A creationist scientist must be as accurate and thoroughgoing in his work as an evolutionist scientist. Both must report facts as found; there must be no embellishments, no wishful thinking. Theorizing should be plainly and clearly identified as such. Those who defend the creation account of origins must examine and study supportive material as rigorously and painstakingly as "evolutionary" material is examined. The cause of creation is not served by spurious reporting, nor by the dissemination of unfounded accounts.

References

- ¹Darwin, Charles. *Origin of species*. Edition published by E. P. Dutton and Company, New York, 1974. Dr. Matthew wrote the new introduction.
- ²From October 1836 to January 1839.

NEW BOOK ANNOUNCEMENT

Remember Thy Creator by G. Richard Culp, D.O., was published by Baker Book House, early in 1975, in paperback at \$3.95. Dividing his book into three parts, the author discusses evidence for divine creation, general refutation of evolution, and technical refutation of evolution in 16 well worded chapters, accompanied by illustrations and explanatory charts.

In addition to his refutations of evolution, the author relates many personal experiences with evolutionist professors and classmates. Theistic evolution and creation-evolutionism are carefully distinguished and discussed separately.

When the author began college in 1937, he was an evolutionist and a non-Christian. When he graduated from a large state university, he was a creationist and a Christian. Dr. Culp considers evolution a powerful force that unsettles Christians and turns non-Christians away from redemption through Christ.

USE OF THE SECOND LAW OF THERMODYNAMICS IN MACROSCOPIC FORM IN CREATION STUDIES

H. L. ARMSTRONG*

Often creationists appeal to the second law of thermodynamics to show that evolution could never have happened in the way commonly alleged. Usually the second law is thought of in such arguments in terms of statistical mechanics, or of information theory. The author uses the law in its original macroscopic form, which entails nothing at all about any microscopic structure of things, to reach the same conclusion: that the alleged evolution is impossible. There may be certain advantages to the macroscopic formulation: for instance, it may leave less opportunity for quibbles about open and closed systems.

I. Introduction

As is well known, thermodynamics, especially the second law, is often appealed to in support of Creation. Sometimes the law is stated in some form to emphasize that the amount of order in a system decreases.^{1, 2} Sometimes an author does not make very explicit just how the amount of order is to be judged; although anyone would agree that the evolution of "molecule to man," had it actually happened, would have involved an increase in order by almost any definition.

In fact, in the context intended, the statement is true enough. The order may be referred to the molecular or atomic level. There is nothing wrong with so doing. But one feels that it should not be necessary, for thermodynamics can be independent of any atomic or molecular theory. Indeed, it was established before those theories were worked out. So it may be of some interest to see how far it is possible to go, along the lines of interest in creationism, with the original macroscopic thermodynamics.

II. Historical Outline

Originally thermodynamics, as developed by Carnot and others, had to do with the connection between heat and work. The measurement of heat, which is the practice of calorimetry, was already an established technique; and the notion of mechanical work had been developed in mechanics. The industrial revolution, and the invention of the steam engine, had made this connection a matter of practical interest. The result of these studies was the formulation of thermodynamics in the macroscopic form, and in particular formulation of the first and second laws.

Subsequently much work was done on the kinetic theory. Heat was considered to be the motion of the atoms or molecules making up a hot object. But this motion was random or disorderly. Mechanical work, on the other hand, would involve the motion of the whole object, which could be considered to be orderly motion of the atoms. Hence the relation of heat to work was considered in terms of order and disorder.

Yet later, information theory and related studies arose. The aim was to consider information as if it were being sent by means such as the telegraph. The message would be represented by a series of dots and dashes; and in their distribution and mixing the succession might be more or less random. So it was natural to think of these studies as analogous to the newer, statistical, thermodynamics, and to use several thermodynamic terms.

It will be enough at this point to give a short outline of these developments which were subsequent to the original classical thermodynamics. There will be occasion later to say more about them.

III. Classical Thermodynamics

The logical sequence of development, which is not always quite the historical one, is about as follows. Joule and others did experiments in which mechanical work was "wasted" in overcoming friction; and they measured the amount of heat resulting. For instance, by a system of pulleys a falling weight turned paddles which stirred a tank of water, heating the water somewhat. (Figure 1) It was found that there was a constant ratio of the amount of heating to the amount of mechanical work done by the weight.

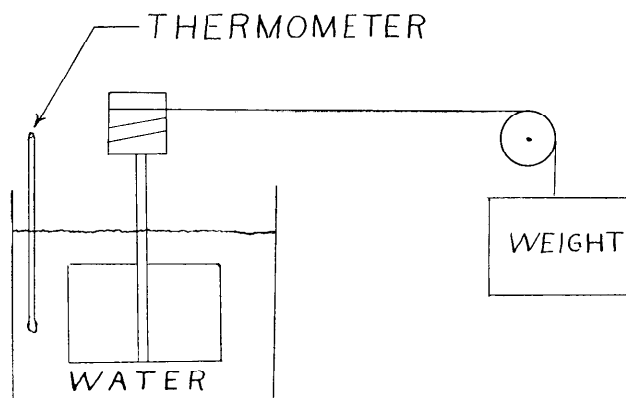


Figure 1. This illustrates how, in an experiment such as Joule's, mechanical work may be turned into heat, and the amounts measured.

Suppose, for instance, that a weight of 100 pounds fell 7.78 feet while turning the paddles. The result was the heating of 1 pound of water by 1°F, which represents 1 B. T. U. of heat. So 778 footpounds of mechanical work wasted against friction (which is what the stirring amounts to) results in 1 B.T.U. of heat. It was natural to say that the two are equivalent, in the way in which so many francs are equivalent to one dollar. The figure 778 is a sort of rate of exchange; but, of course, it does not fluctuate.

It was natural, moreover, to say that, since the 1 B.T.U. was equivalent to the 778 foot-pounds, nothing had been lost. Before the weight fell, there was the potential for mechanical work, often called mechanical potential energy. Afterwards, the heat could be called thermal energy. So the total amount of energy, mechanical plus thermal, was the same after as before;

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the energy was conserved. This is an example of the conservation of energy, which, when heat is involved, is often called the first law of thermodynamics.

It was easy enough to let a weight fall, and thereby to heat something, or in other ways to get heat from mechanical work. Is it possible to go the other way? It is usually more difficult; nobody would expect the water in Joule's experiment to become cooler, and at the same time the paddles and pulleys to act to lift the weight. Still, work is accomplished from the heat of every steam or internal-combustion engine.

But there is a difference. The efficiency of these engines, in terms of work done for a given amount of heat used, is limited. One finds that only a fraction of the heat involved in the engine, from the burning of fuel, for instance, goes into work. Some, in practice often more than half, of the heat must be rejected, and as far as the engine goes it is wasted.

In a steam electric plant, for instance, the heat rejected is from the cooling of the condenser; and it may be rejected into the local river. It is for that reason that some people are concerned about thermal pollution. Sometimes the wasted heat can be used, to heat buildings for instance; but that is a separate story. In general, the conversion of work into heat goes more efficiently than that of heat into work. That is one aspect of the second law of thermodynamics.

Again, suppose that there were two equal blocks of copper, the one at temperature 0° , the other at 100° . If they were put together, they would come to 50° (approximately). One could say that so many units of heat had gone from the hot block to the cold one. If, however, both blocks were at 50° , and they were put together, nobody would expect the one to become hot, the other cold. On the basis of research, the flow of heat is from hotter to colder. This is another aspect, or maybe even a statement, of the second law.

The notion of entropy, which is usually introduced, may be used conveniently in the last example. Suppose that something takes in a certain amount of heat. The amount of heat, divided by the absolute temperature, is called the increase in entropy. In symbols:

$$dS = \frac{dQ}{T} \quad (1)$$

Where S representing the entropy, Q the amount of heat, and T the absolute temperature. (It will be recalled that the absolute temperature measured from absolute zero; in the Fahrenheit scale it is given by adding approximately 460° to the ordinary Fahrenheit temperature.)

It has been suggested that, if one distributes and takes in money, the number found by dividing the amount taken in by the denomination in which it was taken in (e.g., 0.25 for a quarter, 1.00 for a dollar bill, etc.) would be analogous to the entropy. It would also, of course, correspond to the number of pieces of money in the till.³

The cooler of the two pieces of copper would take in an amount of heat Q , say, and at some average temperature T_c , between 460 and 510 on the absolute scale. So the entropy of the cooler copper would increase. The hotter one would give up heat, the same

amount Q ; correspondingly its entropy would decrease. But the average temperature in the denominator, T_h , would be between 510 and 560. So the net increase in entropy for the process would be:

$$dS = \frac{Q}{T_c} - \frac{Q}{T_h} \quad (2)$$

which would be greater than zero, since T_c is less than T_h .

This is one example. In all cases, it is found that the entropy increases during an irreversible process. It is granted that the flow of heat from the hotter to the colder is irreversible, because in fact it does not go the other way.

All spontaneous processes are irreversible. The temperatures in the two blocks of copper would equalize spontaneously, once the blocks were put together; but the reverse process, i.e., the heating of one and cooling of the other if they were put together at the same temperature, does not happen.

IV. Order

It may be convenient, in connection with the last point, to consider the matter of "order." At first thought, it is tempting to identify "order" with "uniformity," and to think that the situation when the two blocks were at the same temperature was more orderly. Of course, the word could be used thus. But that is not what it meant when it is said that the order in a system tends to decrease.

In this paper, order must be understood as referring to arrangement, or something of the sort. Some have defined "order" as "adaption to a purpose," or words to that effect.⁴ Aristotle used to like to speak of the order of an army.⁵ In this sense, an army has order, a mob very little; although the members of the mob might look more alike than those of the army.

V. Another Statement

In principle, when the two blocks of copper were at different temperatures it would have been possible to get some mechanical work from them. The hot one, e.g., might have boiled some liquid, say ether, and the vapor would have run a small steam engine, and then might have been condensed by the cooler one. Such a process, of course, would cause a transfer of heat from the hotter block to the cooler; but, it would bring about something that would have happened spontaneously anyway.

Thus it has been proposed that the second law might be stated in some such terms as: mechanical work can be obtained only from a process which will proceed spontaneously—or perhaps better, from a process such that some spontaneous process will produce the same end result.⁶ (Which, in this case, would be the transfer of heat from the one block to the other.)

VI. Yet Another Statement

The statement above is akin to what is wanted here. What is needed now is a statement to the effect that if a system should undergo an irreversible process without exchanging either heat or work with any-

thing outside the system, it would afterwards be less able to do mechanical work than it was before.

For instance, the two blocks of copper could be considered a system. Suppose that they were put together for a short time, then separated. The temperatures would have equalized partly, but not wholly. And the process, of course, would be irreversible. Afterwards, the blocks would still effect some mechanical work, as suggested above, but less than before.

This may be shown by adapting a result given in some books on thermodynamics.⁷ It has been shown that in an irreversible process the entropy increases, and it is shown in the reference that as a result an amount of energy given by

$$E = T_0 (S_f - S_i) \quad (3)$$

becomes unavailable for doing work as a result of this. In this equation, S_f is the entropy after the irreversible process, S_i that before, and T_0 the temperature of the "heat sink" which is available. (In the example of the power plant, the river, into which waste heat went, was the "heat sink.")

A definite number cannot be assigned to T_0 , but at least the number would be positive. So a certain amount of energy becomes unavailable. If the system has no interaction with anything outside the system, then the total energy is constant. Hence there is less energy available for doing work than before. So any spontaneous process, during which a system is isolated, leaves the system less able to do work than before. Q.E.D.

VII. Application to (Alleged) Evolution

First, consider a cloud of gas, dust, or whatever it may be, in equilibrium in space. Since it is in equilibrium, there is no way of getting mechanical work from it. Then, if it be possible, let it condense spontaneously into two or more stars, planets, etc., as some evolutionists allege has happened.

The resulting system would produce mechanical work; the parts could attract each other by gravitation and pull on ropes, or something of the sort. But then the potential for mechanical work would have increased as a result of an irreversible process in an isolated system, which has been shown to be impossible. Hence the alleged condensation into stars would have been impossible.

Now consider a more ambitious case, which might be represented by Figure 2. Let there be a system in equilibrium, maybe a chamber containing oxygen, nitrogen, carbon (possibly in the form of carbon dioxide), and various other elements. The system, as it stood, would have no potential for any mechanical work, being in equilibrium.

Suppose (again, if it be possible), that the elements were to come together spontaneously to form a man. The man could, e.g. turn a crank, which could extend out of the system; thus the system (of which the man would have to be considered a part, or a stage), would have an increased potential for mechanical work through a spontaneous process. Since it would lead to an impossible result, the spontaneous process of "molecules-to-man" could not have happened.

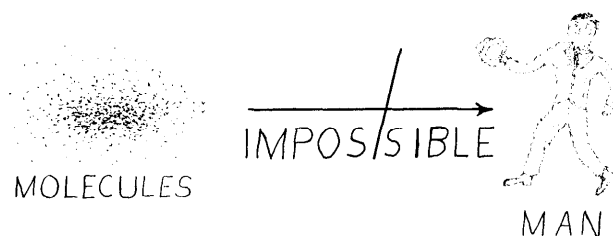


Figure 2. The "molecules-to-man" process, sometimes claimed to have happened, could not have gone spontaneously.

Notice that any "all-out" theory of evolution, in the final analysis, must entail just that: that the various elements united spontaneously to form a man. The untold ages which it is claimed to have taken do not matter. For classical thermodynamics involves nothing about the time taken for something to happen, but entails rather whether or not it will happen at all.

Neither does it matter that intermediate stages are alleged. For, again, thermodynamics does not involve any intermediate stages. Some chemical reactions may be considered to go through many intermediate stages before reaching the end result. Thermodynamics is related to whether or not the reaction will reach the end result, but does not need to be concerned about any intermediate stages.

