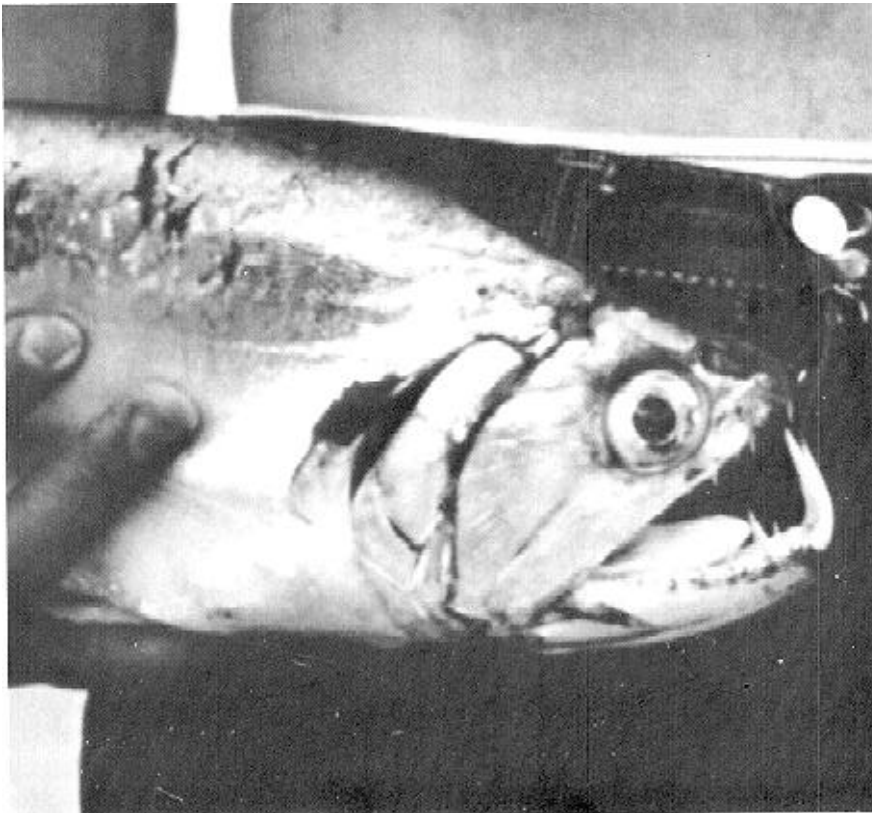


CREATION RESEARCH SOCIETY QUARTERLY



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**

CREATION RESEARCH SOCIETY QUARTERLY

Copyright 1974 © by Creation Research Society

VOLUME 11

JUNE, 1974

NUMBER 1

EDITORIAL BOARD

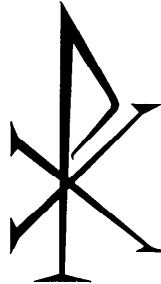
Harold L. Armstrong, Editor

Walter E. Lammerts, Research Editor

John N. Moore, Managing Editor

Department of Natural Science

136 Brody Hall, Michigan State University
East Lansing, Michigan 48824



- Donald O. Acrey.....Geophysicist, Amarillo, Texas
Thomas G. Barnes.....University of Texas at El Paso, Texas
Duane T. Gish.....Institute for Creation Research,
San Diego, Calif.
George F. Howe.....Los Angeles Baptist College,
Newhall, Calif.
John W. Klotz....Concordia Senior College, Fort Wayne, Ind.
Henry M. Morris.....Institute for Creation Research,
San Diego, Calif.
William J. Tinkle....Anderson College (retired), Eaton, Ind.
John C. Whitcomb.....Grace Theological Seminary,
Winona Lake, Ind.
Emmett Williams.....Bob Jones University,
Greenville, S. Car.

☆ ☆ ☆

Notices of change of address, and failure to receive this publication should be sent to Wilbert H. Rusch, Sr., 2717 Cranbrook Road, Ann Arbor, Michigan 48104.

☆ ☆ ☆

Creation Research Society Quarterly is published by the Creation Research Society, 2717 Cranbrook Road, Ann Arbor, Michigan 48104. © 1974 by Creation Research Society.

COVER ILLUSTRATION

Pictured is a rather gruesome, rare fresh water fish that was caught in Brazil by Robert M. Hogue of St. Petersburg, Florida. This illustration was prepared from a "glossy" print provided by Mr. Hogue. He reports that natives call it the "Dog Fish." No scientific name has been identified at this writing. Possibly some reader could supply such information.

The fish is very thin. Mr. Hogue reports that the tusks come through the upper jaw of the fish when the mouth is closed; the tips extend at least half an inch above the dorsal surface, such that the fish has a very "devilish" appearance. A "depression" in the profile of the fish, just slightly above the eye, where the tusks would protrude, is noticeable upon close study of the illustration.

The fish is difficult to catch. "The mouth is so bony and narrow," Hogue states, "that it is hard to set a hook." Actually the two fish Hogue has caught in two years, in the same "hole," were caught "only because the fish locked onto the hook."

Creationists point to this fish as another strange "exhibit" and challenge evolutionists to carefully explain how such a fish came into existence by means of any gradual accumulation of genome modifications. What could possibly be the survival value of tusks of this fish?

TABLE OF CONTENTS

	Page
Some Definitional Formulations	3
John N. Moore	
Can There Be True Science Without True Religion?	6
T. Robert Ingram	
A Biblical Framework for a Course in Physical Science	8
Emmett Williams and George Mulfinger	
On the Distinction Between Religion, Philosophy, Science, and History	10
Harold L. Armstrong	
Time Upside Down	13
Erich A. von Fange	
Is Molecular Evolution of Proteins Possible?.....	28
M. Trop and A. Shaki	
Picturing the Lighter Side of Creation.....	30
Willis E. Keithley	
Geochemistry of the Stable Isotopes	32
Don B. DeYoung	
Hybrid Corn: Man's Glory and Limitation.....	37
William J. Tinkle	
Let the Oceans Speak	39
Harold Camping	
Sex and Ear Size in the Bullfrog.....	46
E. Norbert Smith	
Evolution and Archaeological Interpretation.....	47
Donovan A. Courville	
Additional Notes Concerning the Lewis Thrust-Fault	56
Clifford L. Burdick	
Variation and Fixity in Nature	60
Frank L. Marsh	
Kohoutek, Comets, and Christianity	68
Peter A. Steveson	
Panorama of Science	72
Readers of C.R.S. Quarterly	
Book Reviews (7)	79
Letters to the Editor	84
Guidelines for Contributors	87

INTRODUCTION TO THE PHILOSOPHICAL PAPERS IN THIS ISSUE

The special topic for this issue is philosophical questions about origins. Choice of this topic was made with the knowledge that often proposals to mention creation, as a possible origin, are opposed on the grounds that to do so would be to teach religion.

As can be seen, this topic has been developed in a variety of ways. One aspect that should be primary in any philosophical discussion should be consideration of the question: "What do we mean by what we are saying?" It is only too easy for people to be at cross-purposes because they are using the same words to mean different things. Thus Moore has provided a number of definitions.

There is a sense, of course, in which science, especially, is closely connected with religion, even to the point of being a branch of religion. For scientists, if they are not to leave their job half-done, must consider things as effects of the First Cause, which, as St. Thomas Aquinas has written, all men call God. In this sense it is impossible to exclude religion from the schools, for instance, if anything is to be included. The only question is: "What kind of religion—theism or pantheism?" Ingram has developed this viewpoint.

Since this matter arises partly at least in connection with schools, it is of interest to read how Williams and Mulfinger have dealt with it in an actual course in physical science.

Finally, Armstrong returns to definitions and differences. He proposes that, in the narrow sense in which the word is used in discussing schools, to mention creation is not to teach religion; for to acknowledge creation is one thing, but to consider how to be in the right relation to God is another. As for evolution, by the definitions proposed, it is either no science at all or else a false science.

—EDITOR ARMSTRONG

SOME DEFINITIONAL FORMULATIONS

JOHN N. MOORE*

Clear definitions of terms are required during any serious, rigorous discussion. This is particularly true in any discussion regarding origins; whether attention is given to origin of the universe, of matter therein, of the earth in the solar system, of plant and animal life on the earth, of mankind, or of man's culture.

In attempting to formulate answers to such questions of origin, evolutionists and creationists have derived totally different contentions during the past century to the present. Therefore, today, there is no real consensus between creationists and evolutionists on the meaning of such terms as "facts," "hypothesis," "theory," etc. Consequently discussions regarding whether creation is science or evolution is religion; or, vice versa, whether evolution is science or creation is religion, continue with participants usually at cross-purposes.

Of initial impact is the fact that many evolutionists do not realize that "science," as a profession today, developed from early beginnings set in motion primarily by Christians and other theists. Clearly, one can identify that the "scientific era" began, when the accepted worldview was organized according to theistic beliefs, under

the leadership of such theists as Bacon, Galileo, Kepler, Newton, and continued by such men as Steinmetz, Clerk-Maxwell, Einstein, and Von Braun of the present. This assertion is supported easily by quick reference to numerous authors, among the most recent of which is the work of R. Hooykaas, *Religion and the Rise of Modern Science*.

Actually theistically oriented men established the proper limiting principles of scientific work, as they inaugurated such fields as mechanics, astrophysics, and electricity. Early scientific "greats" recognized that science was properly limited as being, (1) empirical, or observational and based upon sense perception; (2) quantitative, or centered on measurements represented in numerical symbols; (3) mechanical (materialistic), or organized according to machine-like models; and (4) corrective, or designed so that all aspects, beyond basic presuppositions and postulates, are subject to re-test and examination.

Of course early *scientific* men offered various theories to "explain" natural phenomena. The early atomic theory, phlogiston theory, fluid theory of electricity, molecular theory, blending theory were all formulated on the basis of then current observations by sense perception, measurements, and conceptualized physical models. And, according to usefulness and fruitfulness

*John N. Moore, M.S., Ed.D., is professor of natural science, Department of Natural Science, Michigan State University, East Lansing, Michigan 48824.

for continued observation and experimentation, many theories were modified or discarded as tools, instruments, and other methods of analysis were improved.

Yet, today, leaders of the worldwide, intellectual community base their worldview on a basically a-theistic scheme of Total Evolutionism: a total continuum of grand scale or scope: Eternal Matter, out of which Cosmic (or Stellar) Evolution is imagined, from which came supposedly Molecular Evolution, from which came presumably Organic (or Biological) Evolution, from which Social (or Cultural) Evolution toward some kind of "utopia" is expected to "emerge."

Therefore, against these introductory propositions the following definitional formulations are offered. Possibly these statements may be catalytic commencement of a search for concensus on terminology used by creationists and evolutionists.

Basically, there is no need for new physical evidence regarding ideas pertinent to questions of origins of the universe, of life, or of mankind. And there are no private facts for scientists who follow a theistic worldview nor for scientists who follow the a-theistic worldview of total evolutionism.

Disagreements between creationists and evolutionists are *conceptual* and *not factual* in character. The same physical data of the geological record, animal breeding records, and plant breeding records are utilized by both creationists and evolutionists. The "real situation" could be phrased in terms of "conflict questions," as was done in the doctoral thesis, "Methodological Issues in Evolutionary Theory," by Wing Meng Ho for his 1965 degree at Oxford University.

Dr. Ho maintains that these conflict questions are no longer problems of *science*, but problems in *philosophy*. That is, there is no need for more physical evidence, as claimed by such as Sir Gavin de Beer, for discussion of conflict questions that center in such dichotomies as, (1) mechanism versus vitalism, (2) mechanistic versus organismic biology, (3) non-teleological versus teleological approaches, or (4) non-evolutionary versus evolutionary origin of matter and life.

Problems of origin are truly centered in discussions about the philosophy of science, the philosophy (worldview) of scientists. Foundational to the definitions that follow is the position that *scientific* theories are very limited, and *cannot* be devised or applied to questions of origin at all. This is quite counter to the usual interpretation taken by evolutionists. Nor is the com-

mon meaning of "law," as used by civil lawyers, involved.

The author invites a thorough examination of the following meanings for basic terms. Refinement and "tightening up" will be logical consequences of careful study and reaction by creationist scientists *and* evolutionist scientists.

Assumption (Postulate): a statement taken for granted and not tested directly during particular scientific activity (explicated as basic assumptions, experimental assumptions, or theoretical assumptions). Terms with directly observable referents may or may not be used.

Basic assumption (Presupposition): a statement taken for granted as an untestable "given" upon which scientific activities (and intellectual discourse) are based such as:

1. Objectivity of study is possible.
2. Objects and/or events exist independent of observers.
3. Cause and effect relationships exist that may be identified.
4. Scientific ideas are testable, i.e., falsifiable, or not.
5. There is uniformity in the natural environment.

Fact₁: an object and/or event in space at some-time.

Description (Fact₂): a statement about some object and/or event in space-time. (*The lowest [basic] level of scientific explanation.*)

Observation: a perceptual experience of a fact, or a written or spoken record (as communication to self or another) of an awareness (perception) of an object and/or event in space-time.

Classification: the end result of ordering of objects and/or events according to stated criteria, or the process of ordering objects and/or events according to stated criteria.

Calculation: some arithmetic and/or mathematical manipulation of abstract and numerical symbols.

Problem: an interrogation or stated perplexity for which an answer is sought. (A problem is most properly expressed in question form.)

Hypothesis: a tentative (untested) answer to a problem. (A hypothesis is most properly expressed as an assertive statement in form suitable for testing.)