Incidentally, the reception of radiation from the sun does not seem to matter for this argument. For one could consider the chamber of chemicals, and later (if it were possible), the man, both in the dark, but at some suitable temperature. Either the man is thermodynamically "more likely" than the chemicals, or he is not. Were he "more likely" the process from chemicals to man should, in principle, be able to go spontaneously.

But it has been shown that this is not possible. So the man is not "more likely" (as anyone would have said upon glancing at the question); and the introduction of vast times, intermediate stages, etc., would not change the conclusion. As for the radiation, it would seem to be more like a catalyst. It might make a reaction go more quickly, cause a better yield, etc.; but it would not cause a reaction to go which would not go at all in the absence of radiation.

VIII. Conclusion

It has been shown that the second law of thermodynamics, in its macroscopic form, may be used to demonstrate the impossibility of any "molecules-to-man" evolution. Of course, that impossibility has been demonstrated before, in various ways, in papers in this *Quarterly* and elsewhere. But the present discussion involves a rather different argument.

Appendix I. Statistical Mechanics

As was mentioned, a specialist using statistical mechanics, working from an atomic or molecular theory, undertakes to deal, in a statistical way, with the motion of the molecules. Since it is the entropy that is of the greatest interest here, let us consider very briefly how it is handled.

Suppose that, in a sample of gas containing many molecules, a fraction, f_0 , at a particular instant, is standing still; a fraction, f_1 , moving to the right at

say 100 miles per hour; a fraction, f_2 , at 200 miles per hour, etc. If one plotted the f 's versus the corresponding velocities, the graph might be like that shown in Figure 3. The entropy, then, is given by:

$$S = -k(f_0 \log f_0 + f_1 \log f_1 + f_2 \log f_2 + \dots) \quad (4)$$

The logarithms should be to base $e = 2.718\dots$; but another base could be used by changing the constant k . As it is, k is called Boltzmann's constant.

By comparison with the known behavior of gases, it is shown that the entropy obtained in this way corresponds to that used in the macroscopic theory.⁸

A simple example may indicate how this could work. Suppose that the molecules were all moving to the right at 500 miles per hour; if, e.g., they had just been squirted out of a cylinder of compressed gas. The f_5 would be equal to 1, and all the other f 's zero. Since $f \log f$ is equal to zero when f is either zero or one, the sum gives zero for the entropy.

Later, after some "bumping around" there will be a great variety of velocities; many of the f 's will be different from zero; and, since they will be fractions, their logarithms will be negative. Thus the entropy will have some positive magnitude; it will have increased. Since the derangement of the molecules into a more random pattern of motion was a spontaneous process, this instance shows how the entropy would increase in a spontaneous process.

Appendix II. Information Theory

By information theory specialists consider what might be a message, e.g., a series of dots and dashes if the message were sent by telegraph; and try to apply some notions of probability to the situation. For instance, a message of say 50 dots followed by 50 dashes would be highly unlikely; it would be much more likely that the dots and dashes would be quite well mixed together.

One might consider a lot of possible messages—sequences of dots and dashes—and assign to them probabilities, which could be considered as the fractions of the time that the sequence would be found. These fractions could be called f 's, as was done above for the molecular velocities, and a similar formulation set up for entropy.⁹

If, then, the operator were to make mistakes, or something became wrong with the equipment, the message would be changed here and there, in the direction of greater randomness, just as the molecular

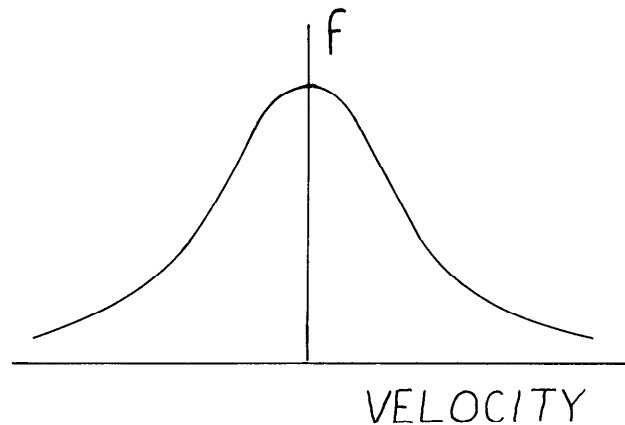


Figure 3. The fraction f of molecules in a gas moving to the right (or left), at various speeds might depend on the speed in a way something like this.

velocities were changed. Then the entropy, calculated in the way proposed, would increase.

The natural tendency is for the entropy to increase in this field too; in other words, messages become garbled. If one thinks of the "genetic code" as a message, mutations would be garbling. And just as no new information arises by garbling a message, but only nonsense, so mutations cannot lead to new kinds of creatures, but merely flaws in existing kinds.

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HUMAN EVOLUTION IS STILL NONSENSE (NO MATTER WHICH EQUILIBRIUM POPULATION IS ASSUMED)

DAVID J. RODABAUGH*

In an article in the previous issue of *C.R.S. Quarterly*, two models of the growth of the human population, the creation model and the evolution model, were compared.¹ The rates of growth, and other parameters, were deduced for each model, and applied to the Jewish population, about which some empirical information is available. It was concluded that the creation model is reasonable, but that the evolution model gives nonsense.

One of the numbers used was an estimate of the equilibrium population: the population which would be approached asymptotically. The figure of 25 billion was taken from a well known source² The author of a recent book, however, has suggested a lower figure: 9.86 billion.³ Some readers might wonder whether this different figure would cause any great change in the conclusions.

The parts of the original article affected are Tables 5 to 9, inclusive. These tables have been re-calculated and are published here, the new equilibrium figure being used. For convenience in comparison, the modified tables will be called 5' to 9'.

In these new calculations, the equilibrium Jewish population has been taken to be 80.7 million. That number is to 9.86 billion in about the same ratio as is the present Jewish population to the total population of the world.

Table 5'
The Jewish Population

Year A.D.	(Population)	Values of the Constant a (Times 1,000)			
		Initial Population = 2 began		Initial Population = 5 began	
		1700 B.C.	2000 B.C.	1700 B.C.	2000 B.C.
1899	(10728491)	4.345	4.011	4.090	3.776
1921	(14771931)	4.423	4.085	4.170	3.851
1939	(16181328)	4.433	4.095	4.181	3.862
1948	(11373350)	4.305	3.978	4.054	3.746

From Table 1, one may conclude that a is between $3.746 \cdot 10^{-3}$ and $4.433 \cdot 10^{-3}$. This information, along with that already available, is enough to calculate re-

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visions of each of the other tables, which follow:

Table 6'
**Time It Would Take Human Population
to Grow from 2 to 99.99 Per Cent
of Equilibrium (i.e.—9.859 billion)**

Value of a	Time to Reach 99.99 Per Cent Equilibrium
$3.746 \cdot 10^{-3}$	8417 years
$4.433 \cdot 10^{-3}$	7113 years

Table 7'
Creation Model/Biblical Chronology

Date of Flood	Value of a	Time for Human Population to Grow from 2 to 99.99 Per Cent of Equilibrium
2348 BC	$4.876 \cdot 10^{-3}$	6466 years
3255 BC	$4.022 \cdot 10^{-3}$	7839 years

Table 8'
Evolution Model—Uniform Growth

Man's Existence	Value of a	Time to Reach 99.99 Per Cent Equilibrium	Number of Jews in 1899 if that Value Had Held for Jews
1,000,000 yrs.	$2.082 \cdot 10^{-5}$	1,514,185 yrs.	5.42
100,000 yrs.	$2.082 \cdot 10^{-4}$	151,418 yrs.	11.26

Table 9'
Evolution-Equilibrium Model

Duration of Widespread Farming	Value of a	Time to Reach 99.99 Per Cent Equilibrium	Number of Jews if That Value Had Held During Jewish History
12,000 yrs.	$5.501 \cdot 10^{-4}$	31,463 yrs.	42.70

Conclusion

It is plain, then, that the changed figure for the equilibrium population leaves the creation model just as reasonable as before, and the evolution model just as absurd.

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PLANT DORMANCY: A KEY TO THE PAST (Genesis 1:14 and Plant Dormancy)

ALBERT B. FERGUSON*

Many plants undergo periods of dormancy, which fit in with seasonal changes of the weather. But it does not follow that dormancy is caused, in the first place, by the weather. In fact, provisions of dormancy at the right times are seen as more examples of the Creator's superb skill and foresight.

Introduction

On the third day of His creative work, our Lord made dry land appear and "clothed" it with a great variety of plant life, each a distinct kind, capable of reproducing a unique type (Genesis 1:9-13)

Genesis 1:14: "Then God said, Let there be lights in expanse of the heavens to separate the day from the night and let them be for signs, and for seasons, and for days and for years."

The Hebrew word *moed* is translated "seasons" in the authorized version of the Bible eight times; "congregations," 149 times; "solemn feast," nine times; "appointed," nine; "feast," six; "set time," six; and "set feast," five times. It seems to me that *moed* is a time or place where important events take place. I believe that in Genesis 1:14 *moed* refers to the importance of the set seasonal climatic changes that take place.

Most forms of organic life go through periodical cycles: annual, monthly or shorter. In many cases these are controlled by annual climatic changes. In temperate and arctic areas, plant, reptile, fish, insect, and mammalian life cycles are built around seasonal climatic variations necessary to their existence in many cases.

It is quite evident that the Lord God placed the earth on its tilted axis when He created it and put it in orbit around the sun. Because of this tilted axis and yearly rotation, there are varying photoperiods and temperature variances to which organic life in the cooler parts of the earth is adapted.

Most temperate and arctic area plants require a cool period of weeks or months for certain biochemical changes to take place before normal regrowth can take place. I believe that freezing temperatures are never beneficial and that in the beginning, many had a built-in tolerance to freezing, which probably wasn't needed prior to the post-deluge era. Thus the tolerance cannot have evolved.

Prior to the flood, a vapor canopy may have prevented extremes of heat and cold throughout the earth. There are strong evidences that freezing temperatures were unknown at that time. There were many types of organic life prevalent in large numbers that are unknown today apart from fossil remains; of which a few are still preserved by quick freezing and are in their frozen state. Siberia and Alaska abounded with fossil plant and animal species that were intolerant to cold.

Information on Dormancy

In an excellent article on "Seed Stratification" by Dr. Harold Pellett, Department of Horticultural Science, University of Minnesota, St. Paul, Minnesota,

seed dormancy is covered quite thoroughly.¹ And another article by Dr. Thomas O. Perry of the School of Forest Resources, North Carolina State University, Raleigh, N. C., "Dormancy of Trees in Winter," is an excellent summary of most of the known phenomena of tree dormancy.²

Woody plants of temperate areas flush with rapid terminal growth as warm night and extended day length arrives in the spring. Most plants with pronounced annual growth rings have a very short period of terminal growth which, in many cases, is pre-formed in late summer of the preceding year. Pine and red oak are prime examples. These trees set terminal buds immediately after the early growth elongates and will not renew terminal growth until the following spring unless it is pruned severely or defoliated or receives some other unusual treatment. (A long, hot, moist summer may be enough.)

Plants like birch, maple and apple with indistinct annual growth rings continue to elongate in spite of shortened days. Temperature and water supply seem to determine time of cessation of twig tip elongation and bud set. An extended chilling period is necessary before normal new growth can take place. Trees like juniper may not have a true dormancy requirement.

Cambial expansion is continual throughout summer months as long as there is adequate water and warm temperatures. Some observers think that the cambium has no true dormancy but others disagree. It is generally agreed that the roots of woody plants do not have a dormancy requirement.

Spring flowering bulbs such as tulips, narcissus and hyacinths require a chilling period before normal growth can take place. Spring flowering plants set their flower buds in July and August shortly after the spring flush of new growth.

Dormancy can be classified into early dormancy, mid-dormancy and late dormancy. The first stage of dormancy begins in mid-summer but cambial meristem continues activity. Cellulose in the first formed cells in reduced and lignin formation is accelerated. Fats and starches are stored in the wood tissues, buds are formed containing the leaf primordia in preparation for the next spring growth flush.

As cool weather and short days arrive, cambial action ceases. This is what plant men call the hardening off period. At this time there is an increase of some types of enzymes including abscisic acid. These enzymes are involved in leaf abscission and the transition from early to mid-dormancy.

In reality, as long as the temperature is above freezing, there is no true dormancy. Buds grow in size, and in quantity and types of enzymes. There is a reduction in polyphenoloxidase and phenols and an in-

(Continued on page 127)

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PANORAMA OF SCIENCE

Comets Recent—Surely Solar System Likewise

There are many attempts to evade the plain evidence for a young universe provided by comets. For comets are observed to "wear out" relatively quickly; they simply could not have formed part of the Solar System for billions of years. A popular way of avoiding the obvious conclusion has been to appeal to the idea, due evidently to Oort, of a "reservoir," out beyond the orbit of Pluto, containing huge numbers of comets in "cold storage," from which one is now and then perturbed into action. Now a paper has appeared which should finally lay this notion of the reservoir of comets to rest.¹

The paper cited contains so much information that only a few points can be mentioned. It is shown that all the alleged evidence for the shell of comets is, in fact, a misinterpretation of evidence. The author describes the shell of comets as "mythical"; and remarks that part of the reason why it has been accepted so generally is that "... others ... took its existence for granted ..."

The conclusion reached is that "... the great majority of comets must be fairly recent acquisitions by the Solar System." And so they are (although the author does not make this point), because the Solar System is fairly recent. The comets, in fact, provide good evidence of the youth of the Solar System.