- Analogy: an expression or comparison of like or similar aspects of known objects, events and/or ideas, concepts.
- Generalization: a universal conditional statement of common aspects of similar objects and/or events; or an assertion that something is true about all members of a certain class of objects and/or events. For example, a scientific law.
- Scientific law: a repeatedly tested and well supported or substantiated generalization of seemingly universal application regarding a certain set of facts. (*A level of scientific explanation between description and scientific theory.*)
- Prediction (Expectation): that expected or projected state of affairs or relationship of objects and/or events based upon known or understood conditions; always found in an if . . . then expression.
- Experiment: a specifically designed use of equipment, tools of measurement, and controlled variable components to gain observations and descriptions usually otherwise unobtainable.
- Experimental assumption: a statement about that aspect(s) of experimentation (controlled or of trial and error category) that is taken for granted as "non-critical" and not measured in any way.
- Cosmology: the study of the nature of the universe; use of tools and technology to describe aspects of the observable and physical universe.
- Explanation: a set of meanings used to provide organization for particular facts. (Something has been "explained" when the statement, "I understand," can be truthfully made in response to the explanation offered.)
- Scientific theory (such as Molecular-Kinetic Theory, Modern Atomic Theory, Nuclear Theory, Gene Theory): a list of postulates or assumptions (theoretical) usually specifying existence, relationship, and events concerning an imaginary entity (such as an atom, gene or molecule) whereby a meaningful "explanatory system" for a range of rather diverse facts is made available. (Postulates are based upon prior observations or relevant objects and/or events; and, in turn, are bases of predictions testable by experience, directly or indirectly.) (*The highest level of scientific explanation.*)
- Theorem: a statement derived from assumptions of scientific theory more or less in the form of testable predictions or expectations.
- Model: a physical object designed to show analogical representation of some larger object(s) and/or event(s); or a conceptual pattern involving listed statements about imaginary objects and/or events and supposed relationships, especially associated with concepts of origination and generation.
- Cosmogony: a list of ideas or formulations centered on origination and generation of the universe. (Such conceptual patterns or models do not qualify as scientific theories since no prior observations or testable predictions about origins are possible.)
- Evolution model: an explanatory belief system based upon eternal existence of matter from which have come an ascending series of elements by nucleogenesis, changes by stellar evolution of "young" stars into "old" stars, galaxies, planets (especially the earth with life that appeared spontaneously thru molecular evolution followed by organic evolution, including human evolution). (Ideas have to do with *origination* of order out of disorder and *integration* of more complex patterns out of least complex patterns.)
- Creation model: an explanatory belief system based upon existence of an eternal Creator who established a completed, finished, and functional universe in all aspects regarding elements, galaxies, stars, planets (especially the earth with mutually exclusive groups of animals and plants.) (Ideas have to do with *conservation* of known conditions; yet, changes of *decay* and *degeneration* are evident and easily documented.)
- Science: an interconnected series of concepts and conceptual schemes that have been developed as a result of experimentation and observation and are fruitful of further experimentation and observation. (Science is limited to the study of nature; that is, study of matter and energy, because of limiting principles of being empirical, quantitative, mechanical [materialistic], and corrective.)
- Scientism: the belief that the only knowledge of repute and value is that obtained by means of scientific process; or the belief that science can be used to gain answers to all human problems.
- Technology: applied science; or the totality of the means employed by human beings to provide material objects for human sustenance and comfort.

References

- Ho, Wing Meng. 1965. Methodological issues in evolutionary theory with special reference to Darwinism and Lamarckism. Oxford, Bodleian Library Oxford. (Shelfmark: Ms. D. Phil. d. 3591. Photographic order no. BPC 7442, Oxford University Press.)
- Hooykaas, R. 1972. Religion and the rise of modern science. William B. Eerdmans Publishing Company, Grand Rapids, Michigan.

CAN THERE BE TRUE SCIENCE WITHOUT TRUE RELIGION?

T. ROBERT INGRAM*

Science, philosophy, and religion are considered as limited aspects of a given body of truth. Attention is given to careful definition of each term. Then science and philosophy are discussed as two branches of religion. Faith, reason, and revelation are mentioned with regard to the creation account. The author concludes that Christian thinkers should agree that philosophy may be understood to be the activity of right reason, and science may be said to be the knowledge of things knowable to sensory perception (direct or indirect), and these cannot be studied without reference to religion, but must serve religion which is Christian truth and life.

Introduction

In considering the relationship between science, philosophy and religion, I will pose the basic assumption that only in the framework of Christian orthodoxy can these three categories be seen as limited aspects of a given body of truth, which may be properly distinguished without being seen as in any way repugnant or contradictory to each other.

On any other assumption, both philosophy and science must be seen simply as false religious systems—false not only because they depart from the truth of the Christian religion, but also because they entail a lie. The lie is in renouncing dependence upon religion; for both are inextricably bound up with religion.

Philosophy involves much discussion about all matters religious—matters of the being and nature and attributes of God, a view of origins and a doctrine of destinies, as well as morals and law. Science, while it may not involve discourse about God directly, can proceed as science only when scientists assent to the truth of Christian doctrine regarding universal order.

The orderly universe which must be postulated in all scientific endeavor is the universe made by the eternal Wisdom of God, who is the Second Person of the Holy Trinity. It is not mere happenstance that the discipline known as science is a product of the Christian society. Science could neither originate nor flourish within the societies of the Hindu, the Buddhist, the Mohamadan, or any other non-Christian system.

To those who might object that modern science is overwhelmingly evolutionary, I would point out, first, that such a statement automatically incorporates a religious error into science, namely the heresy of pantheism, the ancient pagan view of Lucius Varro that God is the "soul of the universe"; and, secondly, I would offer the observation that as long as evolution is taught or studied, there is no science studied.

That is, of course, not to say that a science course may not be divided into two parts: the one concerned with pantheism, or evolution; and the other with the study of the created order as

science. While this may present a mild schizophrenia, an examination of the speculations about evolutionary origins need not blind anyone to a pursuit of a science, which involves the assumption that what is being studied was created by the Eternal Wisdom and Power and Goodness of God. It is to observe, however, the truth of what many college students have said about their course in biology: "We studied very little biology, mostly evolution."

The use of the word "religion" to designate a genus of disciplines, as though there are many religions, came into use very recently and reflects a gross misuse of language. In all European tongues the word "religion" was used to mean Christian monastic life: a "religious" is a monk or a nun. The Order of St. John of Jerusalem, popularly called the Knights of Malta, was known as "The Religion." Certainly even in the United States, at the time of the adoption of the Constitution, religion meant Christianity and nothing else. Freedom of religion meant the governmental guarantee of Christianity: there was to be no interference with its free exercise, or with its assemblies or publications.

Religion as a monastic discipline embraced all learning. Monasticism was the powerhouse of intellectual endeavor and moral guidance for society as a whole, as well as for individuals. Pagan philosophers were read and evaluated. Practical skills were highly cultivated, and there was an active and fruitful pursuit of the knowledge of things created which today is often called science.

It is inconceivable in Christian thought to hold that there is any endeavor of man with which religion is not directly concerned. It is a commonplace to say that theology is the queen of the sciences. Since God is the Creator and Preserver of all that is, it is absurd to imagine that anything can be studied without reference to Himself and what is known about Him.

To departmentalize branches of learning or study in such a way as to exclude religion is to leave the Christian faith. Or to maintain that there are disciplines which may be studied without being controlled by truths about God—that is, theology—is to say there are some things over which God does not rule.

*T. Robert Ingram is rector of St. Thomas' Episcopal Church and School, P.O. Box 35096, Houston, Texas 77035.

Two Branches of Religion

Based upon these considerations I will take the position that both philosophy and science are branches of religion. This is the basic relationship of science, philosophy and religion. Where science is held to be outside the purview of religion, it is thereby a branch of false religion, generally atheism.

Anyone who would claim that science is outside religion would be saying that the Creator has nothing to do with what He has created, and nothing observed by the senses need be associated with our Maker. It is not without reason that scientific thought is popularly held to be atheistical, despite the fact that all sound science accords with religion. That philosophy deals with basically religious matters is beyond dispute.

Where this thesis is denied, that is, where philosophy is seen either as independent of religion or hostile to it, and where science is viewed in a similar manner, the fault lies in religious understanding. And the particular fault is that of assuming that religious matters are above and beyond the realm of right reason. Probably no single point of doctrine has aroused more serious controversy in Christendom than the misunderstanding of reason or a wrong evaluation of it. This controversy includes the issue surrounding what is called natural law.

Biblical doctrine is built on the proposition that all truth is one, and that within proper limits truths are made known to man through right reason. Revelation makes known truths which are beyond the powers of reason. It is false, however, to say that therefore revelation and reason are repugnant, or that one has no need of the other, or that revelation confounds right reason, or (and this is most often heard) that faith requires believing that which is unreasonable, or in a God who acts unreasonably.

The Apostles and the early Church Fathers, that is, the great preachers and teachers of the first three centuries of our era, would have been dumbfounded to hear it put forth as Christian doctrine that faith is repugnant to right reason. St. Paul habitually disputed with the Jews and with Jewish scholars to convince them thereby of the reasonableness of the Gospel.

In the oft mentioned sermon to the Stoics and Epicureans on Mars Hill, the Apostle also presented his case in reasonable argument. It is a textbook principle that the first stage of growth in grace centers in reasoning, and depends upon an understanding of articles of belief.

Reason and Faith Related

That right reason is grounded on faith is also a textbook principle of logic. It may be stated simply that the first rule of right reason is to

believe things are what they seem to be. This might be called simply "good faith." It is impossible to learn, or even to talk or listen reasonably, without good faith. Augustine of Hippo was fond of quoting Isaiah (Septuagint), "Unless ye believe, ye shall in no wise understand." Neither Augustine nor Isaiah, nor St. Paul in the famous passage on faith in Hebrews II, says anything about what is to be believed, or whom.

We may therefore assume that they were speaking of good faith—belief that reality is real and not a sham or an illusion.

Both in Romans and in Hebrews, St. Paul declared the first act of faith is something like just good faith. It is to believe in the reasonableness of creation: "Through faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear." (Hebrews 11:3) That is, things that are seen were made *ex nihilo*.

In Romans, having established that "The just shall live by faith," St. Paul immediately turned to creation, and said, "The invisible things of him from the creation of the world are clearly seen, being understood by the things that are made." (Romans 1:20) Right reason applied to what is seen and heard all around, the Apostle argued, should lead any human being to understand the existence of God, His Eternity, and His Power.

Having both sensory perception to see the created order and a mind to reason rightly, it follows that all men who do not give God thanks and worship him as God are "without excuse." This great truth is not a matter of revelation but of right reason, or true philosophy. Christian thinking has thereupon taken the procedures of philosophy in hand to serve right reason and so reach correct conclusions from revealed truth.

Revelation is best defined as the personal testimony of an eyewitness.

Since created minds are, as may be shown by reason, limited and therefore incapable of understanding fully the unlimited and eternal, the only testimony we can receive about heavenly things is that of God Himself—either God the Spirit, or God the Son.

Of the Lord Jesus, John Baptist said, "What he hath seen, and what he hath heard, that he testifieth." (John 3:31, 32) Since He came from heaven, what he hath seen and heard are heavenly things. God The Spirit has spoken through the prophets and He also, as God, testifies of personal knowledge to "the things of God." (1 Corinthians 2:11)

Creation Account Known by Revelation

The account of creation in Genesis is known to man by revelation, that is, by testimony of the

Holy Spirit very possibly given through Adam. Thus the details provided by this inspired record could not be known except they were revealed in this way. But the Spirit also testifies through the Apostle that all men are held accountable for believing through right reason that all things were made. The testimony of what the Holy Spirit saw and heard may be supported by both the disciplines of science and philosophy.

Ancient philosophers, by such reasoning as Aristotle's on cause and effect, showed that right reason demands a first uncaused cause, which is a correct if altogether inadequate way of speaking of God. Just as certainly men who devote themselves to the study of what can be seen and heard and touched, that is, men of science, are driven by their everbroadening observation of design to conclude that there must be a designer.

Just because such philosophical reasoning and such scientific conclusions do not contain an adequate account of God, does not mean that either is contradictory to revelation, or harmful to religion, or that religion can be understood without reference either to sensory perception or right reason.

There is no warrant in St. Paul's warning against ". . . philosophy and vain deceit after the traditions of men and after the rudiments of the world and not after Christ" (Colossians 2:8), for someone to criticize philosophical speculation which is after Christ. Philosophy after the rudi-

ments of this world is obviously philosophical speculation divorced from theology and wedded to temporalities and materialism and exclusive of religion. Such speculation is not built on the processes of right reason, because right reason must take account of spiritual as well as temporal realities.

Those who would imagine that they are somehow placing a limit on God's will and his power by believing there is such a thing as eternal and immutable right reason should be careful lest they find themselves doing away with Him who is the Wisdom of God, the Word of God, the Mind of God, as well as the Power of God, the Lord Jesus Christ.

God's Wisdom is immutable. He has made himself known to men as Wisdom and as the Word. Through Wisdom, man comes to know the Father. God's laws are immutable, and He himself cannot will to violate them, even though he may surprise men by doing the unusual or by skipping secondary causes and thus working what we call miracles.

Christian thinkers, then, should agree generally that philosophy may be understood to be the activity of right reason, and science may be said to be the knowledge of things knowable to sensory perception (direct or indirect), and that these cannot be studied without reference to religion, but must serve religion which is Christian truth and life. "In Christ are hid all the treasures of wisdom and knowledge." (Colossians 2:3)

A BIBLICAL FRAMEWORK FOR A COURSE IN PHYSICAL SCIENCE

EMMETT WILLIAMS AND GEORGE MULFINGER*

(Editor's Note: Since the relationships of science and faith and teleology arise partly at least in connection with schools, the following material should be of special interest to readers who wonder how appropriate discussions might be handled in an actual course in physical science.

Williams and Mulfinger have described methods of treatment of the subject in their forthcoming ninth-grade textbook, Physical Science, expected from the Bob Jones University Press, Greenville, South Carolina 29614, by December 15, 1974. Price, \$11.95.)

Limitations of Science

Physical science needs to be put into a proper perspective for a Christian high school student. The limitations as well as the accomplishments of scientists should be pointed out.