Dogma vs. Fact in Vitamin Research

Most readers know about the controversy about vitamin C, in which Pauling, especially, has been engaged. Some investigations reported recently² may be worthy of notice, however.

Experiments, carried out on guinea pigs, showed that while it is true that certain amounts of the vitamin are sufficient to prevent scurvy more or less completely, it is not true that amounts greater than those are useless. In fact, amounts up to 20 to 40 times the common dose showed good effects, in terms of general growth, speed of healing of wounds, etc.

The author of the article in which the work is described complains about the "... crippling but time-honored assumptions ... (that) ... ascorbic acid functions merely to prevent scurvy, and secondly, that within a species a narrow range of needs must of necessity exist ...". Those who are concerned with vitamins are asked to "... ascertain the actual facts, in contrast to those which fit most gracefully into preconceived ideas and dogmas ...".

Although this work has to do with vitamin C, it is asked, very reasonably "... can there not be comparable uncertainty with respect to other vitamins ...".

Does this not sound familiar? What more crippling assumption could there be than that of uniformitarianism? Does Darwinism not provide a preconceived dogma, so that facts which fit gracefully into it, if there be any such, are chosen? It is admitted that there is uncertainty about the origin of e.g. birds. It is not likely that, as far as evolution goes, there is comparable uncertainty about all origins?

Here, as in many other fields of science, the stultifying effects of prejudice, of making up one's mind before the facts are in, are becoming apparent. The

same effects are evident in the closed state of mind of evolutionists.

Do Index Fossils Need Re-Indexing?

A person who has not previously studied geology is usually amazed to find that the ages of rocks are not determined by fossils of dinosaurs, mammoths, etc., but supposedly by fossils of tiny sea-creatures such as the foraminifers.

Of course, it would be desirable to correlate the presence or absence of several kinds of fossil; and that is often done. Sometimes, it would appear, the results are fairly satisfactory; sometimes they are not.

It is concerning matters of this sort that a controversy has been manifested in the journal *Nature*.^{3, 4} As the summary of the matter said, the discoveries "... seemed to invalidate the timing of what was thought to be one of paleontology's most reliable datum planes—the first appearance of the planktonic foraminifer, *Globorotalia truncatulinoides*. This plane had always been taken to mark the onset of the Pleistocene about 1.8 million years ago."

The controversy continues. Whatever the outcome, one might be delineation that many of the geological ages are based on rather flimsy evidence.

Can Racemization Indicate Ages?

The process of racemization seems to be taking a place along with the decay of carbon 14 and other radioactive isotopes as a way of attempting to determine the ages of remains. Racemization applies especially to bones.

Certain of the organic materials in living things can exist in both the right-hand and the left-hand form. However, in actual living things, only the left-hand form is found. (This fact is itself an argument against uniformitarianism, as has been noted before.)

When some living being dies, however, the materials start to turn into the right-hand form, at least partly; and the end result is a mixture of the two forms. It is possible, by suitable analysis, to find the proportion of the two kinds, and thus, the rate being supposed known, to calculate how long ago the living thing died. Similarity to the studies with carbon 14 is apparent.⁵

The rate of the racemization, a chemical process, is known to depend strongly on the temperature, as do most chemical rates. Thus a letter,⁶ in commenting on the method, has maintained that the method cannot yet be considered reliable, because of the possible effects of temperature, and maybe other things, too.

It might be remarked, in addition, that surely the possible presence of catalysts should be considered under "other things." The way in which a catalyst, present maybe in a very small amount, can speed up a reaction, is well known. Possibly something similar could be involved in racemization.

Another Anomalous Proportion of Isotopes

Something unusual has been found in uranium in a deposit at Oklo, in Gabon, Africa. Ordinarily, the uranium consists mainly of the isotope 238. Generally, there is also a certain small amount of the isotope 235, which might be called the explosive one. The uranium

at Oklo does contain some type 235, but in some samples not much more than half of what is commonly found is present.⁷

It appears, then, that under certain circumstances, arising naturally, the proportions of radioactive isotopes can differ rather widely from what is expected.

It is common, as is well known, to try to determine the ages of rocks from the amounts of various isotopes present. Had any such attempt been made at Oklo with the uranium, the results would plainly have been meaningless. This can be another piece of evidence to show that alleged ages, obtained by such methods, should be viewed with much reservation.

Uniformitarian Theorists Cannot Explain the Moon

The Moon, as well as inspiring song-writers and poets, continues to provide stumbling-blocks for evolutionists regarding the origin of the Earth.

It is hard to believe, in any uniformitarian theory, that the Earth and the Moon formed simultaneously, in more or less the relation in which they are now. So it is usually supposed that either one body broke apart to form the two ("fission"); or else that the Moon, having been formed separately, was acquired by the Earth some time later ("capture").

The author of an article on the subject has pointed out that either of these concepts involves difficulties.⁸ As for *fission*, it is hard to believe that the Earth once spun rapidly enough to throw off the Moon. Moreover, if that had happened, why is the Moon's orbit inclined to the Earth's axis?

It is not clear, on the other hand, that a planet can capture a satellite. As the author wrote: "Capturing a satellite, as it turns out, is most difficult." An attempted capture would give something with an orbit still around the Sun; as, indeed, has happened to the comets "captured" by Jupiter.⁹

The conclusion is, that as far as uniformitarian ideas of the origin of the Moon go, all models "... fall considerably short of a satisfactory explanation ...".

The Creation of the Moon, on the other hand, as set forth in the Biblical record, offers no real difficulty to anyone who does not let prejudice keep him from admitting the possibility of Creation.

Planetary Orbits Prove Nothing About Origins

One result of the continuing controversy about Velikovsky's suggestions is that some questions, which were considered to be closed, have been re-opened. One of these concerns some points of celestial mechanics. Perhaps it would be better to say that the results, long largely neglected, of a previous re-opening are now receiving some study.

The motion of a single planet around a Sun, considered as a problem in mechanics, is fairly simple. If there are several planets, however, they exert gravitational forces on one another. The problem of calculating the motion then becomes impossible, except by a series of approximations. Astronomers call these effects of the other planets "perturbations."

Newton believed that these perturbations might eventually make the Solar System unstable in some way, unless God should intervene to set it right again. Laplace, Poisson, and others, in the eighteenth and nineteenth centuries, believed that they had shown

that the perturbations remain limited in their effects, so that the orbit of a planet, for instance, would merely vary back and forth slightly about some mean orbit. This is still often stated or written as a fact.

Unfortunately, the solution is worked out in infinite series, which may not converge unless the disturbances are small. So the stability was assumed in trying to prove it; the question was begged. This has been known since the end of the last century.^{10, 11}

The possible instability of orbits is perhaps not so directly concerned with Creation. What is of interest is the fact that if some unusual event should occur in the Solar System, the planets, because of mutual interaction, would afterwards settle into a configuration something like the present one; described, to note only one feature, by Bode's law.

The point of this is that, even just according to the mechanics, the present configuration of the Solar System might have come from any one of a very great number of earlier configurations. It is something as if billiard balls had been "broken" violently; one could not calculate back, after they had come to rest, to find how they were moving shortly after the "break."

Thus, any attempt to determine from the present configuration of the Solar System the nature of a nebula, or swarm of "protoplanets," or something of the sort, whence it would be alleged to have originated, is bound to be inconclusive.

Astronomy and Chronology

Not only is astronomy a science of import, but also it has a related interest to those who believe the Bible. This is because of applications, legitimate or otherwise, of astronomy to chronology. Some information which may have a bearing on such applications is available.

In two more articles, a researcher has continued to point out places in which, it is argued, the data given in Ptolemy's *Almagest* were fudged.^{12, 13} It is not likely that those particular data will be used in chronology. But other data from Ptolemy might be; and when some data are found to have been fudged one is inclined to look very carefully at other data.

Whatever anyone may think about Velikovsky's views on astronomy it must be admitted that he has studied ancient records very carefully. So his views on chronology deserve at least a hearing. He has maintained that many of the astronomical methods, and in particular the "Sothic" method, by which the dates of events in ancient Egypt were established supposedly, are worthless. Indeed, they serve to perpetuate a chronology which had been set up, apparently by conjecture, before the hieroglyphics had been deciphered.¹⁴

Much the same must be said, it has been claimed, about many—but not all—of the attempts to establish ancient dates from remarks about eclipses.¹⁵

Indeed, there is evidence to show that the term "eclipse" may not necessarily have meant in ancient times as restricted a range of phenomena as it does now. For instance, Luke in chapter 23, verse 45, stated literally, in the Greek, that the Sun was eclipsed at the time of the Crucifixion. There was, indeed, darkness. But it could not have been an eclipse in the astronomical sense. The time was the Passover—

the full Moon. The Moon was on the wrong side of the Earth to cause an eclipse of the Sun. Evidently "eclipse" just meant a darkening or hiding, whatever the cause.

Again, some authors wanted to interpret certain ancient inscriptions as referring to an eclipse of the Moon on the 25th of the month, or of the Sun on the 26th. But there can be no eclipses on those days of a lunar month; eclipses of the Sun can come only about the beginning or the end of the month, those of the Moon about the 14th or 15th.

More Evidence of a Catastrophe?

Another example has been found of a "hiatus" in the deposits on the floor of the ocean. This particular hiatus involves the time of the early Oligocene (according to the conventional geological names), and was found in the north-eastern Indian Ocean. The writers suggest, however, that it might be world-wide.¹⁶

It is worth while for creationists to make note of findings of this sort; for they may be useful in working out a more detailed account of what happened during the Flood.

Are Footprints Becoming Scientifically Respectable?

Footprints will be familiar to many readers, from the well known film, *Footprints in Stone*, and from other reports. However, reports of such findings can be seen in other scientific journals.

Editors of *Nature* have published the photograph of a footprint, which, according to the report,¹⁷ was found in volcanic ash near Demirköprü, Turkey, in 1970. The print is now in the Museum of National History, Stockholm. It is said that the print seemed to have been made by one running toward the River Gediz. The estimated age is said to be 250,000 years.

The similarity of some to the circumstances to those connected with the prints found near Glen Rose, such as the appearance of haste, and the association with a river, is striking. Incidentally, this print does not appear nearly so convincing as some of those from the Paluxy River.

A Distinction Needed

It has been common, in these pages and elsewhere, to distinguish between micro-evolution, which is what happens in e.g. plant breeding within kind, and macro-evolution, which is what evolutionists usually claim e.g. change over time *across* kinds. The distinction, of course, is not new, having been made, for instance, in *Science Is a Sacred Cow* by Standen.

There are those who say that the "micro-" process should not be called "evolution" at all; and certainly they have a point. But others present evidence for the "micro-" changes, which, indeed, nobody denies, and then talk as if this were also evidence for the "macro-" process. So it is worth while, now and then, to remind readers that a distinction must be made.

The present purpose here, however, is to suggest the need of another distinction. It is proposed, in fact, that those who talk about evolution should distinguish between "one-shot" and "continuing" evolution. (To propose this distinction is not to admit that either occurred. But it is always possible to say to an opponent:

"I do not agree with you in any event; but at least you might try to argue logically." And, in fact, since distinctions are ways of getting at the truth, and since the truth is on the creationist side in the controversy about origins, creationists can expect that ultimately any *true* distinctions will be advantageous to creationism.)

To be specific: In talking about the "origin of species," evolutionists make much of the uniformity of things; they try to hold that supposed causes which brought about the diversity of living things are still active. If that were so, then evolution should still be going on. So that would be "continuing" evolution.

On the other hand, some talk, usually rather loosely, about the "evolution" of "life," i.e. of living things, or even of the universe. Nobody, presumably, would maintain that such events are happening now just as they are alleged to have happened in the past. So if the origin of living things, or of the universe, be called evolution, then such events would have been cases of "one-shot" evolution.

The reason for making the distinction between "continuing" and "one-shot" is the same as that for the distinction between "micro-" and "macro-." If the distinction is not made, some people will present, what is claimed to occur, as something in support of "continuing" evolution, e.g. something about white and black moths. Then it will be assumed tacitly that the same thing serves as evidence for some "one-shot" evolution. But, of course, nothing could be farther from the truth. It is conceivable that the universe and a few kinds of living beings might have originated by special Creation, and the diversity of living things come about by variation and selection.

Indeed, Darwin, at times, suggested something of the sort. On the other hand, if the universe, and some living things could have come about by what might be called "evolution," it would still be possible that further kinds of living things could have been created directly. Indeed, some creationists hold a view somewhat akin to this: that after the Flood, God intervened directly to increase the diversity of living things. Certainly such a thing could have happened, but it is beyond the present purpose to discuss the idea further.

The point to be made now, however, is clear: anyone who wants to hold both "continuing" and "one-shot" evolution needs to substantiate both concepts, separately. And that, creationists maintain, is what cannot be done.

Analogy Casts Doubt Upon Natural Selection

For Darwinism, whether of the "neo" or the "paleo" variety, two things have to be supposed: changes in living things, and some way of maintaining at least some of the changes. The second item is by no means unimportant; anyone who has ever been in a "tug of war" knows that holding what has been gained is as important as gaining.

It is for the purpose of "holding," of course, that natural selection is invoked. Someone has said that it is a "ratchet" to hold what has been gained. The analogy is to the ratchet in a ratchet-type automobile jack, for instance. The ratchet holds the automobile at the fraction of an inch by which it has been lifted, while the lever may be lifted some more.

The analogy is clever, but is it truthful? First of all, the motion of the lever, which would correspond to variations in living things, is certainly not a random thing. No, the lever is moved up and down in purposeful strokes of the right length; to rattle it up and down at random would not accomplish desired results.

There is another analogy which may be more to the point. Consider the arrangement of electrical parts, shown, in the conventional way, in Figure 1.