Science is generally overglorified in existing physical science textbooks. But the discipline of science is a human activity, and therefore subject to all the limitations of human nature.

Adhering to a Biblical framework we point out that man is a fallible, fallen creature, severely re-

stricted in what he can ascertain and accomplish. (Isaiah 55:9, I Corinthians 1:18-21, 3:19-21) Yet the many limitations inherent in science are usually glossed over in the standard textbooks. It is important that the student of science be apprised of these shortcomings.

The failure of scientists to explain the nature of such basic things as matter, energy, and gravity, the tentativeness of scientific ideas, and the inability of scientists to make legitimate pronouncements on the subject of origins, are but a few of the many shortcomings that can be made explicit to beginning students.

Observation should be stressed as being the key ingredient of the scientific method. If a

*Emmett Williams, Ph.D., and George Mulfinger, M.S., are with the Department of Physics, Bob Jones University, Greenville, South Carolina 29614.

phenomenon cannot be observed by man's senses, either directly or with the aid of instruments, then it cannot be dealt with scientifically. In accordance with such restrictions, all speculations concerning the remote past, the distant future, and such conjectured unobservables as extra-terrestrial life are eliminated from the lawful domain of science.

Considered collectively these limitations will help the student to realize that science is not a fit object of worship. The great prevalence of science worship today can be traced in part to a very specific defect in science courses and textbooks: the failure of teachers and authors to present a realistic picture of science.

Historical Approach

The human element in physical science is important in yet another sense. The use of a **historical** approach to the subject can give the student an appreciation for the personalities who had a part in structuring the various laws and theories, and for the arbitrariness of the choices made. Blunders and blind alleys in the history of chemistry and physics, often deliberately omitted from textbooks, are reexplored and assessed.

At certain key points in our book biographical sketches of outstanding Christian men of science are included. In each case a brief description of the scientist's work is presented, together with something about his testimony, beliefs, and insights.

All of the scientists who have been selected for biographical sketches were fundamental Bible-believing Christians. It is hoped that this feature will serve to dispel from the mind of the student the erroneous idea that the greatest scientists have been atheists or agnostics.

When scientific concepts such as the atomic theory are presented from a historical standpoint, the student immediately develops an appreciation for the changeableness of scientific ideas. The fact that scientific truth is not absolute is illustrated clearly. Hopefully, then, when furnished with enough insight from the history of science, the student will learn to evaluate scientific statements for himself. We are concerned that the Christian student have the necessary scientific facts at his disposal, but he should also be able to use his mind to develop a proper Christian philosophy of science.

Many scientific ideas are left rather mysterious. Present-day science is not presented as the final word. It is hoped that this will encourage many young people to spend their lives in scientific activity. Some might even be able to change the structure of scientific knowledge.

Creation and Evolution

One might expect that evolution and a general anti-God philosophy would not constitute a major problem in a course which deals only with chemistry and physics. A close study of existing texts, however, reveals a number of objectionable statements that reflect an evolutionary bias of the authors. Apparently imagined evolution is presented and promoted, whether or not evolution is directly related to the subject.

For example, in one book, in a section on the lever, a highly imaginative description was given concerning a primitive subhuman and his use of a lever to pry rocks from the entrance of a cave. Such allusions are thoroughly unscientific in that they are based on unenlightened guesswork rather than actual observations.

We have endeavored scrupulously in every instance to trace to Biblical origins rather than to hypothetical beginnings conjured up by man's imaginations. Metal working, for example, is traced to Tubal-cain in Genesis 4:22 rather than to some speculative "neolithic man."

Our textbook is not only a Christian book; it is a creationist book. Whenever possible, creationist applications are developed. For example, cave formations and the formation of fossil fuel are discussed within a creation-worldwide flood framework. A young earth model is offered when the scientific dating methods are discussed. Dr. Thomas Barnes' information on the decaying magnetic field of the earth is covered in the chapter on magnetism.

In what is probably a unique chapter for a ninth grade physical science book, the first and second laws of thermodynamics are discussed and then related to the concept of evolution.

Why do authors of most ninth grade physical science texts avoid a discussion of these laws to any great depth despite the fact that the laws are the best science we have today? Is it possible that these laws offer such a devastating denial to supposed molecules-to-man evolution that most authors choose to ignore this crowning achievement of modern scientists?

Scientists may construct models that are in general accord with these laws. But the impact of thermodynamics on evolutionary thinking is often overlooked or shunned. Sections on organic and biochemistry can be used by a Christian teacher to discuss and debunk chemical evolution.

Teleology

When creation is mentioned, teleology is inferred. The opposing worldview, evolution, when consistently applied, implies dysteleology. When a student sees these two worldviews sharply contrasted he will be more inclined to think and

examine, rather than to accept pronouncements by scientists in blind faith.

Teleology, a word which is all but unknown to most Christians today, should be quite familiar to students who have taken our physical science course. For too long the idea of purposiveness or design in nature has been rejected as old-fashioned and unscientific.

Teleology is presented clearly in a number of areas in our book; such as: (a) Some of the intricate mechanisms of the human eye are discussed in the section on optics. (b) The amazing details of the ear and the wonders of the human voice are described in a chapter on sound. (c) The protection afforded by the ozone layer of the stratosphere is covered under the chemistry of oxygen. (d) The function of the earth's magnetic field in shielding the earth's inhabitants from cosmic rays is discussed in the chapter on magnetism. (e) The unique properties of water and their significance for living organisms are taken up in a chapter on water.

Other teleological arguments are included at appropriate points; therefore, such examples of God's handiwork should carry a strong message to the mind that is not blinded completely by sin.

Other Pedagogical Distinctives

The effect of drugs, alcohol, and tobacco on the human body are presented as the primary physical pollution problem. The authors are in favor of reasonable environmental protection, but are opposed to hysterical and hasty measures.

Because present-day industrial technology is so highly advanced, engineering and industrial applications of scientific principles as well as research laboratory examples are given.

Many different scientific ideas are pictured through the use of cartoons. The use of humor can do much to increase student interest and aid in the grasp of nebulous models. Sterile scientific discussions may be satisfactory for graduate classes, but the ninth grader needs to be stimulated before he will attempt to grapple with an abstract idea.

ON THE DISTINCTION BETWEEN RELIGION, PHILOSOPHY, SCIENCE, AND HISTORY

HAROLD L. ARMSTRONG*

Careful attention is given to what is meant by "religion," "philosophy," "science," and "history." Religion has to do with right relation to God. Philosophy involves one in the study of all things, and creation and origins would rank only as one area of study among many. Science is organized knowledge and methods of investigation of the natural environment. Therefore, creation, origins, and evolution cannot be studied scientifically. History is developed from written records. The "fossil records," then, cannot be considered as history.

When the question of a special subject for this Annual Issue of the *Creation Research Society Quarterly* was being discussed, the proposal was made that we look into differences between religion, philosophy, and science.

Such a discussion is needed, at least partly, because when mention of creation in the schools is proposed, the objection that creation has to do with religion rather than with science is raised usually. Sometimes it is said that questions about origins have to do with philosophy.

Thus a discussion of this whole matter—the question, under which heading investigation of origins comes—would seem to be very much worth while.

As will be noticed, while articles were written and this *Quarterly* issue was prepared, the topic broadened considerably. That is not undesirable, and was to be expected. Incidentally, the reason for adding history to the list will appear later.

Everyone has had the experience of listening to arguments, which were interminable, because the terms utilized were not well defined. Different people were using the same words to mean different things. Lest that happen here, let us consider what we mean by "religion," "philosophy," "science," and "history."

Religion

The usual dictionary¹ definition of religion is: "system of faith and worship; human recognition of personal God or gods entitled to obedience." This might be re-phrased a bit to say that religion is a way of being in the right relation with the Supreme Being. (If polytheistic religion were being considered, one might say: "higher beings.")

Note that the essential aspect—and this agrees with the definition in the dictionary—is the notion of right relation. It is not just a matter of intellectual belief; nobody would call the devils who "believe and tremble"² religious. Also, this fits in with St. James' definition of religion.³

*Harold L. Armstrong, M.Sc., is with the Department of Physics, Queen's University, Kingston, Ontario, Canada.

It follows, then, that to mention creation in school as a possible origin of the universe is not an exercise of, or an attempt to propagate, religion. Nothing is said about right relation.

Philosophy

Here the discussion becomes more involved. First, consider two meanings which are not related to the present point.

Sometimes "philosophy" means a general outlook, or a body of presuppositions, as in one's "philosophy of life." In that sense either creation or evolution might be a philosophy.

Sometimes "philosophy" is used in a wrong sense, to mean speculation as opposed to sound investigation. That is really not a legitimate use of the word. Indeed, one finds cases in which evolution, at any rate, is a "philosophy" in that sense.

The usual dictionary definition of philosophy is: "pursuit of wisdom or knowledge, esp. of ultimate reality or general causes and principles."¹ In a manual of (Neo-)Scholasticism philosophy is described as: "the science or understanding of all things through their most general reasons."⁴

This follows Aristotle, who considered philosophy, under the name "philosophic wisdom," "the most finished of the forms of knowledge"; and who concluded that it is "intuitive reason combined with scientific knowledge."⁵ Thus philosophy, in this sense, is a more general form of the same thing as the more special sciences—Aristotle sometimes called them "partial"; whereas today they are labelled "departmental" sciences.

The difference lies in the fact that philosophy is not restricted to some particular kind or aspect of thing, but deals with everything. For that very reason, philosophy is confined to more general matters, and details are developed under the departmental sciences. For the same reason, the points of departure and principles of philosophy involve those ideas which are common to all men.

Philosophers do not depend, primarily, on the results of special investigation and experiment; although, of course, they may sometimes have occasion to take cognizance of these things.

It might be mentioned, incidentally, partly because of the sad mis-use of the word, that *metaphysics* is a branch of philosophy in the sense just expounded, having to do especially with considerations of what can be said about things by virtue of the fact that they are, that they exist.

Actually neither creation nor evolution is primarily a matter of philosophy in the sense expounded. It is true that philosophers may have something to say about the matter: for instance that it is ridiculous to suppose that things came about without a reason, or that there must have been a beginning. In these ways, notions con-

sidered under philosophy could certainly be used to support creation, not evolution. But, then, philosophy pertains to everything; yet, philosophers are no more concerned with origins than with many other things.

Science

Here the multiplicity of meanings will be really serious.

First of all, the word is often used as an "O K word," as Potter used to put it. For instance, we are told that science has found that such and such a pill is useful. Clearly this meaning has little to do with the question being considered; although it is sometimes used in exactly the same way; if we are told, for instance, that "science has proved evolution."

Sometimes "science" means any more or less organized body of knowledge. One might speak, for instance, of the science of flycasting, or the science of chess. This usage likewise is not relevant to the present discussion.

Generally science concerns studies of things which are true, and involves reasoning to reach some conclusions. This is still too broad a statement for the present purposes. Science would be scarcely distinguished from philosophy. And science might include things that should be excluded. In the Middle Ages, for instance, theology was called the queen of the sciences.

To be specific, "science" should be restricted to natural or experimental science. To a large extent, these terms coincide, although it is easy enough to find distinctions. As a restriction, "experimental" really means that which is based on experience.

In some cases the experience may be that which is available freely in the circumstances of the natural environment; in others, it may be the specially arranged experience which is called experiment. It would seem to be a matter of circumstances which predominates.

Physics or chemistry, for instance, depends largely on contrived experiments; whereas geology (in so far as it is geology, not e.g. chemistry) or meteorology depends on what the investigator finds. Sometimes either source of information might be available. (I have sometimes wondered whether much of the information, obtained at considerable expense by the use of the huge accelerators in nuclear physics, might not have been had free, so to speak, by the study of cosmic rays.)

As for natural science, well, it must be a study, involving reasoning, of nature and the natural. What, then, is meant by "natural"? First of all, the natural happens without human interference. Thus natural science is distinguished from e.g. engineering. Indeed, natural scientists may con-

trive experiments; but they want the experiment to show what would happen should the same circumstances arise without human interference.

But things happen, without human interference, which could hardly be called "natural." To paraphrase Aristotle a bit, one might say that the natural is that which happens always or for the most part.⁶

This is why experiment, in practice, is so important. "Always or for the most part" means always or for the most part under the widest possible range of circumstances. And often artificially contrived experiments are required to see what does happen under a wide range of circumstances; one purpose of experimentation is to vary the circumstances widely.

These considerations finished, what can be said about the original question?

It is clear that creation, considered as creation, is not a matter for science. (Note that "creation" may be used in two senses; sometimes it means the *act*, sometimes the *results*. I am considering the former here.) Nothing can be said about creation "always or for the most part." For there was only one act of creation; it was utterly unique.

As for evolution, if it is a matter for science, it is so in so far as science denies it. No one has observed that "always or for the most part" living beings turn into other kinds. Quite the contrary; only the fact that like begets like is supported by observation. So evolution is either outside science or contrary to it.

At the same time, it is true that men in science may have something to suggest about creation, and creation may be a source of some leads for men in science.

The way in which consideration of the laws of thermodynamics supports the belief that there must have been a creation has been considered often in this and other publications. Consider, for the moment, the matter from the other end, so to speak.

Specialists in thermodynamics sometimes make much of "postulates of impotence"; statements that something or other, for instance to make heat flow from a colder to a hotter object, is impossible.⁷ Some men have questioned whether it is possible, or desirable, to base a science on such principles.⁸ However, no one can deny that they have a practical value. The principle that it is impossible to have perpetual motion, for instance, can, if believed, save inventors from years of fruitless work.

Now a belief in creation should provide a sort of postulate of impotence: that it is impossible, by the methods of science, to reach conclusions about origins. As in thermodynamics, the process might be used in either way.

One might argue from a belief in Creation that any **scientific** determination of origins is impossible, and thus save a lot of fruitless work. On the other hand, one might grant first that it is impossible to find out about origins scientifically.

This might be done in the same way as perpetual motion can be handled in thermodynamics: by pointing to the steady record of failures. Then it must follow that origins are outside the ordinary range of happenings; i.e., they are by creation.

Thus neither creation nor evolution comes under science, as part of the subject matter. Either creation or evolution can, of course, be presupposed.

A belief in creation can be useful in science. Not only because of a principle of impotence gained which, if admitted, can save useless work; but also, as Berkeley suggested,⁹ a proper place for teleological considerations can be gained, and the proper uses of things can be identified.

On the other hand, one can hardly think of any instance in which a belief in evolution has actually helped anyone in any scientific work. Lammerts has suggested, in fact, that in the breeding of plants and animals a belief in evolution has been a hindrance.¹⁰

History

The distinguishing aspect of history, anyone would agree, is that it depends on records. Ordinarily, moreover, these are written records. But there is no particular concern, at the moment, with "natural history," which seems to mean a description of nature, as contrasted with reasoning about it under natural philosophy.

Again, philosophers talk about "historical knowledge." This means the kind of knowledge obtained from the testimony of others. For instance, North Americans believe that there is such a place as Australia, although many persons in Canada and the United States have never seen Australia. No direct concern with this notion is required in this discussion.

However, the difference between history and archaeology should be emphasized. The difference is that history involves records; archaeology, only things. Which is more effective?

This is made evident through a comparison of our knowledge of Europe, around the beginning of the Christian era, with that of the civilizations in the Americas about the same time; or through a comparison of our knowledge of Greece about 500 B.C. with that of Etruria about the same time. As Courville has pointed out: "The vast majority of archaeological finds taken alone are capable of numerous interpretations."¹¹

Now as for origins, the only record available, which is worthy of serious consideration at all, is

that of Scripture, and it tells of creation. The "fossil record" is not a record at all, as records go in history; rather the "fossil record" is a series of archaeological finds. And the "fossil record," like the others which Courville mentioned, may be interpreted in several ways.

Actually, archaeology is most useful when used to illuminate the story of times which are already known, in outline at least, by those who read the records of history. This is how the archaeology of Greece or Rome would be used.

Likewise, the information from fossils would be employed most usefully in filling in the story of creation and subsequent destruction in the flood, of which an outline is already at hand in Scripture.

Conclusion

In conclusion, then, creation is not a matter (in the sense of subject matter) of science, nor of philosophy; it is a matter of history. We know that creation happened in the same way as we know that any other event before our time happened: we know it because we have reliable records.

Evolution, if it were true, and if we had any written record, would be a matter of history. But it is not true, and we have no written records to support it. The only evidence which can be adduced for evolution, which is even worth con-

sidering is the "fossil records." But we have seen that the fossils do not constitute a record as records are used in history. Fossils are more like archaeological finds, subject to various interpretations. Evolutionary thinking, then, consists of a mistaken interpretation of these finds, and is certainly not science.

References

- ¹The Little Oxford Dictionary, Fourth Edition. Oxford University Press, 1949.
- ²St. James 2:19.
- ³St. James 1:27.
- ⁴Cardinal Mercier, A manual of modern scholastic philosophy. English translation by T. L. Parker and S. A. Parker. Third Edition. Routledge and Kegan Paul, London, 1960. Vol. 1, p. 8.
- ⁵Aristotle, Nicomachean ethics, Book VI, Chapter 7.
- ⁶Perhaps not in quite these words in any one place; but see Rhetoric Book I, Chapter 10; Physics Book II, Chapter 5; and Physics Book VIII, Chapter 1.
- ⁷Zemansky, M. W. 1951. Heat and thermodynamics. Third Edition. McGraw-Hill Book Co. Articles 7.5-7.7.
- ⁸Dingle, H. 1972. Science at the crossroads. Martin Brian and O'Keefe, Ltd., London, pp. 203-205.
- ⁹In his book, Principles of human knowledge, which may be found in any edition of his works.
- ¹⁰Lammerts, W. E. 1961. Neutron-induced variation of roses, *Pacific Rose Society News*, XXVI (3):7, 16 and 17; and (4):11, 18 and 19.
- ¹¹Courville, D. A. 1971. The Exodus problem and its ramifications. Challenge Books, Loma Linda, California. Volume 2, p. 3. (See particularly the whole of Chapter I.)

TIME UPSIDE DOWN

ERICH A. VON FANGE*

A new look at world prehistory is presented. Substantiations are enumerated at length to support the author's contention that much, much evidence has been ignored too long by authors of conventional textbooks. Upside down formations, odd things in wrong places, extensive challenges of dating methods, the fading magnetic field of the earth, stalagmite formation, footprints in stone, petrified wood, reexamination of the Sahara, Neanderthal man, and other oddities found below the earth's surface are itemized. Keys to unlocking mysteries of ancient history are discussed also.

I. Introduction

According to many textbooks, the Antarctic ice cap is 60,000,000 years old. Earliest man was thought to have emerged into history about 1,000,000 years ago.^{1,2}

In the National Museum of Turkey two map fragments dated 1513 and 1528 are on display. The maps were compiled from a number of now lost ancient originals which existed long before the time of the Greeks. At the bottom of one of these fragments the coastline of the Antarctic continent is shown, including rivers and mountains.

The original map, which shows amazing knowledge and accuracy, was made when the Antarctic was ice-free.³ Antarctic mountains and portions of the coastline depicted on the map were confirmed by scientific studies in 1952 and again more recently.

The evidence of the maps cannot be ignored, according to responsible reviewers who have studied them. Independent evidence of the recency of the Antarctic ice cap came to light with the discovery of 81 mummified seals in some mountain caves, 2500 feet above the present sea level.⁴

The story of the earth as found in the Scriptures and the testimony of scientists in textbooks

*Erich A. von Fange, Ph.D., resides at 467 Pine Brae Drive, Ann Arbor, MI 48105.

and in the news media are quite disparate. About 107 years ago T. H. Huxley stated the issue very well:

You (clergy) tell your congregations that the world was made 6,000 years ago in six days, and that all living animals were made within that period. . . . I am bound to say, I do not believe these statements you make; and I am further bound to say that I cannot call up to mind amongst men of science and research, and truthful men, one who believes those things, but, on the other hand, who does not believe the exact contrary.⁵

Many facts are reported in journals and books which conflict with commonly accepted ideas about the world. If these data are used at all in texts, they may be referred to as anomalies or mysteries, but with no attempt to change the ideas undermined.

There is, of course, always some risk involved in accepting data reported in newspapers and journals. "Facts" reported earlier may be retracted in a new edition or succeeding issues of a journal or newspaper. Readers perform a genuine service when they point out such errors to the author.

Most scientists assume a very old, evolved world, and they use evidence which seems to support this assumption. They disregard, or reject, or label as anomaly, anything which does not support this world view. One is not inclined to be false to his assumptions, even when the assumptions turn out to be false. A professor of biology at a state college said in 1972:

For many years I have been very disenchanted with the current theories of evolution as well as those dealing with fossilization, extinction, geological processes, etc. Other biologists have argued at length with me basing their position on the claim that there is no other possible alternative.⁶

The author of a recent geology text speaks of the need to study a patient unhurried universe.⁷ For more than a century any sudden change has been anathema, as well as any sort of divine role in the process.

In the past decade or so, however, it is interesting to note that old hard-line uniformitarianism is being changed to what is now called uniformity. Geologists admit that some catastrophes did have some effect on some formations. Long pauses in time are placed between catastrophic events to keep the total number of years for the age of the earth the same. And one candid historian says:

In this age, on principle, we are inclined to prefer even the most farfetched of material explanations to the possibility of any kind of divine guidance or intervention, or the fulfillment of any divine purpose. Change and

probability appear to us so much more scientific, and therefore more credible. . . .⁸

Based on earlier work by Bishop Usher (1654), Lightfoot popularized the statement that creation took place at 9:00 a.m. on October 26, 4004 B.C. Other sources have given such dates as 3761 B.C. (Hebrews); 5509 B.C. (Russian Orthodox). Hebrew, Samaritan, and Septuagint versions give variant readings on early chronology.^{9, 10, 11}

In sharp contrast, Darwin carefully inspected the once forested, open rolling upland of England and announced its age as 306,662,400 years.¹² All these estimates were based on certain assumptions and certain logical results followed from the assumptions made.

Of course there are many intriguing questions, problems, and puzzles about which the Scriptures are silent. Neither scientists nor biblical scholars can satisfy much of human curiosity. There is plenty of room for humility on both sides.

This paper is focused primarily on people's beliefs about time—time as presented from scientific sources versus time as indicated in Scripture. Is textbook time or science time vulnerable? Can one break down textbook time? If the answer is "Yes," a great deal will have been accomplished.

(*Author's Note:* References to the conventional geological "clock" in Table I are indicated by letters of the alphabet, each of which refers to a specific time division.)

II. Evidence About Textbook Time

(1) *Surtsey Island Shouldn't Be!*

Seventy kilometers south of Iceland a new island was formed in 1963. That was not an unusual occurrence. The following year, Sigurdur Thorarinsson, Iceland's foremost geophysicist, wrote a little book about the island. Here is part of his description of the island:

Only a few months have sufficed for a landscape to be created which is so varied and mature that it is almost beyond belief. . . . Here we see wide sandy beaches and precipitous crags lashed by breakers of the sea. There are gravel banks and lagoons, impressive cliffs resembling the White Cliffs on the English Channel. There are hollows, glens, and soft undulating land. There are fractures and faulted cliffs, channels and rock debris. There are boulders worn by the surf, some of which are almost round, and further out there is a sandy beach where you can wade at low tide without getting wet.

An Icelander who has studied geology and geomorphology at foreign universities is later taught by experience in his own homeland that the time scale he had been trained to attach to geological developments is mislead-

Table 1: The Conventional Geologic Clock

	MILLION YRS. AGO	YRS. IN MILLIONS	ERAS	PERIODS	EPOCHS	NOTES
A	—	—	Cenozoic	Quaternary	Recent	
B	—	1			Pleistocene	(a great dying)
C	—	12		Tertiary	Pliocene	man
D	—	12			Miocene	
E	—	11			Oligocene	
F	—	22			Eocene	
G	—	5			Paleocene	mammals, birds
	63					(a great dying)
H	—	72	Mesozoic	Cretaceous		
I	—	46		Jurassic		
J	—	49		Triassic		
	230					(a great dying)
K	—	50	Paleozoic	Permian		reptiles
L	—	30		Pennsylvanian		
M	—	35		Mississippian		amphibians
N	—	60		Devonian		
O	—	20		Silurian		
P	—	75		Ordovician		fishes
Q	—	100		Cambrian		trilobites; shellfish
	600					
R	—	3,900	Precambrian			soft-bodied species
	4,500					

ing. . . . What elsewhere may take thousands of years may be accomplished here in one century. All the same he is amazed whenever he goes to Surtsey, because there the same development may take a few weeks or even a few days.¹³

There are other surprises. Evidence was submitted by authorities from Harvard and Carnegie Institute that the mighty Himalayas, during violent upheavals, reached their present form and height in the age of man, in historic times. Evidence for the same phenomenon has been noted regarding the Andes, that in historic times the mountains rose many thousands of feet.¹⁴

If at least some mountains are very, very young, what reason is there to believe that other mountains are untold millions of years old?

(2) *Upside Down Formations That Can't Be*

When Pre-Cambrian strata seem to be water deposited on top of Cretaceous formations, billions of years of rock are resting in the wrong order. (See R and H). Field work carried out in 1968 resulted in the above conclusion. This geologic puzzle is the Lewis Overthrust, which extends from Glacier National Park 350 miles into Alberta, Canada, in a strip 15-30 miles wide.

This phenomenon is cited in texts as the classic example of a large overthrust, i.e. older rock pushed up and out over younger rock. The problem of the overthrust concept here is the absence of the usual evidence left by actual overthrusts: gouging, ground rock and powder, breccia, and

striated stone. The fossils, too, are in the wrong order.¹⁵

Another mystery is found in the Franklin Mountains near El Paso, Texas, at a location known as West Crazy Cat Canyon. Here massive Upper Ordovician limestones are found lying immediately on top of an Upper Cretaceous formation. (See P and H). A geologist who conducted a tour there a few years ago explained that no actual physical evidence of an overthrust had yet been discovered, but since the fossils were completely out of order, geologists assumed an overthrust.¹⁶

In 1948 a startling observation was made at Mount Vesuvius. Researchers found that blocks of limestone enveloped in molten lava at Vesuvius have, by the absorption of silicates, developed into forms that are similar to Pre-Cambrian rock, e.g., those found by Dawson in Canada.¹⁷

Another famous location is the Glarus Overthrust near Schwanden, Switzerland. Instead of the textbook order of Permian, Jurassic, and Eocene (See K, I, and F), a 21-mile overthrust is assumed because the order of formations is Eocene at the bottom, Jurassic next and Permian on top. (See F, I, K). A so-called gouge layer shows no striations, and irregularities at the bottom of each formation have not even been worn away. Again the fossils are in the wrong places.¹⁸

In the Empire Mountains in southern Arizona, Permian limestone rests on top of Cretaceous. (See K and H). The contact resembles gear meshing. There could have been no sliding without

the projections of the lower formation being ground off. Yet it is called an overthrust.¹⁹

Fossils are in the wrong order in Heart Mountain, Wyoming, and in nearby Sheep Mountain. These mountains are capped with Paleozoic limestone. Lower down are Jurassic and Tertiary sediments. (See K, I, and C).²⁰

An impossible combination of fossils was reported in 1970 in Guryul Ravine, Kashmir. Permian brachiopods were found mixed with lower Triassic pelecypods. Since the one is supposed to have been extinct long before the other evolved, no explanation of the puzzle was offered. (See K and J).²¹

One text writer stated that some of the strata above could scarcely be supposed to have been inverted if it had not been for a study of the fossils in them. He also said, "Had these sections been planned for the purpose of deception they could not have been more skillfully devised."²²