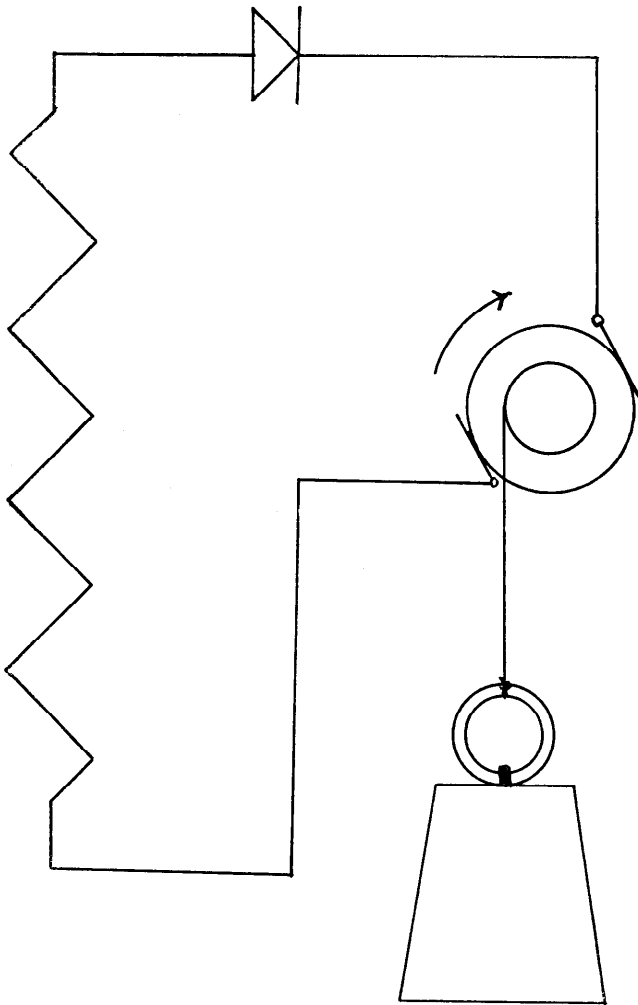


Figure 1. As electrical noise cannot lift the weight, so "genetic noise" cannot lift the level of complexity of organisms.

The resistor, shown by the zig-zag, has electrical "noise"; electrical current tends to flow back and forth in it in a random way. This electrical noise would show up as noise in a radio receiver, for instance, hence the name; in a television set it would appear as "snow."

Because of the rectifier, shown by the arrow-head, electrical current will flow in one way, but not in the other. So an electric current is set flowing in the electric motor, to make it turn and, for instance, lift a weight, as represented in the illustration.

While the proposed arrangement seems plausible, engineers agree that it would not work. It is not in conflict with the conservation of energy, for the resistor would take in heat from the surroundings; but it is in conflict with the second law of thermodynamics.

For one statement, or consequence, of that law is that it is impossible to have a device which, working indefinitely, will take in heat and convert the heat into mechanical work, such as that done in lifting a weight.

The "catch" seems to be that in the rectifier, and perhaps in other parts of the arrangement, there will be other electrical fluctuations which, on the average, will just counteract those in the resistor. Thus nothing would be accomplished.

Is it not likely that the natural selection, which in this analogy, might correspond to the rectifier, would fail to accomplish the alleged task of "holding" for a similar reason? Darwin, for instance, mentioned proto-giraffes, which could eat off the tree-tops. But in times, or places, in which there was plenty of grass the long neck would be no advantage; it might well be a disadvantage, by making the animal clumsier, for instance.

So, just as fluctuations in the rectifier counteracted those in the resistor, fluctuations in the conditions under which animals live would counteract the variations which might have been advantageous had living conditions remained absolutely unchanging. So "variation and selection" lead nowhere, on the average.

Incidentally, "survival of the fittest," which is the same notion as selection, is denied flatly in Ecclesiastes 9:11.

—Contributed by H. L. Armstrong

Squirrel Shopping Habits Do Not Prove Evolution

Plants like the lodgepole pine (*Pinus contorta*) now select fewer seeds and more seed protection in supposed evolutionary responses to seed predators, according to Phillip Elliot.¹⁸

In the last several years two theories have been proposed as to how plants react to seed predation: some workers claim that seed predators discriminate between trees on the basis of which tree will yield the highest feeding rate, thus selecting for fewer seeds per cone; while others postulate that seed predators select for smaller seed size by killing a higher percentage of the seed crop of trees with fewer but larger seeds.

Elliot maintains that evidence now seems to show that the first view above is more tenable, because seed predators have been found to choose cones from trees that have the most seed per amount of cone material.

The author claims that the pine squirrels (*Tamiasciurus hudsonicus*) discriminate between the lodgepole cones upon which they feed. The squirrels apparently select on the basis of visual stimuli, usually on the width of the cone and the shape of the cone in relation to its attachment to the branch. From these stimuli squirrels determine the number of viable seeds per cone and the ratio of total seed weight to cone weight.

Research was done in the lodgepole forests of southwestern British Columbia: three pine-squirrel territories were marked out and sample data were collected from each plot. Elliot states that the method used in measuring predation intensity, "though based on estimations and extrapolations, affords a great advantage in that it takes into account the trees' past history of experienced predation" (p. 225).

Upon the completion of sampling, computer multiple regression analysis produced a statistical model

regarding the degree of predation experienced by a given tree during its lifetime as the dependent variable, and cone and seed characteristics which dictate a squirrel's feeding preference as the independent variables. The analysis yielded five independent variables as statistically significant: cone width, number of viable seeds per cone, ratio of cone length to cone width, proportion of cone length from the widest point to the apex of the cone, and per cent of total cone weight in seeds.

Elliot concluded that these factors generally determine which trees the squirrels feed upon. Since those trees having cones characterized by the significant factors will suffer more predation than those which do not, they will not produce as many new trees over the years. Gradually, natural selection will yield lodgepole forests characterized by different factors, and Elliot reasons that those trees whose cones have more seed "protection" per seed will eventually become dominant.

Elliot must be given credit for the depth and completeness of his research despite the fact that his results did not follow his expectations. In two of the three plots, the five independent factors selected were not statistically significant. This deviation from the predicted may be the major weakness in Elliot's ideas, because his findings actually support his contentions in only one of three cases!

Elliot states it is necessary "to point out that *how* a squirrel determines seed number or the proportionate amount of seed weight in the total cone weight is not the critical point" in his research; instead, his main concern is "identifying the *effects* of . . . selection in terms of the evolution of plant reproductive characters" (p. 229). But to demonstrate evolution, one must not merely present the supposed effect, but also some specific cause.

Even if the pine squirrel is a selecting agent for *Pinus contorta*, despite the statistical problems the author found, evolution is not supported or even indicated. The case may be likened to that of the English peppered moth (*Biston* sp.) where no true "evolution" has taken place, but where the population balance has simply shifted.

If Elliot's proposal is correct, *true* evolution is not taking place, but over the years the phenotypic ratio is simply being changed so that there will be more lodgepole pine trees with "protected" seeds than there were before. Any evidence of "evolution" might come from a consideration of the lodgepole fossil record, something Elliot has not discussed. Elliot has no case for evolution.

—Contributed by Bart Clarke,
Los Angeles Baptist College.

Desert Survival and Four-carbon Photosynthesis

The highly efficient photosynthetic four-carbon plants are the subject of an article by Bjorkman and Berry, who show that these plants are adapted to conditions of high temperature, low water supply, and low carbon dioxide concentration.¹⁹ The highest rates of production of the four-carbon plants are reached during the dry months of May through August. Some are found in arid localities such as Death Valley.

The four-carbon plants seem to acquire a large

number of carbon dioxide molecules without losing too much water through stomates. The efficient method by which these plants maintain such a high rate of photosynthesis while experiencing a relatively low water loss is the concern of these authors.

The "secret" of the four-carbon plant is that it has two photosynthetic cycles instead of just one. In the normal photosynthetic process, carbon dioxide enters the Calvin-Benson cycle directly, forming a three-carbon molecule known as phosphoglyceraldehyde (PGAL). In the four-carbon plants, the carbon dioxide first enters a completely different cycle before reaching the Calvin-Benson sequence:

(a) The carbon dioxide reacts first in the mesophyll cells with phospho-enol-pyruvate (PEP), a three carbon compound, to form a four-carbon compound called oxaloacetic acid (OAA).

(b) The OAA forms malic and aspartic acids (also four-carbon acids) which enter the bundle-sheath cells and release a carbon dioxide molecule to the Calvin-Benson cycle.

(c) Four-carbon plants have a complex array of cells forming concentric cylinders around the fine veins of the leaf—bundle sheath cells.

(d) The three carbons of an aspartic acid, which remain after the carbon dioxide is released, form a pyruvate, which again enters the first cycle.

Thus the first cycle does not yield a product as such, but is simply a device in which carbon dioxide is fixed and transferred to the Calvin-Benson cycle with great efficiency.

While the leaf of a three-carbon plant must be saturated with carbon dioxide for proper functioning, the four-carbon plant, by virtue of this process, can utilize carbon dioxide in the cell even at extremely low concentrations. As the authors point out, because of this efficient use of carbon dioxide in the four-carbon leaf the stomates are closed longer, thereby reducing water loss.

The authors point out that many agricultural crops are of the four-carbon type. They correctly suggest that agriculturalists consider the possibility of widely cultivating four-carbon domestic plants in areas that are now desolate. This is a timely subject in a world where people are looking for additional sources of food.

On page 93, Bjorkman and Berry add a new twist to the supposed "proofs" of evolution. They admit that many of the four-carbon plants are in no way related to other four-carbon plants but that each "evolved" this cycle independently of the others. Usually when one envisions evolution, he thinks of a series of links. According to these workers, however, each different type of four-carbon plant evolved independently through the millennia past.

But if it is unlikely that even one plant group would produce the enzymes and anatomical modifications involved in four-carbon photosynthesis, how probable is it that 100 plant genera from over 10 different families would undergo these complex evolutionary changes independently? It seems more logical to attribute the similarities in design to the various four-carbon plants to an Omniscient Creator.

After a moment's reflection, it seems obvious that a three-carbon plant would have to possess ALL the

essential enzymes and anatomical changes required for the four-carbon process if the cycle is to be of "value." Yet how could a three-carbon plant gradually acquire the necessary enzymes and other changes in response to drought or high temperature? Here is another instance in which well-adapted systems appear in certain plants with no links to show any supposed gradual evolutionary development.

Just as a bat's wing is of little value before it is completely functional, the four-carbon cycle would be of little or no value in conserving moisture until fully developed. Yet it is inconceivable according to present mechanisms proposed for natural selection that either a bat's wing or four-carbon photosynthetic equipment could form quickly and completely as would be required for survival value in neo-Darwinian evolution.

Unwittingly, Bjorkman and Berry present a strong argument for rapid action in Divine special creation of the four-carbon photosynthetic apparatus as a moisture conserving and highly efficient photosynthetic sequence in various "unrelated" plant groups.

—Contributed by Orville C. Murphy and George F. Howe, Los Angeles Baptist College.

Setting the Record Straight

At least since November, 1972 editors of *Science* have periodically referred to the majority "opposition" of "evolutionary" biologists to attention by parents and others "to the teaching of evolution theory," as one author used the expression recently.²⁰ And in an associated "briefing" column²¹ the Creation Research Society was mentioned, as if the organization was a part of "a nationwide campaign by fundamentalists to adulterate the teaching of evolution." (Of course determined, dedicated evolutionists are, in their way, fundamentalists too! Most evolutionists have a *prior commitment* to a particular ideology as seen in Simpson, G. G. 1964. *This View of Life*. The World of An Evolutionist. Harcourt, Brace and World, Inc.)

Thus another denial of *any* political or lobbying action by the Creation Research Society must be asserted once again. Only individual C. R. S. members have been associated at all with actions in California, Texas, Tennessee, Ohio, and other states; where parents have expressed criticisms of schools, because they felt that their children's values and beliefs were being altered undesirably.

Members of the Creation Research Society, in addition to sponsorship of publication of the C. R. S. *Quarterly*, have only tried to be of service, *as individuals*. C. R. S. members are quite active, *as individuals*, in pointing out the "bankruptcy" of terminology used by "evolutionary" writers, which is so well illustrated in various series of articles in recent months in *The American Biology Teacher*,²² *Science*,²³ and *Scientific American*.²⁴

Authors repeatedly utilize such terms as "could," "might," "suppose," "suggest," and "expected" with regard to ideas of first origins, which are absolutely untestable, and hence are outside of good, solid scientific investigation. Even the word, "scenario," is used as authors in *Science* have *imagined* aspects of origin of the moon. Since when has scenario writing, i.e., play writing, become a part of *scientific* endeavor?

This writer maintains regularly in public addresses that evolutionists include supernatural events—supra natural or beyond the natural—in their thinking about some "big bang" explosion to start the universe, spontaneous generation of first life at the sub-microscopic level or organization, movement of dry rocks in supposed mountain building and initial continental drift, plus accidental mutational changes (errors) in the appearance of humankind. None of the *imagined* changes are natural, nor repeating, and hence evolutionists do dabble in the supernatural.

In short, evolutionists have been teaching a purely *imagined* belief system about first origins in the public schools at most levels for the last three decades, if not the last 100 years. I hold that the late Julian Huxley and his sycophantish followers in the public schools, with their "evolutionary" humanistic faith, are the ones who have been violating the so-called separation of church and state. Parents rightfully criticize school systems wherein teachers of their children are guilty of selective indoctrination of the young into one belief system about origins, **at taxpayers' expense**—especially so, if that belief system is diametrically opposite to beliefs about first origins taught in the home.