(3) *Odd Things in Wrong Places*

According to conventional dating, coal was formed about 300,000,000 years ago. (See L and M). Other coal formation took place in Tertiary times. (See C). Man, of course, did not emerge until about a million years ago. From time to time, some very odd things have been found in coal. Modern methods of coal mining make other finds very unlikely today. The following reports have stirred considerable question and debate:

(a) In 1885 at a foundry belonging to Isidor Braun of Vöcklabruck, Austria, when a block of coal was broken, a small steel cube with a deep incision around it and with the edges rounded on two faces fell out of the coal. Some who examined it concluded that only human beings could have made the object. The son of the owner took it to the Linz Museum in Austria, but later it was lost. A cast of the cube, however, is still kept by the museum. Debate on the object was never closed, but some authorities held it to be a meteorite.²³

(b) In 1912, some coal mined near Wilburton, Oklahoma, continues to be an unsolved mystery. Two employees of the Municipal Electric Plant, Thomas, Oklahoma, came upon a solid chunk of coal too large for the furnace. They broke it up with a sledge. An iron pot fell from the center leaving an impression, or mold, in the piece of coal. An affidavit was made out by the two witnesses, and the pot was photographed. Thousands of people have examined this strange object.²⁴

(c) Proceedings of a society of antiquities in Scotland contain a report that an iron instrument had been found in the heart of a piece of coal from a mine in Scotland. The instrument was considered to be modern, but there was no sign of boring in the piece of coal.²⁵

(d) Other things have been reported in other kinds of rocks. For example, a nail was reported to have been found by David Brewster in a Cretaceous block from the Mesozoic era. In a report of the British Association, 1845-51, it was stated that a nail was found in a block of stone from Kingoodie Quarry, North Britain. The block was eight inches thick and came from below the surface. The point of the nail projected into some till and was quite rusted, but the last inch, including the head, was embedded in the stone.^{26, 27}

(e) Workmen quarrying rock near Tweed below Rutherford Mills discovered a gold thread embedded in stone at a depth of eight feet. A piece of this object was sent to the office of the Kelso Chronicle in that district.²⁸

(f) A report was carried in the *Scientific American* that in June, 1851, workmen were blasting near Dorchester, Massachusetts. Cast out from a bed of solid rock was a bell-shaped metal vessel. The vessel, with inlaid floral designs in silver, showed a remarkably high degree of craftsmanship.²⁹

(g) In the sixteenth century, Spanish conquistadors came across an iron nail about six inches long solidly incrusting in rock in a Peruvian mine. The rock was estimated to be tens of thousands of years old. Iron was unknown to the Indians there. The Spanish Viceroy kept the mysterious nail in his study as a souvenir, and the account of this find was recorded by letter in the Madrid Archives, 1572.³⁰

(h) The *London Times*, 1851, contained a report that Hiram de Witt found a piece of auriferous quartz in California. When it was accidentally dropped an iron nail with a perfect head was found inside.

(4) *A Jawbone in Coal*

The jawbone of a child about six years old, flattened like a piece of sheet iron, was found embedded in a lump of coal in Tuscany in 1958. The coal is dated from the Miocene age. (See D). The finder was Prof. Johannes Hurzeler of the Museum of Natural History in Basel, Switzerland. According to conventional dating, man did not live that long ago. Calling this the "world's oldest man" raises more questions than it solves.³¹

In the collection of the Freiberg Mining Academy, West Germany, was an object supposed to be a human skull reputedly fossilized in brown coal, first described in 1842, before Darwin's book on the origin of species. The specific source of the "skull" is unknown. While the object is frequently labelled as a fake, the early date of its description is important. A specialist in Germany referred to it as a puzzling human skull just a few decades ago. The matter is still an open question, but the problem is that it was found in

a formation too old for concordance with conventional dating assumptions.³²

In the Number Three Eagle Coal Mine at Bear Creek, Montana, miners found two huge human molars in strata dated at least 30 million years ago. The discovery was made in 1926. Again, man was not yet supposed to have existed at this time.³³

In the 1870's, Dr. Scheuermann discovered a number of sticks, apparently artificially pointed by the hand of man, which had been found in lignite. The lignite, however, was considered to predate man.³⁴

Only a few years ago Dr. Henry Morris reported that he had interviewed a coal miner in West Virginia who had excavated a perfectly formed human leg that had changed into coal. Years before in the same general area another party of miners unearthed a well-constructed concrete building. Not enough evidence exists to evaluate these supposed finds.³⁵

Eminent scientists have taught that peat forms at the rate of about one-fifth inch per century, or one foot in 6,000 years. More than a century ago, however, peat farmers said that the rate was about 2½ inches per year. A large number of embarrassing finds soon supported the experience of the peat farmers.

However, elephant bones found under a few inches or feet of peat in America are still dated in terms of many thousands of years. In some places in Scotland old Roman roads were covered with peat to a depth of eight feet in some places, but one could hardly argue for an age of 48,000 years for such work by human beings.³⁶

Other finds included datable metal objects found at great depths in peat. In Abbeville, France, a boat loaded with Roman bricks was found in the lowest tier of the peat. In the Somme Valley, beech stumps up to four feet in height were found covered by peat before they had decayed.³⁷

(5) *Bristlecone Pines Tell on C-14*

Certain discovered truths are held to be beyond any question or doubt. Among these of course are the unchallenged constants of absolute zero, the speed of light, and the decay rate of radioactive materials. Certainly nothing in today's newspapers and children's textbooks give any hint that these are not sacred truths to be completely accepted.

One of the first suggestions that the constant decay rate of radioactive material might be open to challenge appeared in a news magazine in 1964, when a group of physicists reported that they had proved that they could influence the rate of radioactive decay. Yet radioactive dating methods stand or fall on the assumption that the rate is a constant.³⁸

More difficulties developed several years ago with studies of bristlecone pine borings. These trees are the oldest living matter known on earth. C-14 tests made with wood from these pines of known age showed that C-14 readings are in error from a few centuries up to a thousand years. This shocking find casts doubt on the assumptions of the method.³⁹

The author of a text on nuclear geology admits that most of the time scales used in geology are based on the uncritical compilation of a wide variety of data, so that the overall figures are necessarily very rough. Just how rough these figures are is the main point of this paper. The author further notes that some geologists question the use of the C-14 method for samples stored under moist conditions. This is a most serious limitation, for who can be sure that a given sample has not been moistened?⁴⁰

Dr. Libby, the discoverer of the C-14 method for which he won a Nobel prize, expressed his shock that history extended back only 5000 years, a finding totally in conflict with any evolutionary concept. Older dates are very unreliable.⁴¹

Other methods, e.g., uranium-lead and thorium-lead ages, have resulted in contradictory evidence. A classic example is that the dust samples on the moon seem to be older than the rocks underneath.⁴²

Another remarkable example appears in a book published by Stanford University Press. Six C-14 ages were determined from a core in an attempt to date the formation of the Bering land bridge. The dates ranged from 4390 to 15,500 Before Present.

The first problem was that the results were so disarranged from bottom to top of the core that no two samples were in the same order. Then the oldest date was discarded because it was inconsistent with other tests elsewhere.

Then the remaining dates were assumed to be contaminated by a fixed amount, after which the authors concluded that the delta under study had been formed 12,000 years ago. This is what happens to men who operate without an alternative.⁴³

Even more astonishing is this statement made at a symposium of Nobel Prize winners in Uppsala, Sweden, in 1969: "If a C-14 date supports our theories, we put it in the main text. If it does not entirely contradict them, we put it in a footnote. And if it is completely 'out-of-date,' we just drop it."⁴⁴

(6) *Impossible Dates to Remember*

By this time tens of thousands of C-14 dates have been published from tests performed in various laboratories around the world. In the annual volumes in which the dates are published, concern has been expressed about many rela-

tively young datings which violate established geological age notions. One example given was ice-age materials that were dated within the Christian era by C-14 methods.⁴⁵

In his book on prehistoric America, Ceram notes a classic case of the difficulties that befall C-14 dating. Bones dated at 30,000 years old were found lying above wood which was dated at 16,000 years.⁴⁶

Another classic C-14 problem is noted for Jarmo, a prehistoric village in northern Iraq. Eleven samples from the various strata were dated and a 6000-year spread from oldest to most recent resulted. On the basis of all the archaeological evidence, however, analysts concluded that the village was occupied no more than 500 years before it was finally abandoned.⁴⁷

Mortar samples can be tested by usual C-14 means, since mortar absorbs carbon dioxide from the air. Mortar, however, from Oxford Castle in England was assigned an age of 7,370 years. The castle was built 785 years ago. The kind of contamination is unclear.⁴⁸

Living trees near an airport were dated as 10,000 years old with C-14, because the wood contained contamination from airplane exhaust.⁴⁹

C-14 analysis of oil from the Gulf of Mexico deposits resulted in an age measured in thousands of years—not millions.⁵⁰

Data produced by the Petroleum Institute at Victoria, New Zealand, showed that petroleum deposits were formed 6-7,000 years ago. Textbook authors state that petroleum was formed about 300,000,000 years ago.⁵¹ (See A, L).

A geophysical research journal reports that lava which formed in the year 1800-1 was assigned an age of 160 million up to 3 billion years in age after testing by the potassium-argon dating method. Similar dates for young rocks in Norway, Germany, France, and the Soviet Union have been published in other reports.⁵²

In the Canadian Arctic on a rock ledge on Victoria Island, researchers found a number of brachiopods and tracks in what was almost surely a Precambrian deposit. No such life was known to appear until the Cambrian period, however. The impossibly young date of 445 million years (Ordovician period) was obtained from laboratory dating. Presumably laboratory tests will continue until a more "reassuring" date of more than 600 million years is secured.⁵³ (See P, Q, R).

Fossil wood was found in an iron mine in Shefferville, Ontario, which was a Precambrian deposit. Later the wood was described as coming from Late Cretaceous rubble, which made it about 100 million years old instead of more than 600 million years old. Two independent C-14 tests showed an age of about 4000 years.⁵⁴ (See A, H, R).

The last major glacial advance in America was long dated at about 25,000 years ago. However, a revision down to 11,400 years was required to accord with C-14 dating. United States Geological Survey scientists carried out studies which gave a C-14 date as recent as 3300 years ago, but no textbook author treats such a puzzling find which falls well within historic times.^{55, 56}

In the past decade studies of plant spores have been made in the formations of the Grand Canyon. Spores of conifers were found in the Permian, Mississippian, Cambrian, and Precambrian, and pollen of flowering plants were also found in the Precambrian. No evolutionary theorists can accommodate these findings.^{57, 58, 59} (See K, M, Q, R).

Bones with man-made incisions on the surface have been found in a number of Pliocene and earlier formations. Some preserved in the museum of Florence, Italy, along with implements, are of so recent a type that a great mystery is evident, or some kind of contamination must be assumed.^{60, 61} (See A and C).

The age of moon rocks reported in the press is not as clear cut as might appear. Dates acceptable according to preconceived notions have been published generally. Much less is reported about unacceptable dates found by means of potassium-argon dating, ranging from 7 to 20 billion years in age. Rather than question the method and the assumptions underlying the method, scientists seem to regard the samples with variable dates as contaminated.^{62, 63, 64}

(7) *Earth's Magnetic Field—Fading Fast*

By 3991 A.D. the earth's magnetic field may have disappeared according to a report in *Time*, 1968. Here is what may happen (and these events have happened before on the earth): catastrophic mutation of plant and animal life, widespread climatic changes, lush valleys becoming barren wastes, deserts blooming, icecaps growing and covering the land or melting and drowning coastal cities.⁶⁵

For the past 130 years careful measurements of earth's magnetic field have been conducted. The rapid decay of the field is startling, and it is possible to project the rate back for as much as 20,000 years and thus deduce impossible, unknown conditions. These data can be used as strong evidence for a young earth.⁶⁶

Authors of standard texts claim that 171 reversals of the earth's magnetic field have occurred in the last 76 million years, i.e., since Late Cretaceous times. (See H). The last reversal is said to have occurred 700,000 years ago, and the next event is long overdue.⁶⁷

Yet some authorities say that the 171 reversals are nothing more than arbitrary interpretations of selectively chosen samples.⁶⁸

But while geologists proclaim and debate these ideas, sophisticated research by archaeologists shows that there was a magnetic reversal as recently as the eighth century B.C. These studies were made with Etruscan pottery. The authors also claim that polarity changes also would bring about faunal extinctions, climatic changes, fantastic extent of volcanic activity, earthquakes, tidal waves, and other awesome phenomena.⁶⁹

(8) *Stalagmites in a Hurry*

During a tour through a cave, one is often told that stalagmites and stalactites took many millions of years to form. Little specifically seems to be known about the growth rate, except that it is a vaguely slow process.

Some formations are believed to be about 100,000 years old since they rest on silt and fossils dated at about that age. The usual orthodox view is that only rarely will more than one hundredth of an inch be deposited per ten-year period, or one inch in a thousand years.^{70, 71}

About twenty years ago the clear outline of a bat was found inside a stalagmite in Carlsbad Caverns, New Mexico. It had been cemented over before bacteria, decay, or predators could destroy it. The suggestion was made that under the right conditions the growth of the stalagmite might be amazingly rapid.⁷²

In a cave in the Tehuacan Valley of Mexico, a vast chamber known as the Hall of the Dead was found. A massive cave-in had occurred and one can still see the skeletons of people of the Olmec period there. The skeletons are all covered with stalagmites. Rather than an age in the millions of years, the skeletons are dated as no earlier than 1200 B.C.⁷³

A writer in *Nature* some years ago was able to show that a stalagmite about 15 years old from a lead mine exactly paralleled in form and height another which, in association with human remains, had been estimated by experts as being 220,800 years old. Some authorities are suggesting that the association of human bones with long extinct animals may not be proof of the antiquity of man but rather that these animals lived into quite recent times.⁷⁴

In the British Museum there is a skeleton embedded in solid rock which came from the island of Guadeloupe in the West Indies. The rock is a hard limestone and also contains fragments of shells and coral. The skeleton is that of an Indian killed in battle with the British only two centuries ago.⁷⁵

In a cave in England water passing through a lime deposit was channeled through a four-inch pipe. In eight weeks the diameter of the pipe

was reduced to only one inch and the crystalized deposit, which had grown in layers like tree rings, gave every appearance of being thousands of years old.⁷⁶ There are numerous reports of other quick-grow stalagmites:

- (a) In the Carrara district, Italy, stalagmitic deposits are a local source of income. The water is so impregnated that any object placed in it is thickly coated in two weeks.
- (b) In New England spouts carrying water from mines become choked up with deposits within two or three years. . . .
- (c) A stalactite a foot long was found hanging under a railroad bridge in Alliance, Ohio. . . .
- (d) Indisputable evidence was produced to show that a deposit $\frac{3}{4}$ -inches thick had been formed in fifteen years in a lead mine in England. . . .
- (e) Grown stalactites were found one year after the atomic explosion set off in Gnome Cavern, New Mexico. . . .
- (f) A five-inch stalactite was found in the man-made Hetch Hetchy tunnel, California, less than 20 years after it was built. . . .
- (g) Another eight inches long was found hanging from a flume in Georgia which formed in less than a century. . . .
- (h) About a hundred miles from Zagreb, Yugoslavia, lakes fed by waters coming through limestone underground beds are so charged that deposits are more in the hour range than the century. Objects placed in these waters are soon coated by lime deposits.^{77, 78, 79, 80, 81, 82}

(9) *Footprints Tell Tales*

Handprints and footprints have held a fascination since ancient times. Paintings and rock carvings of these representations are found in many parts of the world. On rare occasions footprints are found or uncovered in rock strata. Such prints must have been covered rapidly or they would have eroded away from wind and water action.

From time to time human prints have been reported in strange places. Understandably, paleontologists are not interested in considering the possibility of human prints in formations they believe to be older than the emergence of man.

One paleontologist warned his colleagues about the extraordinary forms which false prints may take. He described a print found in Triassic rock. (See J). It appeared to be the fossilized leather sole of a shoe, about size 13, which showed a double line of sewed stitches, one line close to the outside edge and the other parallel at a distance of about a third of an inch. The edges of the sole were rounded off smoothly as if cut, and the right side of the heel seemed to be worn more than the left.⁸³

An astonishing find was reported in the newspapers in 1968, but geologists had no comment about it. Sandal footprints of an adult and the footprints of a child were found embedded in strata right on top of trilobite fossils. This is a Cambrian deposit near Antelope Springs, Utah. (See Q). Photographs have been published of these finds, but more evaluation is needed.⁸⁴

In the *American Journal of Science* the following references to footprints in rock strata are discussed and reproduced:

(a) Human impressions were reported in various locations in South America, but details are lacking. . . . (b) Human footprints in a limestone slab in a paved area between a house and garden in New Harmony, Indiana. . . . (c) A rock outcrop extending for three miles in front of St. Louis, Missouri, one to 200 feet wide, was observed during low water stages. The large number of human footprints there were noted already by early French explorers. The prints are in crinoidal limestone. The prints are described as of a man standing erect with toes spread apart. They appeared strikingly natural with every muscular impression, and the swell of heel and toes. The print described was about 10½ inches long. The observer contrasted these prints with carved footprints he had observed elsewhere. . . . (d) Other prints were reported in a quarry at Herculaneum, Missouri, and on rocks near Kingston, New York.⁸⁵

Footprints were found in sandstone near Carson City, Nevada. The prints are very clear and well-defined and were reproduced in the *American Journal of Science*. The finder later believed them to be of the giant sloth.^{86, 87}

The State Geologist of Kentucky performed extensive tests on footprints found near Berea, Kentucky. The prints were discovered when the overburden from a sandstone formation was removed in logging operations about 1930. One series of prints found included some arranged in a normal walking stride.

Microscopic studies showed that the grain counts were greater in the soles than in the adjacent sandstone, showing greater compression within the print areas. Distinct left and right foot impressions were found, each with five toes and with a distinct arch.

The prints could not have been carved since some of the tracks were still partly covered by higher sandstone strata. Other prints have been reported in nearby areas, but further information is lacking so far.⁸⁸

A shoeprint was discovered in a coal seam in Fisher Canyon, Pershing County, Nevada. The imprint of the sole is so clear that traces of sewed thread are visible. The age of the coal is esti-

mated to be more than 15,000,000 years.⁸⁹ (See D).

Perhaps the most famous footprints in the world were found close to a lake near Managua, Nicaragua. They lie under eleven strata of solid rock from 16-24 feet under the surface.

Heated debate about the age of the prints has gone on for almost a century. Initially they were dated about 200,000 years old, but since the feet were perfectly modern the age was reduced to older than 50,000 years.

The only geologist to visit the scene at the initial discovery also found traces of domesticated dogs and horses with the prints—an impossible situation to resolve. Polished stone artifacts and projectile points were also found.

The prints are now dated at about 3000 B.C. on the basis of C-14 tests, but this means that a considerable number of catastrophic events occurred in a short period of time. Since fossils and mastodon remains have been found in strata above the human prints, the conclusion then is logical that the mastodon lived into very recent times.

Near the city of San Raphael other human and animal tracks have been found, including a sandal print which is now in the museum at Harvard.^{90, 91}

Near Glen Rose, Texas, in the river bed of the Paluxy River, human and dinosaur tracks can be seen together in stone! The rock formation is the Cretaceous. (See H).

In 1970 James Ryals, who had been cutting out tracks and selling them since the 1930's, was interviewed. He reported the human tracks as caused mostly by bare feet, but sometimes apparently by feet enclosed in some form of wrapping. The strides varied from two to seven feet.

There are human tracks crossing dinosaur tracks, and dinosaur tracks which have blotted out human tracks in sequence. Excavation of tracks show a compressed layer pattern underneath as would be expected.

A scientist who did not examine the evidence ruled out the possibility that the tracks were human. A professor of medicine from Illinois University examined the tracks and was convinced that they were genuine.^{92, 93, 94}

(10) *Llamas and Elephants—Village Pets*

According to conventional formulations, the camel family appeared on the scene in Eocene times, and then underwent rapid changes. By Oligocene times (26-38 million years ago) the feet were two-toed, the other three toes having completely disappeared. The camel family also includes the llamas which have two toes, but at a very early stage they supposedly had five.⁹⁵ (See F and E).

The Tiahuanacan empire in Bolivia predates the Incas. About 1920 an archeologist was digging in the ruins of two coastal sites which belonged to this empire. He came upon pottery jugs with representations of llamas. The llamas had five toes, which seemed most strange, since by no stretch of the imagination could the Tiahuanacan civilization be made out to be that old.

According to evolutionary thinking man "evolved" many millions of years after the last five-toed llama lived. The mystery deepened when the same archeologist discovered the skeletons of llamas, all with five toes.⁹⁶

The mastodon arrived in America during the Miocene epoch (Sec D), according to authors of texts, multiplied astonishingly, and then for no known reason became extinct. Various dates, e.g., 4500 B.C., are given when the last elephant in America died.

Near Concordia, Columbia, a complete skeleton of a mastodon was found in an artificial salt pond, which had been constructed by Indians. The pond, with a bottom of paved stones together with the animal, had been entombed by a sudden landslide.⁹⁷

Rock carvings of the mastodon were found in Hava Supai Canyon, Arizona, which were believed to date back to 10,000 B.C. In the same location, however, utensils were found made out of recent, not fossil, ivory, which means the date must be lowered considerably.⁹⁸

In 1929 the skeleton of a mastodon was found in Ecuador. Evidently killed by Indians, a circle of fires had been built around the body for convenient roasting of the flesh. A landslide covered the site, which also included broken painted pottery and artifacts. This remarkable find was dated at the beginning of the Christian era.⁹⁹

In 1928 a Mayan workshop was uncovered in Central America. The archeologist concluded that the owner of the shop, dated from the second to the fourth century A.D., must have kept a mastodon, for the bones of the animal were found among smashed bowls and jars.¹⁰⁰

One paleontologist believed that mammoths still lived in the interior of the American continent at the time of the first Spanish explorers. He supported his belief by the fact that such bones are found under a few inches of peat. Many accurate descriptions of the elephant have been collected from various Indian tribes in America and Canada.¹⁰¹

David Ingram, an English adventurer, was put ashore with 113 other men between Mexico and Florida in 1568 and wandered for years in the American interior before making his way to the east coast of the American colonies. In his report to the state secretary of Queen Elizabeth, he described precisely and drew accurate pictures of

elephants as well as bison and other animals they had observed during the journey.

This account is not taken seriously, but it is a curious fact that 200 years later President Jefferson was informed by a delegation of Indian chiefs that the hunting in the interior lands included animals described as elephants. It is a matter of record that President Jefferson asked Lewis and Clark to be on the alert for elephant herds during their exploration of the West.¹⁰²

(11) *Petrified Wood and Fossils While You Wait*

Drop by drop the water which bears a trace of minerals trickled on the log which had been buried in a storm. Millions of years pass. Today tourists look in awe at the Petrified Forest in Arizona. Who can doubt the immense age of the earth?

More than a century ago, in 1867, a scientist asked how one would account for the fact that wood had turned to stone without injury to the most delicate vegetable fibers. If long periods of time passed during the process of petrification, decay would destroy much of the structure long before.

The same problem was noted in the case of fossilized sponges. The most delicate structures are perfectly preserved in flint. Yet these same structures are destroyed usually by decomposition only a few hours after the death of the sponge. If petrification occurs at all under the right conditions, it happens very quickly.¹⁰³

Counter to commonly held beliefs and popular textbooks, a scientist in 1947 noted that logs had petrified in less than one year.¹⁰⁴

Several years ago a surprising find was discovered in India. Small pieces of wood had been worked by man before they had become fossilized.¹⁰⁵

A number of cut fossil bones were discovered in various parts of Lombardy, Italy. Scientists who studied the finds determined that they had been produced by a cutting implement before they became mineralized. The fossils were dated from the Pliocene Epoch, i.e., before the age of man.¹⁰⁶ (See C).

Much more startling was the report of two saurian bones distinctly scored at regular intervals by cuts, such as might be produced by a flint knife. If the bones had been of a modern species along with implements, there would be no question but what they were of human workmanship. The bones were from a Jurassic deposit, however, so the evidence was not acceptable.¹⁰⁷ (See I).

The *Popular Science News* contained a report of a find of quartz crystals in a Nevada mine which could have been formed only in a maximum of 15 years. In the same area a mill had

been torn down and the discovery was made that sandstone had formed during a period of 12 years. A piece of wood with a nail in the wood was found in the sandstone.¹⁰⁸

The diatomite fossil beds in Santa Barbara County, California, contain striking evidence of a sudden catastrophe. Fish fossils are heavily matted together in foot-thick layers so well preserved they retain a fish odor when a fragment is broken.

There are many indications that the fish were suddenly trapped. The fossils show wide open gasping mouths, fins widely spread, back fiercely arched, body twisted, and head back. Many fossil fish are partly on end through bedding planes of the rock which led to the observation that the heads and tails are millions of years apart according to conventional dating.¹⁰⁹

(12) *The Lush Green Sahara Resort*

The ancients handed down some "wild" tales. One of these is the account of the travels of the Argonauts who sailed from the Mediterranean across the Sahara (including portages) all the way to the west coast of Africa. To put it mildly, the tale makes no sense at all.¹¹⁰

Yet the map fragments referred to at the beginning of this paper also include a large portion of the Sahara which shows a network of lakes and rivers which could well have been navigable in historic times. Some day, therefore, the reported voyage of the Argonauts may have to be reexamined.¹¹¹

Recently researchers have learned that abundant fresh water lies beneath the enormous area of the desert, enough probably to meet all human and animal needs several times over. The potential up to now has scarcely been tapped. There is abundant evidence that the desert did not exist in historic times.¹¹²

Because of the location of the Sphinx, the conclusion that the Sahara was not a desert at the time the Sphinx was constructed is quite logical. The base is repeatedly cleared, but the next wind storm covers it again.¹¹³

In areas where even camels now turn away in despair, lush vegetation grew in historic times. Most of the Sahara was a land of lakes and rivers full of fish. There were meadows, forests, and fertile valleys offering sustenance for a large human and animal population.

In remote areas rock carvings and paintings exist by the tens of thousands. The cattle wore discs between the horns as in Egyptian drawings. Some rock drawings show Phoenician work or influence. Pottery, tools, and polished stone weapons have been found in abundance. The desert did not form gradually over long eons of time. It occurred suddenly in historic times.^{114, 115}

(Editor's Note: Further reading on desert formation may be found in the W. E. Lammerts article, "On the Recent Origin of the Pacific Southwest Desert," *Creation Research Society Quarterly*, 8(1):50-54.)

(13) *What Ailed Old Neanderthal Man?*

The Piltdown Hoax is too well known to merit much discussion here. At the least it illustrates an eagerness to believe in anything that might help to support preconceived ideas.

One can almost picture men in museums all over the world hurrying with gray paint and a brush to paint out that imagined branch of the human tree on the day the hoax was exposed. The next day, Piltdown Man had never existed.