—Contributed by John N. Moore

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BOOK REVIEWS

Physical Science for Christian Schools by Emmett L. Williams and George Mulfinger. 1974. Bob Jones University Press, Greenville, South Carolina 29614. 628 + xi pages. \$15.00.

Reviewed by Ron Dickey*

From the finest detail of the most easily read type to the unique sketches and outstanding illustrations and diagrams, those responsible for the production of this book have succeeded in developing a text of very superior quality.

The introduction contains excellent suggestions on how to study science. In the first unit, science is defined and placed in proper perspective in society, both the strong points and the limitations of science being stated.

Limitations, it must be said, are too often not made clear in textbooks. In this book, the authors clearly show, for instance, that, contrary to popular belief, science does not result in final or absolute answers or truth. Neither can scientists, as scientists, prove a universal negative, or make value judgments. Indeed, things like matter, energy, and gravity are not really fully understood by scientists.

Points such as these are very well explained; and I feel that they should be understood by any science student.

The importance to the scientist of facility in math and in English grammar, as well as discipline in work habits, is pointed out. Throughout the text each topic is made relevant to the present-day society; at the same time historical developments of many of the major principles of physical science are traced. Along with this, there are biographical sketches of outstanding scientists who have contributed significantly to the topic being studied.

Each topic is treated in a depth, and with a wealth of detail, found in few other present grade nine texts. The coverage is so clear, lucid, and interesting that it is easy to understand the ideas; yet as complete as one could hope for at this level. The classification of matter, the introduction to measurement, and the introductory chemistry are but three examples of the good qualities mentioned above.

Another superior feature of the book is the large number of excellent questions, problems, and student activities; plus a list of terms, found at the end of each chapter.

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Yet a strong point of the book might also be a weakness. The depth, quality, and quantity of material covered make the text long enough for two complete years of science, or two courses. Thus some might consider the cost prohibitive if the book were utilized in only one course. Perhaps two separate books, one ending at unit VII, the other beginning at unit VIII, might have been better, or might yet be considered.

The following topics are especially noteworthy, either because of their unique treatment, or because they are not usually found at all in a grade nine text.

1. The creationist viewpoint is presented and compared with the "evolutionary" one wherever this is applicable to the material being covered. For example, the Flood model for the origin of fossil fuels is clearly the most logical model.

2. There is an excellent treatment of the two laws of thermodynamics, which presents some of the most basic and important concepts of science. These concepts, which are often very difficult for beginning science students to understand, are presented in a lucid, interesting fashion.

3. The treatment of pollution and related questions is also very sane, clearly pointing out the pros and cons of control of pollution, and the dangers of extremes in these matters. For example, the authors point out that where a decision has to be made as to whether the production of food or keeping the environment free from certain insecticides is more important, the best decision may not necessarily be one favoring the environment. In that connection, the authors suggest that the greatest present-day pollution problem may be the pollution of the individual by drugs, alcohol, and tobacco.

In summary, this text contains one of the most comprehensive and realistic treatments of Introductory Physical Science which one could hope to find. The subject is presented in an interesting, often amusing, and always lucid fashion. Students studying from this text could hardly help but understand the process or method of science, and the dangers inherent in blindly accepting statements of supposed fact.

The authors really show the fallibility of man as they trace the "Great Ideas" or principles of science such as the periodic table from a historical perspective. They show how easily "honest mistakes" can be made, and show the importance of ever seeking for truth. They show, indeed, that only God is unchangeable

while ideas in science are repeatedly changing. This point is vital; it is clearly made; and it should be understood by every student of science.

"Introducing Scientific Creationism into the Public Schools" by Henry M. Morris. Institute for Creation Research, San Diego, California., 1975. Booklet. 16 pages. Price 30 cents.

Reviewed by Richard B. Bliss*

"Introducing Scientific Creationism into the Public Schools" is a much needed booklet for the public school practitioner today. The author offers pertinent instruction relating to how a relatively controversial concept can be dealt with, and still recognizes that it is the height of folly to imagine that school boards will turn away from evolution and accept creation as a major theme in the classroom overnight.

Dr. Morris gives general, however not complete, instructions to the teacher, administrator, and the school board official regarding implementation on a supplementary basis. He alludes to the normal paths that must be taken in order to bring about the proper implementation and subsequent acceptance, of scientific creation in the public school classroom. There must be a reeducation of teaching staff and the development of educational "packages" that are readily available to teachers and contain the necessary help with implementation.

This booklet should be a great help to pastors as they formulate guidelines that will help them in their own instruction. In this respect it places a great responsibility upon the church's training program. The pastor will have to refine the thinking of his people toward the biblical aspects of creation that cannot be dealt with in a public school context. Pastors using this booklet can quickly place the philosophical "world view" of evolution into its proper context as it relates to generally held religious values.

The author seems to face all the major problems and conflicts that individuals can expect to face when they embrace creationism or even allude to it as a viable alternative to the evolutionary model.

One of the best segments of information, from my point of view as a supervisor of science, is found in the last chapter on the legal basis. In that chapter the author shows his understanding of our present legal system, when he indicates the legal conflict that is posed when "biblical creation" rather than "scientific creation" is proposed; however, he also points out that a two-model approach to origins is not only acceptable, but desirable. The concluding statement by the author expresses this more adequately:

The only fair, legal, constitutional solution of this problem is to teach both evolution and creation, strictly as scientific models of origins, whenever and wherever the subject of origins is under discussion.

This booklet is a great starting point to subsequent and detailed instructional techniques that must follow as additional curricular materials in scientific creation become available to school teachers and administrators. Once again, Dr. Henry Morris, with his prolific

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pen, has afforded an effective prod toward developing materials in a sound and practical scientific frame of reference.

When Science Fails by John Hudson Tiner. 1974. Paper, 136 pages, Baker Book House. \$1.25.

Reviewed by Bolton Davidheiser*

This little book has much to recommend it and contains many interesting facts which may be of use to those who relate science to scripture in public talks or Sunday school lessons. However, there are some statements which are unfortunate.

On page 80 the author stated that cosmic rays strike carbon-12 and change it into carbon-14, but it is nitrogen-14 that is changed to carbon-14.

And the author wrote that Gregor Mendel "couldn't bear the thought of using mice in experiments," and so did his work on heredity with garden peas. Certainly breeding experiments would not hurt the mice in any way, and Mendel *did* make crosses with gray and white mice. But some of his contemporaries doubted it was proper for a priest to engage in activities dealing with natural science and they would have been shocked indeed had they known he crossed mice.

Mendel's biographer, Hugo Iltis, believes he did the mouse crossing *before* he did the work on peas, and thus Mendel knew in advance what ratios to expect from the peas. In fact, the ratios reported from the pea work were "too good" and two statisticians have accused him of cheating a bit in making his counts.

Mr. Tiner says that "science has no quarrel with religion." Would indeed that this were so. There is no need for quarrel, but those who work in the area of presenting science and the Bible to the public in lectures know all too well the very real quarrel between many "evolutionary-minded" scientists (and those they influence) and those who promote the Biblical view of origins!

Adam When? by Harold Camping. 1974. Frontiers for Christ, 3016 Gibbons Drive, Alameda, CA. 94501.

Reviewed by Donovan A. Courville†

Several concepts presented in this volume have merit. Camping has gathered evidence from oceanography from which he has deduced a relatively young age of the earth—far too young to fit the demands of "evolutionary" geologists. However, these data are irrelevant to his proposed dating of Adam in the late twelfth millennium B.C. (p. 259).

The reviewer believes that Camping has correctly interpreted the evidence of extensive migrations in the late predynastic period into Egypt as reflecting the Biblical incident of the Dispersion from Babel, thus placing the incident at no long time prior to the opening of the Egyptian dynastic period. Such recognition, however, provides no support for the currently ac-

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cepted date c. 2800 B.C. for the beginning of the dynastic period, a date Camping seems to take for granted.

Camping has also provided what may seem, at first glance, to be more realistic background for Joseph in the XIIth Egyptian dynasty whose kings reigned from the Delta region, rather than in the Hyksos era as some have proposed. One can only ask, however, why he did not move Joseph back an additional three reigns and correlate Joseph with the extensive famine recorded in the reign of Sesostri I. The inscriptive evidence meets the details of Scripture for the famine of Joseph in a remarkable manner. If the reviewer is permitted to surmise an answer to the question raised, it would be that such a placement would have negated most of the arguments derivable from Camping's basic thesis.

Fundamental Question Raised

This raises the following fundamental question which must be given a satisfactory answer, and which should be answered by any one who presumes to deal with these problems of Biblical archaeology: Does *any* chronological scheme, purported to provide a correlation of archaeology and Scripture, merit serious consideration, if the originator of the scheme must disregard the unique details of Scripture in favor of trivial details which are susceptible to alternate interpretations, because such details have little or no unique qualities?

Claims are made by archaeologists, and accepted by even most Biblical archaeologists, that Scripture contains numerous errors and historical inaccuracies. These claims are based on failures of archaeologists to reveal the expected corroboration of these details if they are factual. Camping's chronology did meet a few of these details which are not accounted for by most previous proposals. But he did not adequately meet the many other claims of error which result from the placement of the Exodus in the XVIIIth Egyptian dynasty as he has proposed.

By identifying the pharaoh of the Exodus as Thutmose III, and setting the event at the point of the death of this king, Camping provided a *possible* explanation for the death of the Exodus pharaoh in the Red Sea debacle. This detail is met, however, *only if* one is willing to accept the large improbability that the body was recovered and returned to Egypt for burial. If the background of the Exodus as given in Scripture is factual, it is far more probable that the Egyptians had other things to think about than attempting to find the body of the pharaoh, even if it could have been known that his body was not still at the bottom of the Red Sea. (Exodus 15:5)

Even more at odds with the Scriptural account is the absence of any evidence of crisis at this point in Egyptian history. The repeatedly observed sequence in antiquity has been the successful revolt of tribute-paying peoples at the least sign of weakness in the government, with a coincident loss of the empire.

No such situation followed the death of Thutmose III. The power and prosperity attained under Thutmose III continued into the reign of Amenhotep II with no diminution. The attempted revolt of Syria was squelched in a decisive manner.

To deny that such a crisis occurred at the Exodus is to reduce the incident to one of such minor significance that severe qualifications in the accuracy of the Scriptural account are required. This is what is being done uniformly by scholars who deny any necessary dependability of the details of Scripture.

Relevance to Literal Interpretations

Is there any consistency for one believing in the literal interpretation of Genesis 1 to follow such interpretations of the Exodus and associated events? Just how does such a person proceed to convince some believer in theistic evolution, for example, that he should accept the Genesis account of creation literally, when his would-be "converter" has no rational explanation to offer for these many historical discrepancies with Scripture for the later historical period?

Such claims of error are not without foundation if the placement of the Exodus incident in the era of the XVIIIth dynasty is correct. The discrepancies are not limited to the account of the Exodus; they are to be found also in the failure to observe the expected cultural change in Palestine at the point necessarily assigned to the conquest under Joshua. Similar discrepancies appear in archaeologies of many of the sites of Palestine.

If Scripture is historically correct and dependable (as the reviewer holds), the first step in meeting these discrepancies is to show where the popular chronology of antiquity is in gross error, not to invent methods of explaining away Scripture. This can be done only by showing that archaeology does confirm the accuracy of Scripture when the chronology is corrected. The next step is to demonstrate that the chronology of antiquity can be altered to meet the demands of Scripture without doing violence to the facts of archaeologists. Camping did not meet these demands by his proposed chronology.

It is futile to attempt to avoid the obvious meaning of the Genesis genealogies as a means of bringing Scripture into line with the minimal demands of a chronology which rests on premises which deny the very necessity of regarding Scripture as historically dependable. In attempting to proceed on such a faulty basis, Camping started with a premise which may be stated thus: the word *begat* in these genealogies need not be regarded as referring to a father-son relationship *unless* it is specifically added that the begetter "called the name" of the begotten. He then assumed exceptions to this premise in all cases where a father-son relationship is stated explicitly elsewhere in Scripture.

According to logic, these very exceptions must be regarded as evidence that the starting premise is in error. No one knows why such a statement is not made for each name, but a person cannot be permitted to draw conclusions from what is not known. Scholars *do* know that at times the assigned name had a special significance in terms of a situation at birth, but not necessarily so always.

There is no certainty that a child received his ultimate name at birth. Moses was given his name by the daughter of the pharaoh, not by a parent or even an ancestor. Yet it is stated that she "called his name Moses," because she had drawn him out of the water.

It was the prophet Isaiah who gave the name Emmanuel to the Christ, but certainly not as a remote ancestor of Christ.

Author's Interpretation Self-Defeating

Camping's interpretation of these genealogies is self-defeating. He had to assume the exceedingly high improbability that each period of "patriarchal rule" was marked at its end by the death of one patriarch and the birth of the next within the same year. To assume that the next patriarch was born earlier than this would controvert the starting premise that the total life of the patriarch represented his period of rule.

No group of scholars involved in the translation

of the extant Hebrew manuscripts has ever suggested that the Hebrew wording permits the meaning assumed by Camping. Having started with such equivocal premises, there is no demand to point out the further weaknesses in the subsequent developments, though this could be readily done.

In conclusion, then, in this book the author has presented some useful evidence, physical and otherwise, for a relatively young earth; young at least in comparison with the ages proposed by uniformitarianists. In using this evidence, the reader is not necessarily committed to accepting the rather long chronology, and the peculiar interpretation of the genealogies, proposed by the author.