No orthodox evolutionist would dare to propose a recent beginning of man which would correspond to the Biblical account. Although various authorities have pointed out that the variability found among human fossils is really no different from the amazing variability found among man today, little or nothing is made of this fact in the textbooks today. White, middle-class scientists should not necessarily make themselves the model from which fossil bones are judged.¹¹⁶

From the same skull fragment, astonishingly different reconstructions have been made. As someone has noted, the features of the ape or the philosopher may be constructed on the surface of the bone.¹¹⁷

Of more than passing interest is the consideration of fossil man stated recently by an anthropologist that habits of life, climate, and diet can influence the anatomical features of the skull to the point that experts may place such species into different genera. An additional factor of great significance is the physical degeneration and extraordinary physical variability that occurs among isolated inbred populations.¹¹⁸

The fact is well known that when "primitive" Java man was discovered in 1891, two other skulls were found in the same formation and of the same age which were no different from skulls of Australian aborigines living today. The news of the modern skulls found with Java man was not made public for 20 years because they did not fit the preconceived ideas of the investigator.¹¹⁹

In 1963 Dr. Leakey found the human fossil, which he named *Homo habilis*, at the lowest level of strata—a complete contradiction to evolutionary concepts since *Homo habilis* was like modern man. Many aspects of this discovery are highly controversial. While Dr. Leakey suggested that all anthropology works be rewritten, there is really no way this can be done while anthropologists cling to the conventional view of how man supposedly evolved.¹²⁰

Neanderthal Man entails a separate story. When the first discovery was made about 1856, scientists thought they had at last had the overwhelming evidence they needed to show an intermediate stage between man and ape. Texts today still faithfully illustrate this famous beetle-browed, bent-kneed, subhuman "slob." There was only one slight drawback. The brain case on the average was more than 13% larger than that of the average of modern man. Yet the Neander skeletons were still considered the perfect illustration of an important step in the presumed evolutionary sequence of man.¹²¹

Famous early evolutionists made much of Neanderthal man, and texts published in 1973 still reflect their views. Haeckel proposed to solve the world riddles once and for all with the Neanderthal man. Lyell and Huxley pointed confidently to the Neanderthal skull as evidence that there had been a low-caste, half-human creature, intermediate between man and ape.^{122, 123}

Most interesting is the fact that *Time*, May 17, 1971, contained the proclamation that the primitiveness of Neanderthal was unwarranted. Apparently, except for physical ailments, he could walk the streets today and be unrecognized. One could very well expect that in later centuries historians may inquire as to why this incredible blunder was not detected at once and was not refuted with adequate determination.

Though a tragic commentary on the scientific community, the following must be stated. Back in 1872, Virchow, probably the greatest biologist of his day, maintained that the peculiarities of Neanderthal man were not due to any special place in the lineage of mankind, but rather to a bad case of rickets. An authority reported in *Nature*, 1970, that every Neanderthal child's skull studied so far shows signs compatible with severe rickets. Again back in 1872 another medical authority declared that Neanderthal skulls showed medical problems, and that similar skulls of modern man may be found in any medical school.^{124, 125, 126, 127}

(14) *Funny Things Under the Earth*

Perhaps the most prodigious lava flow in the history of the world occurred in the Pacific Northwest. The lava spread over an estimated 200,000 square miles in depths up to 5,000 feet. Much of Washington, Oregon, Idaho, and portions of neighboring states was covered.

In 1972 a competent geologist stated that the eruptions took place a mere fifteen million years ago. The immense age of the deposit can easily be imagined by the fact that the Snake River has cut canyons through the deposit to depths of 3000 feet.^{128, 129, 130}

Still, there are several curious things about this lava flow. Many competent observers have

commented on the remarkable "freshness" of the deposit, as though the eruption had taken place in very recent times.

A startling find was made in 1889, near Nampa, Idaho. While workers were boring an artesian well, a small figurine of baked clay was extracted from a depth of 320 feet. Above the figurine the drill, inside a 6-inch tubing, had cut through fifteen feet of basalt lava.

The find has never been challenged adequately. The conclusion is unmistakable. Before the basalt flowed, sophisticated humans lived in the area.¹³¹

Before the Ice Age when many Tertiary fauna were destroyed (See B, C), an advanced civilization of men lived in California.

They worked the hardest stones, fabricated perfect granite mortars and dishes, used a skillet-like vessel made of lava hard as iron which was circular and had three legs and a spout, made polished stone axes with perfect holes drilled in them for a handle, ladles, disks or quoits.

They were able to bore into mountains for gold and silver. One ancient shaft was drilled 210 feet down into solid rock. An altar for worship was found.

Fossil plants and animals found associated with human remains and artifacts were described as Miocene (See D), long before man appeared on earth, according to textbooks.

Other finds include the following: a mortar for grinding gold ore at a depth of 300 feet in a mining tunnel; a mortar and pestle weighing 30 pounds, beads, perforated stones; a 40-pound oval granite dish. One human skull was found at a depth of 130 feet under five beds of lava and tufa separated by layers of gravel. Evidently man came before the lava flows, and deep canyons have been cut by rivers since the lava flows.

An amazing number of stone relics have been found among the bones of the camel, rhinoceros, hippopotamus, horse, and other animals. The findings are almost always in gold-bearing rock or gravel.^{132, 133}

Nothing describes what has been discovered in California quite as well as Job 28. And similar locations have been studied in many parts of the world.

Far from where anyone lives or human feet ever travel, men dig the shafts of mines. There they work in loneliness, clinging to ropes in the pits. There are mines where silver is dug. There are places where gold is refined. Men dig iron out of the ground and melt copper out of the stones. Men explore the deepest darkness. They search the depths of the earth and dig for rocks in the darkness. Food grows out of the earth, but underneath the same earth all is torn up and crushed.

The stones of the earth contain sapphires, and the dust contains gold. No hawk sees the roads to the mines, and no vulture ever flies over them. No lion or other fierce beast ever travels those lonely roads. Men dig the hardest rocks, dig mountains away at their base. As they tunnel through the rocks, they discover precious stones. They dig to the sources of rivers and bring to light what is hidden. The value of wisdom is more than coral, or crystal, or rubies, or the finest topaz and the purest gold.¹³⁴

In 1871 near Chillicothe, Illinois, well drillers brought up a bronze coin from a depth of 114 feet. This remarkable discovery was described in the Proceedings of the American Philosophic Society. This is additional evidence that man had been present there. Rapid change of the terrain may also be deduced.¹³⁵

A California newspaper contained the report that an elaborately carved rock and other worked stones weighing up to 800 pounds had been found in hydraulic operations hundreds of feet underground. The original site was an ancient river bed assigned a date long before the last Ice Age.¹³⁶

Some very crude scrapers, which were found under a glacial morain, are on exhibit in the museum at Moses Lake, Washington. This would appear to date man in Washington at a time before the Pleistocene epoch, which scientists are reluctant to accept.¹³⁷ (See B and C).

A similar discovery was made near Sudbury, Ontario. Crude choppers and scrapers of quartzite were found deep in the earth. Evidently they had been tumbled and mixed in glacial till. Again this is evidence that man lived in Canada before the glacial advance. Yet some scientists do not want to think of man in America that long ago.¹³⁸

A strange account comes from the little village of Plateau City, Colorado, a short distance east of Grand Junction. A resident was digging a cellar in 1936. At a depth of ten feet he found paved tile laid in some kind of mortar, different from any other construction in the valley. While the tiles are dated anywhere from 20,000 to 80,000 years old, they lie in a Miocene formation, which could make it up to 25,000,000 years old by conventional dating.¹³⁹

Heizer has noted a number of impossibilities according to commonly accepted geological dating: (1) a hyena tooth sawn by a flint, (2) cutting operations on the fossilized bone of an extinct rhinoceros and on other animals at a site near Paris, and (3) evidence of the use of a sharp tool on the horn of a rhino in Ireland. In the North Sea the trunk of an oak was removed from a long submerged forest. The trunk showed the marks of a hatchet.¹⁴⁰

According to conventional majority opinion early hunters migrated from Asia to America. One of the best known early projectile points is the Folsom point, and the identical pattern is found both in China and over much of America. However, this point is dated as early as 10,000 B.C. in America, but no earlier than 2000 B.C. in China¹⁴¹

III. Some Keys to Unlocking Mysteries of Ancient History

At this point the reader should be satisfied that conventional dating in the news media and in textbooks is radically in error and is based on assumptions which do not hold up against evidence to the contrary. And the fact that scientists are really not equipped to reconstruct the past nor to foretell the future should be easily conceded. Then how do creationists proceed in developing an adequate framework for ancient history? While answers will not be found for many questions, there is nevertheless much material available of value and interest for study and synthesis.

A. Sources for a Reconstruction of Ancient History

Despite the most fervent attempts to undermine the historicity of the Scriptures, the Bible remains a reliable and indispensable key for any attempt to reconstruct ancient history. Among events described in the Bible (but not explored in this paper) which need investigation are the following: (a) the geological implications of God cursing the earth after the fall of man; (b) attempts to fix the point in geological time of the flood; (c) the curious passage about Peleg and the dividing of the earth; (d) the consequences of Babel when men were subsequently "splattered" across the face of the earth; (e) the plagues and the exodus; (f) events recorded in the Bible around the time of King Hezekiah; (g) the astonishing number of Old Testament passages which contain references to catastrophic events.

In recent years a number of scholars have urged that universal myths and other ancient writings need decoding for the truths they contain about man's past. As one example of many which could be cited, Stahlman has urged a new approach to the study of prehistory.

He noted that modern man revels in the denial that ancient myth has truth-value, that historians have blinded themselves to essential clues that lie right before their eyes, and that they misuse the biological seedbed of "evolution" by trying to apply this concept to history. He criticized the simplistic notion that all fields of knowledge are very modern and that they simply "evolved."¹⁴²

The value of research in geology, paleontology, and archaeology is obvious from the content of

this paper. Much of the focus of these fields is on painstaking analysis. These findings should become the raw material for syntheses which are based on new assumptions and an appropriate model of prehistory based on Scriptures.

Other scholars have pointed to the value of word and language studies including ancient place names, many of which have come down to modern times, as important clues to prehistory.

B. Issues Involved in a Model of Prehistory

1. The present disaster in current attempts to write prehistory results from the fact that the evidence is completely counter to evolutionary assumptions. Historians know that something is wrong, but they are frustrated by a lack of any alternative that they can find acceptable. Creationists can hardly appreciate how bad the situation is unless one hears the scholars scolding the scholars.

Historian Easton, more candid than most, has admitted that very little indeed is known about prehistoric man. No two experts agree on what is known even. Although Easton accepts biological evolution, he does not want it applied to history:

There are still many inconvenient facts which seem very difficult to explain on the basis of natural selection; and the entire theory (of evolution), if viewed dispassionately, often seems to a layman so extraordinarily unlikely as an explanation of how the present . . . including man evolved, as to suggest a willful perversity in present-day man.¹⁴³

de Santillana and von Dechend have stated that the word "evolution" has blinded modern scientists to the real complexities of the past. The simple idea of evolution, which is taken for granted, is spread like a tent over all those ages that lead from primitivism into civilization. Gradually, we are told, step by step, men produced the arts and crafts, this and that, until they emerged into the light of history.

These soporific words "gradually" and "step by step," repeated incessantly, are aimed at covering an ignorance which is both vast and surprising. One should like to inquire: Which steps? But one is lulled, overwhelmed and stupefied by the gradualness of it all, which is at best a platitude, only good for pacifying the mind, since no one is willing to imagine that civilization appeared in a thunderclap.¹⁴⁴

Yet acceptance of the word "gradually" leads into all sorts of difficulties, and so the word "suddenly" is used to explain what cannot be explained. Marshack has been disturbed by the frequent use of this word in historical writings, e.g., science began *suddenly* with the Greeks, other sciences appeared *suddenly* in Mesopo-

tamia and in Egypt, civilization itself had begun *suddenly* in the Fertile Crescent, writing began *suddenly*, agriculture appeared *suddenly*, and the calendar *suddenly* appeared fully developed.¹⁴⁵

As the late French scientist Bounoure said¹⁴⁶ so elegantly, "Evolutionism is a fairy tale for grownups. This theory has helped nothing in the progress of science. It is useless."

With only one option, i.e., evolution, acceptable to most scholars today, there is simply no intellectually honest way prehistory can be written, except to repeat parrot-like what others have written. Thus more and more writers of ancient history texts are "copping out."

Instead of writing the usual Chapter I on the caveman, followed by Chapter II on the Greeks, with perhaps a nod toward Egypt and Mesopotamia, many authors are now beginning their texts with the Greeks. Evidently they are embarrassed to keep on writing the same old first chapter, generation after generation, which bears no relation to following chapters.

2. Those who attempt to reconstruct ancient history must cope with the fact of a Golden Age before the time of Abraham, and of which by comparison the Greeks were "little children."

More than a century ago a scholar observed that man has not originated from a state of barbarism, and then risen to civilization; but that, wherever man has been found in a state of barbarism, it is barbarism arising from a degenerated civilization. All known peoples with a knowledge of their past have some tradition of their having been raised from the barbarism by a people more civilized than themselves.¹⁴⁷

Stefansson, the great explorer, has stated that those scholars who were taught history the traditional way, namely: that navigation of the high seas was supposed to have started with the Phoenicians, cannot believe that men sailed over at least three of the oceans, the Atlantic, Indian, and Pacific, during remote periods.