REPORT OF 1975 BOARD OF DIRECTORS MEETING

The annual meeting of the Board of Directors of the Creation Research Society was held at Concordia Lutheran Junior College, Ann Arbor, Michigan, beginning at 1818 hours Friday, 18 April, with a time of silent prayer. Present were: T. Barnes, E. Williams, H. Armstrong, W. Frair, C. Burdick, D. Gish, G. Howe, J. Klotz, W. Lammerts, J. Meyer, J. Moore, G. Mulfinger, W. Rusch, Sr., and H. Slusher. Absent were: L. Butler, R. Korthals, H. Morris, and W. Tinkle. The secretary was informed of special circumstances which prevented their attendance.

The 1974 minutes were read and approved. The secretary reported that 130 ballots had been cast in the election to the Board, and that the six nominated candidates for the Board had been elected. There were four write-ins. President Barnes expressed a warm welcome to the two new members of the Board: Dr. John R. Meyer of the University of Louisville, and Prof. George Mulfinger of Bob Jones University.

Rusch, membership secretary, reported a grand total of 1,975 as of early April. (This figure is always revised upward as renewals and new memberships come in; the figure as of late May, 1975, was about 2000). In the future, special notices will be sent to individuals, as appropriate, to encourage renewal of expired subscriptions and memberships.

On behalf of Korthals, treasurer, Rusch presented the financial statement. Income was \$27,334.26, total expenses were \$21,980.92, and the total balance as of 31 March was \$38,159.75.

Moore reported on the C. R. S. *Biology* books. As of 17 April, 1975, total sales have been: textbook—36,205; teacher's guide—1,584; teacher's manual—1,186; student's lab manual—5,302. The text is on the approved list in Georgia, Oregon, Idaho, and Oklahoma; it is certified for availability in Michigan, Ohio, and other states.

Howe announced that the anthology of items from the second five years of the *Quarterly*, entitled, *Speak to the Earth: Creationistic Studies in Geoscience*, should be published in paperback by September 1975. The paperback, *Many Separate Kinds: Creationistic Studies in Bioscience*, is expected in 1976.

Armstrong, editor of C. R. *Quarterly*, reported that he hopes, for the immediate future, to keep the *Quarterly* about the same size as Volume 11, which

contained a total of 228 pages. He expressed gratitude to those who have refereed manuscripts, and mentioned that more pictures are needed for the front covers.

Moore reported that since December 1973 the *Quarterly* has been registered for copyright purposes in the Library of Congress. Beginning with the issue of June 1975 the *Quarterly* will have a slightly different format, which will utilize the paper stock more economically and afford readers more *Quarterly* per dollar.

Williams reported that during the year the Research Committee had awarded grants totalling \$591.38 to creationistic research projects. The projects include work on bristlecone pine rings, *Drosophila*, stalagmites and stalactites, radioactive dating, and evaporites. Other proposals are under consideration.

Williams indicated that the book, *Physical Science for Christian Schools*, by Williams and Mulfinger, published in 1974 by Bob Jones University Press, has been well received by many schools. Since December 1974 more than 2,900 copies have been sold.

Lammerts presented a brief history of the Creation Research Society. He mentioned especially some of the previous organizations having similar aims and how the "Committee of Ten" came to form the C. R. S.

The meeting was adjourned at 2020 hours.

The next session was called to order on Saturday, 19 April, at 0910 hours, and there was a period of silent prayer. The president appointed a new Membership Promotion Committee to disseminate information about the C. R. S. The members are: Meyer, chairman; Mulfinger and Gish.

It was agreed that we must make provisions to have new editions of the biology textbook. Moore will look for people to work on new editions.

The theme chosen for the 1976 Annual Issue of the *Quarterly* will be "Creationist Thinking in 1976."

The following motions were carried:

1. That the right of members of the Board of Directors to claim reimbursement for expenses incurred in attending the annual meeting of the Board be clarified. Expenses for which reimbursement may be claimed are: travel expenses; lodgings for the actual time of the meeting; and the opening fellowship meal. (The last item, it may be mentioned, is for the sake of efficiency. By doing things thus it is possible to

start the business of the meeting considerably earlier on the first evening of the annual meetings.)

2. That certain Christian Colleges be designated repositories of the *C. R. S. Quarterly*, as listed elsewhere in this issue.

3. That Article III, Section 2, of the constitution be amended to provide for a new class of member: that of Fellow. (This amendment is given in full on page 127 of the *Quarterly* for September 1974.)

4. That John J. Grebe, William J. Tinkle, and Walter E. Lammerts be elected to the class of Fellow.

5. That future nominations of candidates for Fellow include a biographical sketch of the candidate to be submitted by a Board member to the secretary for distribution to the entire Board in advance of the annual meeting.

6. That Klotz be authorized to transmit old *C. R. S.* records to the archives in Concordia Historical Institute, St. Louis, MO.

7. That Klotz, Korthals, Lammerts, Morris, Rusch, and Slusher be nominated to serve on the Board from

1976-1978; and that Walter G. Peters be nominated to serve the remainder, viz. one year, of an unexpired term. (See also the announcement elsewhere in this issue of the *Quarterly*.)

8. That the meeting of the Board for 1976 be held Friday and Saturday, 23 and 24 April, at Concordia Lutheran Junior College, Ann Arbor, MI, beginning at 1800 hours and preceded by dinner at 1700 hours in the Concordia dining hall.

By secret ballot all present officers of the Society were reelected unanimously.

Howe described his investigations of the regrowth of chaparral shrubs, *Adenostoma* and *Ceanothus*, after fires. He used his findings, which were illustrated with slides, to cast doubt upon the "evolutionary" account of the formation of species. It is hoped to present this research in more detail in the *Quarterly*.

The executive session was adjourned at 1515 hours. Members who were able to stay continued informal discussion of creationism throughout the rest of the afternoon and the evening.

—Wayne Frair, Secretary

REPORT ON RESEARCH PROJECTS

This past year (i.e., parts of 1974 and 1975) the Creation Research Society sponsored six research projects. Each one concerns some aspect of the creation model. The following are abstracts of progress reports of the research submitted to the Board of Directors at the meeting in April 1975.

1. Effect of Environment on Tree-Ring Formation in Bristle-cone pine, *Pinus aristata*

It is assumed in the use of Bristle-cone pine rings for dating that each ring represents one year of growth. Dr. Walter Lammerts believes that under certain conditions *P. aristata* will yield more than one growth ring per year.

The project has been underway since December 1974. Plants kept in higher minimum temperatures in a greenhouse are growing much more rapidly than "outdoor" plants. Some plants exposed to a 16 hour day, 65°F minimum temperature and fed nutrient once per month are in their second growth cycle. Also some plants exposed to a normal day, 45-50°F minimum temperature and fed nutrient once per month are also in their second growth cycle.

It remains to be determined whether this second growth cycle is registered as a growth ring. Extensive testing of many plants under varying conditions is continuing.

2. The Formation of Precipitates Caused by Brine Mixing

A controversy developed in past issues of the *Quarterly* over the rapidity of formation of basin evaporites. Pilot research projects were sponsored in two separate facilities to investigate brine mixing.

When saturated solutions of NaCl and MgCl₂ are mixed the reaction is essentially complete in five minutes. It appears that the precipitate is NaCl. Representative data are given in Table 1.

Table 1. Grams of precipitate formed upon mixing 50 ml portions of the indicated brine.

	% MgCl ₂			
	94	88	82	76
% NaCl	100	10.56	7.74	4.71
	89	5.96	6.13	2.34
	79	4.26	3.54	1.65

An interesting problem has developed in the mixing of actual sea water brine. The evaporation to 1.15 g/ml. was accompanied by the production of large amount of solid residue. This residue will not go back into solution upon addition of deionized water accompanied by heating and vigorous stirring.

In the future all precipitates will be subjected to quantitative analysis and x-ray diffraction analysis.

3. Nuclear Decay Rates

The precision of nuclear decay rates has been questioned by many creationists. One of the assumptions basic to radiometric dating is that the half-life of the radioactive species has remained constant (over millions of years for the ancient-age methods).

The Society is sponsoring a study to see if nuclear half-life is constant. It has been found that decay rates are affected by physical and chemical sample changes.

Comparison of reported half-life data for many unstable isotopes has been revealing. Authors regularly publish uncertainties that lie outside one another's experimental error. Either the half-life is varying between samples or the investigators do not know how to handle statistical uncertainty.

Nuclear lifetimes of less than 10⁻¹⁵ seconds or greater than 10¹⁵ seconds are unmeasurable. Work is continuing in the area of cosmic ray effects on nuclear lifetimes.

4. *Drosophila* Mutants and Selection in a Rigorous Environment

An evolutionist must claim beneficial mutations are possible for the continuance of his supposed natural process. One aspect of the effect of environment on mutations in *Drosophila* is under investigation.

5. Laboratory Production of Limestone Formations

George Mulfinger's earlier work indicated that stalactites and stalagmites could form rapidly. This work is continuing on a much larger scale by testing more variables.

The effect of drip rate is being tested. Whether a fast or slow drip rate is used, CaCO_3 material is deposited on strings hanging from a porous plastic plate.

Carbon dioxide laden water running over limestone chips picks up 670-740 mg/l of HCO_3 in a short amount of time in a limited space.

It has been found that NaCl and humic acid in water increase the dissolution of limestone. If the Flood water contained either of these (the latter forming from decaying organic material), and if, as the water abated, it ran through recently deposited limestone and dripped into recently excavated caves, then fast formation of stalactites and stalagmites

would be possible. This was demonstrated in a test where CO_2 laden water solutions reacted with limestone chips for 12 hours. Some results are shown in Table 2.

Table 2. The solution of limestone by water containing carbon dioxide and other additives. In the bottom example, acetic acid was used as a substitute for humic acid.

Solution	Dissolved CaCO_3 g/100 ml H_2O
$\text{H}_2\text{O} + \text{CO}_2$	0.1040
$\text{H}_2\text{O} + \text{CO}_2 + 5\% \text{ NaCl}$	0.5393
$\text{H}_2\text{O} + \text{CO}_2 + \text{acetic acid}^*$	0.4019
*Humic acid substitute.	

Tests are underway to check the precipitation of limestone drip formations from water containing either NaCl or acetic acid.

The Research Committee will be glad to consider any research projects concerning the creation model. Any interested persons should contact:

Dr. E. L. Williams
Chairman, Research Committee
403 Library Drive,
Greenville, South Carolina 29609.

SPECIAL NOTICE

The following candidates have been nominated by the Board of Directors to serve for a three-year term beginning in 1976:

John W. Klotz
Richard G. Korthals
Walter E. Lammerts
Henry M. Morris
Wilbert H. Rusch, Sr.
Harold Slusher

The following candidate has been nominated to serve a one-year term, 1976, that being the remainder of an unexpired term:

Walter G. Peters, creationist lecturer and former geology instructor, who now resides at 30 W. Clarendon Drive, Round Lake Beach, IL 60073.

The date of the annual election is 1 March, 1976.

BYLAWS EXCERPTS

Article III—Election of Directors

Section 1. The date for the annual election of directors shall be set by the secretary, but in no case shall it be later than March 1.

Section 2. The Board of Directors shall annually nominate at least one candidate for each vacancy on the Board of Directors, said candidate to have agreed to serve on the Board of Directors. The secretary shall report the names of those nominated by the Board of Directors together with the date of the election to all voting members not less than 120 days prior to the election.

Section 3. Any voting member may nominate one candidate for election to the Board of Directors by presenting a petition signed by not less than 25 voting members of the Society, said petition to list the name and address of the candidate, indicate the qualifications of the candidate in not more than 50 words, list the name of the individual nominating him, bear the certification of the nominator as to the authenticity of the signatures on the petition, and contain a statement by the nominator that the individual nominated is willing to serve on the Board of Directors. This petition must be mailed to the secretary and must be postmarked not less than 60 days prior to the election. On receipt of the petition, the secretary shall ascertain that at least 25 of the signers of the petition are voting members in good standing.

LETTERS TO THE EDITOR

Comments on "Time Upside Down"

Dr. Erich A. von Fange's article, "Time Upside Down,"¹ proved for me to be a veritable gold mine of information. However, since he made liberal use of secondary and tertiary sources, I have found it necessary to sort out the gravel from the gold. I am sending this letter first to Dr. von Fange to enable him to add comments and corrections as he sees fit and thus attain the maximum benefit for all concerned.

I have been able to locate some of the original source material and compare this with the data presented in Dr. von Fange's article. I will proceed through his article by referring to his reference numbers, giving the original reference or other pertinent references, and then offering my comments.

Reference 23: Iron cube found in Tertiary coal. Dr. Adolf Gurlt² exhibited this cube having the dimensions 67x62x47 mm before the *Niederrheinische Gesellschaft für Natur- und Heilkunde*. Gurlt expressed the opinion that due to the presence of small craters or eruptions on all surfaces (including the incision), which is characteristic of iron meteorites, the cube had to be a natural product, unaltered by the human hand. As a reason for the cubed shape he said it tended to fracture in a cubic manner. He also explained that the circumscribed incision is another characteristic observed in most other meteors. Furthermore,

The entire outward appearance can easily be explained by assuming that the chipped-off iron cube in its flight through the atmosphere at over 30 Km/sec possessed a rotation with an axis perpendicular to two sides, thus explaining why these were worn down only on the edges, whereas the surfaces in the periphery of rotation received the deep incisions.

Thus by postulating a rotation perpendicular to the flight path, and having its axis perpendicular to two sides which lay in a plane parallel to the line of descent, Dr. Gurlt offered a purely natural explanation for the curious shape of the iron meteorite. To further support this idea, Dr. Gurlt alluded to the then famous meteorites of Braunau in Bohemia (western Czechoslovakia) and St. Catherine in Brazil which also exhibited this regular form.

This iron cube was also discussed in other periodicals^{3, 4, 5} all based on this report by Dr. Gurlt.

Reference 24: An iron pot found in a lump of coal. The point in question is as to how many people actually saw this iron pot. The article referred to in the *Quarterly*,⁶ p. 201-2, includes an excerpt of a letter by Robert Nordling stating that his friend had a (private) museum whose contents were scattered at the time of the man's death. Prof. George Mulfinger sent me a letter dated Nov. 7, 1971, from Dr. Frank L. Marsh in which he stated,

How many times have I wished that, back in 1949, when I received from Robert Nordling in Minnesota the photo of the iron cup in southern Missouri, I had got right on the trail and possibly *at least been able to study the cup*. (Emphasis added).

However, Dr. Rusch makes the statement, "He (Dr. Marsh) personally saw the pot, and examination of it indicated nothing that would contradict the story. Since then, the owner died and the pot has been lost."⁷

But apparently Dr. Marsh never saw the pot himself, and the only people to have examined it are its finder, Frank J. Kenwood, his fellow employee, Jim Stall, Kenwood's friend who owned the private collection, Robert Nordling, and others who may have seen the collection.

References 26 and 27: An iron nail found in a stone block. In Brewster's communication⁸ he stated that the block of sandstone in which the nail was found was *nine* inches thick (not eight inches). As to the formation, I located the place of Kingoodie as a village four miles west of Dundee, Scotland⁹ and then checked an atlas to locate Dundee at latitude 56.28N and longitude 3.00 W. A geological map of Scotland¹⁰ revealed that the formation found four miles west of Dundee was Devonian ("Old red sandstone"), thus dating it according to conventional geology at 350-400 million years of age.

Reference 31: Jawbone of a child in coal. In the years preceding August 2, 1958 various fragments of skeletons, including teeth and a lower jaw, were turned up as the result of brown coal mining operations in Tuscany, Italy. Based on an examination of these fragments, Dr. Johannes Hürzeler of the Naturhistorisches Museum in Basel, Switzerland wrote a report¹¹ on these finds, expressing the view that these could belong to the "Homo" line. This report then probably resulted in the story in many newspapers that a child's jaw had been found in coal. However, when on August 2, 1958, an almost complete skeleton (including the skull) was discovered *in situ*, Dr. Hürzeler issued another report¹² in which he classified *Oreopithecus* as an extinct side branch of the *Homo* line (Homonidae).

But another anthropologist, Dr. Adolph Schultz¹³ undertook some measurements of the skeleton and arrived at the conclusion that due to its relatively long arms (there were no hands and feet), it should be classified in the superfamily Hominoidae and not in the family Hominidae. He pointed out that with regard to its limbs, it bears many characteristics of the family Pongidae of which the Gorilla is a member. Thus *Oreopithecus* can by no stretch of the imagination be classified as human.

Reference 34: Sticks or lignite pointed by the hand of man. The lawyer, Dr. Scheuermann gave these sticks to Prof. L. Rüttimeyer for examination. In his report,¹⁴ Prof. Rüttimeyer claimed that because the sticks were pointed, they must have been worked by the hand of man. However, a geologist, Prof. T. McK. Hughes has observed,

Now I have found myself along the shore fragments of wood and twigs half decomposed and wave-worn till they were cut to a point obliquely to the grain, as they (i.e. Rüttimeyer and Scheuermann) describe the Dürnten (in Switzerland) sticks.¹⁵

Thus it appears that pointed sticks *per se* are not conclusive evidence that man was the source of the sharpening.

References 60, 61, 106, 107: Man-made incisions on bones. Again as above, we are faced with a situation where random scratches or incisions on bones are taken *per se* as evidence of the work of man. Prof. Hughes again showed in a paper¹⁶ that these cuts and scratches or incisions on bones could just as easily have resulted from animals' teeth or movements of the earth causing the bones to slide over rocks or other bones.

References 86 and 87: Carson City footprints in the Pliocene. Charles Fort refers to Prof. O. C. Marsh's article¹⁷ and claims that the footprints found in the yard of the Nevada State prison were very clear and well-defined. However, Prof. Marsh first referred to the alleged human footprints and to the tracks of animals, and then said:

The footprints occur in series, and are all nearly in the same horizon. Some of the smaller *tracks* (Emphasis added) are sharp and distinct, but most of the impressions are indefinite in outline, owing apparently to the fact that the exact surface on which they were made is not usually exposed.¹⁸

I doubt whether Prof. Marsh meant that the 18-20 inch footprints were "the smaller tracks" which were "sharp and distinct," for he illustrated the article with a footprint drawing which had to be reconstructed on the basis of several footprints since none were so clear as to allow their use as a model for the sketch. The best description of the prints I could find was given by Prof. G. vom Rath:

There are 120 footprints which are grouped in 8 series (6 long, 2 short). . . . The longest series of tracks measures 112 feet, consists of 44 individual footprints (of which the middle 5 are unrecognizable), and belongs to the western half of the prison yard. . . . Even the most exact inspection of the prints, including a very careful investigation of three tracks that had been exposed from under the overlying rocks, has not resulted in even the faintest notion of a double feet stance. . . . In light of this we can only conceive of an upright walking being.

However the form in relation to human tracks is unusual in that the concave curvature of the inner part of the foot impression is very strongly pronounced. The shape of the foot appears to have been unusually crooked. One cannot find the slightest trace of toes on the impressions, which if we were to attribute them to an animal, would hardly be explainable, whereas a wrapping of the human foot (e.g. with moccasins of the North American Indians or with the huaraché (low-heeled leather sandal) of the Mexicans) would solve this puzzle. . . . The length of the footprints is no less than 18, 19, and even 20 inches and their width at the ball of the foot is 7 to 8 inches. They are sunken into the ground 2 to 7 inches and end in a rounding which would certainly be compatible with a moccasin covering but not with a wooden sandal.¹⁹

He goes on to say that although the straddle (18-18½ inches) and the stride (from 2-3 feet) would speak against the theory that the prints were of human origin, on the basis of human footprints found in deep mud of ground that had thawed out, a person tended to widen his stance when walking through deep mud, and thus this wide straddle could be explained.

Prof. vom Rath reports the varying opinions as to the interpretations of the prints. H. W. Harkness and Ch. Drayton Gibbes would opt for the human theory, whereas Joseph LeConte²⁰ and Prof. Marsh would see the prints as being the result of a sloth (*Myiodon harlani*) whose remains have been found in the same formation of this part of the country.

The proponents of the sloth hypothesis see in the unusually wide straddle, the outward turn of the tracks, and the great size of the tracks reasons for rejecting the human hypothesis. To explain the apparent absence of front feet prints and lack of claw marks, LeConte said,

The apparent singleness, the singular shape, and the large outward turn of the tracks I attribute to the imperfect tracking of the hind and fore-foot on the same side, while the absence of clawmarks was the result of the clogging of the feet with mud.²¹

Marsh adds as a postscript,

The important fact has recently been determined that some of these tracks show impressions of the fore feet. The latter are somewhat outside of the large foot-prints, as would naturally be the case, if the animal changed its course.²²

Chester Stock supported this view and said further,

An interesting verification of the views of LeConte and Marsh is suggested by the restoration of the *pes* (foot) of *Myiodon harlani* (sloth) from Rancho La Brea. The posterior foot of this species corresponds very closely in size and shape with the imprints found in the Pleistocene of Carson City, Nevada.²³

Note that Stock refers to the tracks as being in the Pleistocene instead of the Pliocene as the previous investigators have mentioned.

Thus it appears that there are seemingly valid arguments both for and against the human origin of the Carson City footprints, and any absolute statement one way or the other would be unwarranted.

References 132 and 133: Gold miners of the Miocene period. There is a problem in the interpretation of these human artifacts and the human skull found in geological strata of the Miocene. If we accept as true that these mortars, pestles, and dishes of stone were left behind by miners, and then say that the miners lived during the formation of the very gravels and lava through which they had tunneled, this would be equivalent to claiming that because we found a miner's pickaxe and lantern in an abandoned coal mine in West Virginia, the miner must have therefore lived during the Carboniferous period.

In the article referred to,²⁴ the main question was whether or not the various artifacts and the human skull were deposited *in situ* along with the gravels in

which they were found. The author, Dr. James Southall, lawyer, alluded²⁵ to the discovery of an ancient mine shaft in Table Mountain in which an altar for worship, evidences of labor, and some human bones were found.

Dr. Southall felt this to be sufficient evidence that human remains elsewhere were also introduced via ancient mining operations into the Miocene gravel bed long after the gravel was laid down. Also, the fact that these artifacts were almost always found in gold-bearing gravel layers further solidifies the argument that they were introduced by gold mining operations subsequent to the strata formation.

I have carefully examined Prof. J. D. Whitney's report²⁶ on the nature and locality of these human relics found in the Sierra Nevada and have observed, as indeed the Professor himself on p. 279 remarked, that stone mortars, pestles, and stone dishes (usually all made from granite) were the most common artifacts found. In almost every case mentioned by Prof. Whitney, the then State geologist of California, these implements were found in the auriferous gravels.

Prof. Whitney felt that their intended purpose had to do with grinding food, thus avoiding what would seem to be the obvious conclusion that such hard stone mortars were used to crush the gravel deep in the mines so as to separate the gold from the gravel on the site instead of first taking it to the surface. Dr. Southall substantiated this view by referring to the discovery in 1880 in Colorado of an ancient mine in which were found "stones, bones, skulls, and gold . . . the value of the latter being about 900 dollars."²⁷

Thus the facts would seem to indicate that these people lived at a time subsequent to the Miocene or Pliocene periods and introduced their artifacts in the process of their search for gold.

I trust this information will serve to further the cause of Christian investigations without which there can be no such thing as true science.

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Yours in Christ,
Russel Brubaker
8 München 40,
Türkenstr. 58,
W. Germany

A Response to Mr. Russel Brubaker

The investigations carried out by Mr. Russel Brubaker are welcomed and much needed. In a very real sense the exploratory paper, "Time Upside Down," was intended to be an audience—participation presentation.

Secondary and tertiary sources were deliberately used in that paper because many items presented as facts in such sources are typically not included in more sophisticated sources. This of course poses the risk that at least some of the facts may not be facts after all. Such should be exposed. As noted in the paper: "Readers perform a genuine service when they point out such errors to the author."

I have collected a great deal of material on frauds, errors, and "humbugs" in prehistory which will soon be written up in a lengthy (and very interesting) paper. It should be noted here that humbugs are found in highly sophisticated sources as well as in secondary ones. We should not fail to use what is factual, but we must vigorously expose errors which have been presented as truth. No one is helped by humbugs; and indeed much harm can result from their use.

Mr. Brubaker has done commendable work in examining eight of the items mentioned in the paper.

I believe that he has furnished us with the best interpretations available; and these should be considered carefully. Regarding the iron cube found in Tertiary coal, I recently read another "authoritative" opinion: that the iron could have been a piece of iron scrap from the factory floor where it was later found with the coal.

It is hoped that other readers will review the article, "Time Upside Down," critically. There is much material in the paper which may have a very significant impact on the creationist view of the ancient world; but as Brubaker has said, the gravel must be sorted from the gold. Brubaker has also stated that he has found much additional material to reinforce other items in the article.

Yours sincerely,
Erich A. von Fange
467 Pine Brae Drive,
Ann Arbor, Michigan 48105

☆ ☆ ☆

Comments on the Nature of Things Before the Fall

I should like to make a few comments on S. J. Jansma's, "Comments on Thermodynamics before and after the Fall"¹

In note (a) Jansma claims that "both man and animals were herbivorous upon leaving the ark. (Genesis 6:12 N.E.B.)" (I think that Genesis 6:21 is being referred to here, because verse 12 has nothing to do with Jansma's claim.) In verse 21, however, God commanded Noah to take "all food that is eaten" into the ark. But surely this does not prove that both man and animals were herbivorous upon leaving the ark.

I think that it is fairly safe to assume that during the Flood both man and animals were herbivorous. I also think it is safe to argue that man was herbivorous from the time of the Fall to the Flood (Genesis 3:18), but that after the Flood he became omnivorous (Genesis 9:3).

One may safely argue that man, beasts, fowl and insects were all herbivorous before the Fall (Genesis 1:29 and 30). Now we must be able to account for the carnivorous and omnivorous animals which are evident from fossils in the geological record of the Flood. Hence I think that we must assume that some animals became carnivorous after the Fall and before the Flood.

May I point out also that what Jansma asserts in note (j) is very debatable; especially in view of the arguments of Whitcomb and Morris in their book *The Genesis Flood* regarding metabolistic and physical changes to man (or woman) after the Fall. (See page 466 of the British Edition). (It seems to be the same page in the first edition published in the U.S.—Editor.)

Regarding Jansma's "series of thoughts" I should like to make the following comments:

1. Step one: I think that there is a problem regarding plants "dying"—the Bible refers to plant-life "withering" (See for example Isaiah 40:7). In view of the terrible consequences of the Fall I cannot see any reason why the creationist should not argue that it could be possible that in Edenic times fruit appeared without a previous blossom and that a new tree appeared without the dying of a seed.

2. Step two: As there was no death before the Fall, Jansma's argument about oyster eggs is a non-starter.

3. Step three: God's command: "Be fruitful and multiply" was given to the fish-life, the bird-life, and man. (Genesis 1:22 and 28). I should just like to make the comments that (a) we do not know how long the reproduction cycle took before the Fall, (b) God told these living things to fill the earth, not to overfill it, (c) presumably once the filling of the earth had taken place, reproduction would have ceased.

4. Steps four and five: This is certainly true now but not necessarily so before the Fall.

I think that Jansma is extrapolating present conditions to the time before the Fall—and I do not think that we can do this. The problem boils down to the fact that fallen man cannot really imagine the perfect world of Genesis One.

Reference

¹Jansma, S. J., Sr. 1974. Comment on thermodynamics before and after the fall, *Creation Research Society Quarterly*, 11(3): 177-179.

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The Fall and Degeneration

This writer has no desire to continue endlessly what he considers to be a useless discussion concerning whether the second law of thermodynamics came into operation before or after the fall of man.¹ However, since it involves an area of interpretation, there appears to be some misrepresentation and misunderstanding. If possible the "air should be cleared" for further sensible discussion. This will be attempted in his letter.

It may be instructive to view the matter from a historical viewpoint to see the recent development of the concept from a creationist standpoint. In his book, *Darwin Before and After*, R. E. D. Clark discussed the tendency in nature toward disorder as the law of morpholysis (to lose form). Dr. Henry M. Morris in *The Twilight of Evolution* identified the second law as leading to death, decay, and degeneration. It appears that these works more than anything else made Christians aware of the second law. Thus creationists began to use the second law as a tool against "evolutionary" thinking by saying rightly that molecules-to-man changes were impossible in the face of such a universal principle.

Unfortunately there are more scientific aspects to the second law of thermodynamics than just the idea of degeneration. Many statements of the law have been constructed to agree with the directionality of natural processes. There are various interpretations of entropy² depending upon the discipline in which it was developed.

This may confuse a person unfamiliar with these areas. Yet to absolutely identify entropy as a measure

of disorder in a system ignores other interpretations of the concept. The term entropy may have different meanings to different people. However it was unnecessary to explore all the various avenues of entropy in such popularizations as *Darwin Before and After* and *The Twilight of Evolution*. But it is easy for a Christian to realize the effect of the second law on so-called evolutionary schemes by reading these books.

Thus historically the second law became identified with the tendency in nature toward degeneration. When the second law was mentioned in creationist circles this natural degeneration was implied, and to many this drift was assumed to start at the Fall. Many creationists including this writer would never question the unidirectionality of natural processes before the Fall. It was assumed.

There are creationists such as Kofahl who see the major thrust of the second law embodied in the statements of unidirectionality. To this group the second law did operate before the Fall. Unfortunately in either case there is no right or wrong answer as is so typical in many areas of interpretation.

Alternate Approach Suggested

An alternate approach is suggested. This writer developed a popular lecture on the subject of the first and second laws of thermodynamics and their relationship to the so-called theory of evolution. As the lecture "evolved" after many presentations, I realized that the use of the term entropy tended to confuse many people. So the term was completely dropped from the lecture. As much as possible technical words and phrases were eliminated.

The lecture was reconstructed along the lines of possible natural processes—conservation processes (first law) and degeneration processes (second law.) The second law is now introduced from the standpoint of unidirectionality of natural processes, and then degeneration is introduced as a consequence of process inefficiency. In my conclusion I suggest that a logical place for the introduction of degeneration processes was at the time of the Fall.

It is obvious that many problems are avoided in this approach. The central theme is maintained: evolution as a creative process is impossible. The issue over the second law and the Fall is avoided; for most creationists agree in part that natural degeneration was introduced at the Fall.

Whether one believes either degeneration processes originated at the Fall or originated at creation with God holding back any degeneration miraculously, the difference in positions is slight. This writer agrees with Dr. Morris that the problems are mainly semantic in nature.³

In the recent exchange over this issue as mentioned in Reference 1, this writer offered several unknowns as to natural conditions before the Fall. They were dismissed cavalierly as "far out." The point not being taken that conditions before the Fall are not known. Also the position of absolutely zero and the concept of temperature are absolutely essential to the argument. As far out as it may sound, if any specified absolute zero was attainable before the Fall it would

be theoretically possible to have 100% efficient heat engines.

The argument is academic and senseless now, but should not be overlooked since anybody's dream is as good as another's when discussing the origin of the second law as long as it is not unscriptural. Also a thermodynamic analysis of *present* conditions does not reveal anything about *past* conditions if they were substantially different.

As a panacea to the problems offered by accepting the complete second law before the Fall, Kofahl offers a miraculous intervention by God to hold back the degeneration. What is more scientifically "far out" than a miracle? To each his own means of escape! This position entails problems also.

Suppose we have scientists in two different worlds A and B that are able to communicate with each other. World A is like this present world. World B is like the Kofahl-before-the-Fall world. Scientists in both worlds make measurements of natural events and find that processes in their respective worlds are unidirectional. Scientists in World A also observe death, decay, disorder, and degeneration; scientists in world B do not.

Each group attempts to formulate a second law applicable to his world. Both construct the same unidirectional laws. Scientists in world A construct them to agree with the observed degeneration effects. Scientists in world B have no degeneration so they do not need any such statements.

Suppose the miraculous intervention is detectable through some *observable physical* characteristic that can be measured. If scientists in World B record physical characteristics different from world A, their statements of world B second law would be different in some aspects than that of world A. Apply this to the present conflict. The second law before and after the Fall would be different since "before" represents world B, and "after" represents world A.

Assume the miraculous intervention in world B had *no* observable physical effects. Scientists in both worlds compare notes. Both have the same unidirectional statements, however B has no corollaries on degeneration. The scientists would reach the conclusion that the second law has a *different* form for each world. Again for our situation the second law before and after the Fall would have different meanings.

So miraculous intervention does not solve the problem logically. As long as there are different physical observations in the two worlds A and B, there will be of necessity different second laws. Or in relation to this discussion the second law in its present form would not apply to a pre-Fall earth.

Re: Another Proposal

Jansma⁴ feels that the physical universe except for man was subject to degeneration forces before the Fall. This position has problems also. Here is a perfect man in a world that is degenerating around him. He breathes in air and takes in food with a higher entropy content than he would have.

The replacement of his body tissue (as occurs presently every three years) would be with degenerating materials. Eventually he would degenerate because of his physical contact with a high entropy world,

or God would have to do continual "janitorial" work on Adam to prevent this. If the latter situation existed, there would be measurable physical differences in the metabolism of Adam indicating a *different* second law.

There are problems with any position a person takes on the origin of the second law. The lack of any data forbids anything more than the grossest of speculation. Recently this writer engaged in a protracted correspondence with a young chemist over this very subject. Finally a meeting was scheduled and the problems were discussed earnestly. It was suggested that the chemist try to develop a rigorous pre-fall thermodynamics without any degeneration possibilities. The challenge was accepted. This is the proper approach. Any contradictions in the theory would become apparent upon examination. It is hoped that the project is still underway. It will provide more answers than the shallow approaches devised thus far.

In conclusion I think it is well to follow the Editor's excellent comments⁵ and separate our discussion of the second law into compartments—those that deal with unidirectionality, and those that deal with degeneration. The natural degeneration as embodied in some statements of this universal law is still one of the best scientific arguments against the theory of evolution, and it is hoped that the discussion of its origin will not detract from this important fact.

References

- ¹Kofahl, Robert E. 1973. Entropy prior to the fall, *Creation Research Society Quarterly*, 10:154; Williams, Emmett L. 1973. Response to Robert Kofahl, *Ibid.*, p. 156; Morris, Henry M. 1973. Another response to Robert Kofahl, *Ibid.*, p. 157; Kofahl, Robert E. 1974. Reply concerning entropy prior to the fall, *Ibid.*, 11:175; Jansma, Jr., S. F. Comment on thermodynamics before and after the fall, *Ibid.*, p. 177; Armstrong, Harold L. In retrospect, *Ibid.*, p. 179.
²Williams, Emmett L. 1973. Thermodynamics: A tool for Creationists (Review of recent literature), *Creation Research Society Quarterly*, 10:38.
³Morris, Henry M., *Op. cit.*
⁴Jansma, Sr., S. J., *Op. cit.*
⁵Armstrong, Harold L., *Op. cit.*

Sincerely,
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Theistic Evolution

Most evolutionists I meet hold to the so-called compromise known as "theistic evolution." Likely other readers of the *Quarterly* have had similar experiences; then the thoughts put together here may be of some interest. In this day, when many women's

skirts are hardly more than a ruffle about the hips and a few reach the ankles, a compromise may be in order. But, with regard to ideas about the central nature of reality, compromises are not helpful at all. Furthermore, contradictions are involved; and it is impossible to believe two statements which are flatly contradictory.

The church member appreciates science—as he should—but he makes the mistake of thinking that science is identical with evolution. The latter is not a science but a philosophy, a way of accounting for living things, a religious philosophy. The church member, not knowing that many scientists reject evolution and believe in divine Creation, tries to believe both Creation and evolution. But that is a contradiction.

The true evolutionist believes that life began by chance and developed by trial and error. Biblical writers, on the other hand, state that God planned and formed the separate kinds of living things by His intelligence and super-human ability. The theistic evolutionist has to reject portions of the Bible, including the creation of woman from man, the purposeful formation of mankind, and how man received Godly likeness in such attributes as conscience and love.

The free-for-all fight to which the evolutionist credits the derivation of man from beast would certainly result in the opposites of these desirable traits. One cannot believe both evolution and Creation, any more than a person can lift himself by his own boot straps (which also is a contradiction; there is the push down with the heels while there is the lift up with the hands.)

The most serious problem for the Christian who believes in theistic evolution has not yet been mentioned: what about the young persons of the next generation? The intellectual ones can see that belief in theistic evolution has no logical basis, so they adopt another outlook upon life. A number of the brightest young people have taken up atheism for this very reason.

What should a creationist do, when face to face with one of these people who try to stand on both sides at once? If others are present, I recommend that a firm position be taken by stating the related facts for the sake of the others. If only one person is present, give the facts which seem to be most helpful at that time. Beware of winning an argument but losing a friend who, with tact and Christian concern, might be convinced at a later moment.

Very truly yours,
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CREATION RESEARCH SOCIETY

History The Creation Research Society was first organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a real need for an association devoted to research and publication in the field of scientific creationism, with a current membership of about 500 voting members (with graduate degrees in science) and over 1600 non-voting members. The *Creation Research Society Quarterly* has been gradually enlarged and improved and is now recognized as probably the outstanding publication in the field.

Activities The Society is solely a research and publication society. It does not hold meetings or engage in other promotional activities, and has no affiliation with any other scientific or religious organizations. Its members conduct research on problems related to its purposes, and a research fund is maintained to assist in such projects. Contributions to the research fund for these purposes are tax deductible.

Membership Voting membership is limited to scientists having at least an earned graduate degree in a natural or applied science. Dues are \$8.00 (Foreign, \$9.00 U. S.) per year and may be sent to Wilbert H. Rusch, Sr., Membership Secretary, 2717 Cranbrook Road, Ann Arbor, Michigan 48104. Sustaining membership for those who do not meet the criteria for voting membership, and yet who subscribe to the statement of belief, is available at \$8.00 (Foreign, \$9.00 U. S.) per year and includes subscription to the Annual Issue and Quarterlies. All others interested in receiving copies of these publications may do so at the rate of the subscription price for all issues for one year: \$11.00 (Foreign, \$12.00 U. S.).

Statement of Belief Members of the Creation Research Society, which include research scientists representing various fields of

successful scientific accomplishment, are committed to full belief in the Biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution), both of the universe and the earth with its complexity of living forms.

We propose to re-evaluate science from this viewpoint, and since 1964 have published a quarterly of research articles in this field. In 1970 the Society published a textbook, *Biology: A Search for Order in Complexity*, through Zondervan publishing House, Grand Rapids, Michigan 49506. Subsequently a Revised Edition (1974), a Teachers' Guide and both Teachers' and Students' Laboratory Manuals have been published by Zondervan Publishing House. All members of the Society subscribe to the following statement of belief:

1. The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in all the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths.

2. All basic types of living things, including man, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.

3. The great Flood described in Genesis, commonly referred to as the Noachian Flood, was an historic event worldwide in its extent and effect.

4. We are an organization of Christian men of science who accept Jesus Christ as our Lord and Saviour. The account of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Saviour for all mankind. Therefore, salvation can come only through accepting Jesus Christ as our Saviour.

(Continued from page 108)

crease in catalases and hydrolases. Growth inhibitors are reduced. Photosynthesis and respiration continue in evergreens and in the twigs of deciduous plants as long as temperatures are a little above freezing.

Temperatures of 4-5° Centigrade (35-40° F) seem most effective in satisfying mid-dormancy. Temperatures of near or below 0° or above 10° Centigrade are not effective in meeting the chilling requirement. After the chill requirement has been met, a temperature of near 25° C is needed for about two weeks or more before new growth can take place.

Generalizing from genetics studies, each type of plant species has certain variable potentials but definite limitations. Among seedlings there are variations in tolerance to heat, cold, fungi and insects, but no changes in basic types. Some plants like apple and crab (*Malus*) species cross and intergraft, but other plant families like the maples (*Acer*) are very fixed in types. Most maple species will not intercross or intergraft. There is often graft failure with different strains of the same species.

Conclusions

The chill factor requirement of many plants in the temperate and arctic regions seems to demonstrate

conclusively that these plants, from the time they were created, have had seasonal temperature changes. The continental drift idea does not seem to adequately fit with this fact.

Preservation and redistribution of plant life during and after the flood leave many unanswerable questions. There would be much free oxygen in the waters of the deluge and very few fungi spores; so seeds and plants would keep in viable condition for a long time.

Fiat creation by a super intellect could be the only explanation of this biochemical phenomena. The "evolutionary" solutions are hopeless. Those who accept the Holy Bible as the true Word of God by faith realize that He who made the physical substances has unlimited ability.

Oh, the depth of the riches and the wisdom and knowledge of God! How unsearchable are His judgments and unfathomable His ways. . . . From Him and through Him and to Him are all things. To Him be glory forever. (Romans 11:33 and 36)

References

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- ²Perry, Thomas O. 1971. Dormancy of trees in winter, *Science*, 171(3966):29-36.

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