Yet no stir was caused at an international congress of archaeologists at Oslo in 1936 when the president of the congress lectured about a Golden Age of deep-sea navigation as being at its height long before the time of Abraham, and that it was on the decline after 1500 B.C. Thus the very period, which most scholars select as the beginning of real seamanship, was actually only a pale image of what had been earlier.¹⁴⁸

The evidence presented in books such as *Hamlet's Mill*, *Maps of the Ancient Sea Kings*, and *Children of the Sun*, is compelling and fascinating.¹⁴⁹

3. Because of ancient man's total obsession with and terror of the planets, radically different treatment of the role of astronomy in the ancient

world is required in contrast to what is customary today. Strange events occurred in historic times which had dreadful consequences on the earth.

de Santillana noted that modern archaeological scholars have been singularly obtuse by cultivating a pristine ignorance of astronomical thought, which has had a crucial impact on reconstructions of ancient history. Besides the terror factor, the ancients knew from the stars precisely where they were anywhere on the earth. The ancients knew when they crossed the equator, and could navigate to remote specks of islands thousands of miles away in the oceans.^{150, 151}

von Dechend, a scholar of ancient history, determined never to become involved in astronomical matters, under any conditions. That is until she discovered two prehistoric shrines on two little specks of islands in the Pacific, one precisely on the Tropic of Cancer and the other precisely on the Tropic of Capricorn. These facts struck her like a sledgehammer, according to her own report, and she realized that astronomy could not be ignored.¹⁵²

4. No reconstruction of ancient history can be valid without treatment of catastrophic events. Darwin personally examined evidence of catastrophic events and passed them off as insoluble problems, giving them no place in his thought patterns. He was ready to concede, however, from his study of the apparent recent and sudden upheaval of the Andes, that the resulting catastrophe might have produced world-wide flood traditions.^{153, 154}

Such events still happen today on a lesser scale. Only a year ago observers reported that a mountain in the Caucasus moved 1.2 miles, blocking off a river along the way. Yet fields, crops, and huts on the mountain remained intact.¹⁵⁵

More and more scientists are looking seriously at documentation for the following description of catastrophes in historic times:

Hurricanes of global magnitude, of forests burning and swept away, of dust, stones, fire, and ashes falling from the sky, of mountains melting like wax, of lava flowing from riven ground, of boiling sea, of bituminous rain, of shaking ground and destroyed cities, of humans seeking refuge in caverns and fissures of the rock in the mountains, of oceans upheaved and falling on the land, of tidal waves moving toward the poles and back, of land becoming sea by submerging and the expanse of sea turning into desert, islands born and others drowned, mountain ridges leveled and others rising, of crowds of rivers seeking new beds, of sources that disappeared and others that became bitter, of great destructions in the animal kingdom, of decimated mankind, of migrations, of heavy clouds of dust covering the face of the earth for decades, of mag-

netic disturbances, of changed climates, of displaced cardinal points and altered latitudes, of disrupted calendars and of sundials and water clocks that point to changed length of day, month, and year, mountains springing from plains and other mountains levelled, strata folded and pressed together and overturned and moved and put on top of other formations, melted rock flooding enormous areas of land with miles-thick sheets, ocean and lake shores tilted or raised or lowered as much as a thousand feet, whales cast out of oceans onto mountains, the Alps and the Rocky Mountains moved as much as a hundred miles.¹⁵⁶

5. As prehistory is made continuous with recorded history, a problem of ancient chronology exerts a crippling effect on both the study of the Old Testament and on ancient history in general. Evidence is accumulating rapidly that Egyptian chronology is off by as much as 500-600 years. Since most scholars calibrate Old Testament events and the history of other ancient cultures by Egyptian dates, the effect is devastating, crippling, and stifling.

C. *New Directions in the Study of Prehistory*

1. Pensée, P.O. Box 414, Portland, Oregon 97207.

2. Immanuel Velikovsky, *Worlds in Collision*. Garden City, New York: Doubleday, 1950; *Ages in Chaos*. Garden City, New York: Doubleday, 1952; and *Earth in Upheaval*. New York: Dell, 1955.

3. Arthur C. Custance. *Doorway Papers*. (A Series). Box 291, Brockville, Ontario.

Without endorsing all the contents of these sources, readers will find a tremendous and refreshing stimulation in them. The authors are almost unique in their treatment of evidence—evidence that has been ignored too long in conventional text books.

Bibliography

- AND Andrews, Henry H. *Ancient plants*. Ithaca: Cornell, 1947.
- AAN *Ann Arbor News*, Michigan
- ANT *Anthropos*.
- ARC *Archaeology*.
- BIB *Bible*.
- BRI Briggs, Peter, 200,000,000 years beneath the sea. New York: Holt, 1971.
- BRO Brown, Howard and others. *Introduction to geology*. Boston: Ginn, 1958.
- CER Ceram, C. W. *The first American*. New York: Harcourt, 1971.
- CHA Charroux, One hundred thousand years of man's unknown history. New York: Berkley, 1970.
- COL Colbert, Edwin H. *Evolution of the vertebrates*. New York: Wiley, 1955.
- CRE *Creation Research Society Quarterly*, Ann Arbor, Mi 48104, 2717 Cranbrook Road.
- CUS Custance, Arthur C. *Fossil remains of early man and the records of Genesis*. Doorway Paper #45. Ottawa, 1968.

- DES de Santillana, Giorgio and Hertha von Dechend. Hamlet's mill. Boston: Gambit, 1969.
- EAS Easton, Stewart C. The western heritage. New York: Holt, 1966.
- ED2 Edwards, Frank. Strangest of all. New York: Ace, 1962.
- ED4 ———. Strange world. New York: Ace, 1964.
- ED7 ———. Stranger than science. New York: Bantam, 1967.
- FAU Faul, Tenry (ed.). Nuclear geology. New York: Wiley, 1954.
- FOL Folsom, Franklin. America's ancient treasures. New York: Rand McNally, 1971.
- FOR Fort, Charles. The book of the damned. New York: Ace, 1941.
- HAP Hapgood, Charles. Maps of the ancient sea kings. Philadelphia: Chilton, 1966.
- HEI Heizer, Robert F. Man's discovery of his past. Englewood Cliffs, N. J.: Prentice-Hall, 1962.
- HON Honore, Pierre. In quest of the white god. New York: Putnam's, 1964.
- HOP Hopkins, David M. (ed.). The Bering land bridge. Palo Alto: Stanford, 1967.
- JOU *Journal of Geophysical Research*.
- MAR Marshack, Alexander. The roots of civilization. New York: McGraw-Hill, 1972.
- MER Mertz, Henriette. Pale Ink. Chicago: Swallow, 1972.
- NAT *Nature*.
- NOR Norwich, John J. Sahara. New York: Weybright and Talley, 1968.
- PEN *Pensée*.
- PER Perry, William J. The children of the sun. London: Methuen, 1923.
- REA *The Reader's Digest*.
- RYA Ryals, James and Cecil. Unpublished interview by George W. Westcott.
- SAN Santesson, Hans S. Understanding Mu. New York: Paperback Library, 1970.
- SAT *Saturday Review*.
- SCA *Scientific American*.
- SCM *Scientific Monthly*.
- SCO Scott, William B. A history of land mammals in the western hemisphere. New York: Hafner, 1962.
- SEN Sendy, Jean. Those gods who made heaven and earth. New York: Berkley, 1972.
- STE Stefansson, Vilhjalmur. Greenland. New York: Doubleday, 1942.
- THO Thorarinsson, Sigurdur. Surtsey. Reykjavik: Almena, 1964.
- TIM *Time*.
- TOA Tomas, Andrew. We are not the first. New York: Bantam, 1971.
- TOP Tompkins, Peter. Secrets of the Great Pyramid. New York: Harper, 1971.
- TRA *Journal of the Transactions of the Victoria Institute*.
- TUT Tuttle, Hudson. Physical man. Boston: Colby & Rich, 1865.
- VEL Velikovsky, Immanuel. Earth in upheaval. New York: Dell, 1955.
- WEN Wendt, Herbert. In search of Adam. Boston: Houghton Mifflin, 1956.

References

- ¹CRE, 9(4):210
- ²BRI, p. 208
- ³HAP
- ⁴ED4, p. 160
- ⁵TRA, 2:304
- ⁶PEN, 2(3):49
- ⁷BRO, p. 384-5
- ⁸EAS, p. 11-2
- ⁹SEN, p. 17
- ¹⁰TRA, 2:304
- ¹¹VEL, p. 209
- ¹²TUT
- ¹³THO
- ¹⁴VEL, p. 286
- ¹⁵CRE, 6(2):96
- ¹⁶CRE, 3(1):59
- ¹⁷TRA, 80:25
- ¹⁸CRE, 8(4):251-5
- ¹⁹CRE, 1(4):45
- ²⁰CRE, 1(4):44
- ²¹CRE, 7(2):122
- ²²CRE, 1(4):44
- ²³TOA, p. 28-9
- ²⁴CRE, 7(4):201
- ²⁵FOR, p. 127-8
- ²⁶CHA, p. 181
- ²⁷FOR, p. 131
- ²⁸FOR, p. 130
- ²⁹FOR, p. 128
- ³⁰TOA, p. 28-9
- ³¹CHA, p. 29
- ³²CRE, 5(4):132
- ³³ED7, p. 77
- ³⁴TRA, 11:27
- ³⁵CRE, 5(4):147
- ³⁶TRA, 2:325
- ³⁷TRA, 13:111-2
- ³⁸TIM, 6/19/64, p. 74
- ³⁹REA, 12/72, p. 86-90
- ⁴⁰FAU, p. 258, 352
- ⁴¹CRE, 9(3):157
- ⁴²CRE, 8(3):203
- ⁴³HOP, p. 110-1
- ⁴⁴PEN, 3(1):44
- ⁴⁵CRE, 6(2):114
- ⁴⁶CER, p. 257-9
- ⁴⁷CUS, p. 19
- ⁴⁸CRE, 7(2):126
- ⁴⁹CRE, 2(4):31
- ⁵⁰VEL, p. 287
- ⁵¹CRE, 2(4):10
- ⁵²JOU, 7/15/68
- ⁵³TIM, 11/12/65, p. 100 & 11/19 letter
- ⁵⁴PEN, 2(3):43
- ⁵⁵VEL, p. 158-9
- ⁵⁶CRE, 5(2):67
- ⁵⁷CRE, 9(1):25
- ⁵⁸CRE, 3(1):49
- ⁵⁹CRE, 9(4):238
- ⁶⁰TRA, 20:89
- ⁶¹TRA, 30:237
- ⁶²JOU, 7/15/68
- ⁶³CRE, 7(3):145
- ⁶⁴TIM, 10/3/69, p. 72-4
- ⁶⁵TIM, 3/15/68, p. 36-8
- ⁶⁶CRE, 9(1):47
- ⁶⁷BRI, p. 10
- ⁶⁸CRE, 9(1):47
- ⁶⁹NAT, 227:930
- ⁷⁰CRE, 8(2):144
- ⁷¹PEN, 3(1):48
- ⁷²CRE, 8(2):144
- ⁷³PEN, 3(1):48
- ⁷⁴CUS, p. 20
- ⁷⁵TRA, 13:36
- ⁷⁶TRA, 15:235
- ⁷⁷TRA, 8:226-8
- ⁷⁸CRE, 7(4):243
- ⁷⁹TRA, 19:200
- ⁸⁰PEN, 2(3):18
- ⁸¹CRE, 9(3):197
- ⁸²CRE, 8(4):249
- ⁸³TRA, 80:21-2
- ⁸⁴CRE, 5(3):97
- ⁸⁵CRE, 7(4):205
- ⁸⁶FOR, p. 159
- ⁸⁷WEN, p. 519-20
- ⁸⁸CRE, 7(4):207
- ⁸⁹TOA, p. 24
- ⁹⁰TRA, 22:148-52
- ⁹¹ARC, 26 (April, 1973): 146-7
- ⁹²CRE, 7(3):142
- ⁹³CRE, 7(4):246
- ⁹⁴RYA
- ⁹⁵COL, p. 386
- ⁹⁶HON, p. 164-5
- ⁹⁷TRA, 22:151
- ⁹⁸SAN, p. 39
- ⁹⁹SCO, p. 261
- ¹⁰⁰WEN, p. 524-5
- ¹⁰¹SCM, 75 (October, 1952): 215-21
- ¹⁰²WEN, p. 525-6
- ¹⁰³TRA, 1:327
- ¹⁰⁴AND, p. 19
- ¹⁰⁵ANT, 1963-64; 1969, 921-40
- ¹⁰⁶TRA, 13:343
- ¹⁰⁷TRA, 23:211-3
- ¹⁰⁸FOR, p. 131
- ¹⁰⁹CRE, 6(3):129-35
- ¹¹⁰DES, p. 255
- ¹¹¹HAP
- ¹¹²NOR, p. 231
- ¹¹³TOP, p. 142
- ¹¹⁴VEL, p. 93
- ¹¹⁵SCA, 214 (May, 1966):21
- ¹¹⁶CUS, p. 26-31
- ¹¹⁷TIM, 5/17/71, p. 75-6
- ¹¹⁸CRE, 5(1):5-7
- ¹¹⁹CRE, 1(2):9
- ¹²⁰CRE, 3(1):14
- ¹²¹TIM, 6/21/68, p. 34
- ¹²²DES, p. 71
- ¹²⁴TIM, 5/17/71, p. 75-6
- ¹²⁴TIM, 5/17/73, p. 75-6
- ¹²⁵CRE, 5(1):5-7
- ¹²⁶CRE, 7(4):232-3
- ¹²⁷CRE, 1(2):9
- ¹²⁸VEL, p. 87
- ¹²⁹PEN, 2(2):18
- ¹³⁰VEL, p. 87
- ¹³¹VEL, p. 87
- ¹³²TRA, 15:196-8
- ¹³³TRA, 15:193-5
- ¹³⁴JOB, 28
- ¹³⁵ED2, p. 101
- ¹³⁶ED4, p. 109
- ¹³⁷FOL, p. 70
- ¹³⁸FOL, p. 184
- ¹³⁹ED2, p. 100-1
- ¹⁴⁰HEI, p. 107-14
- ¹⁴¹MER, p. 99
- ¹⁴²SAT, 1/10/70, p. 100
- ¹⁴³EAS, p. 11
- ¹⁴⁴DES, p. 65-6
- ¹⁴⁵MAR, p. 11
- ¹⁴⁶CRE, 3(1):4
- ¹⁴⁷TRA, 3:21-2
- ¹⁴⁸STE
- ¹⁴⁹DES, HAP and PER
- ¹⁵⁰DES, p. 65-6
- ¹⁵¹TRA, 33:274
- ¹⁵²DES, p. ix
- ¹⁵³TRA, 4:255
- ¹⁵⁴TRA, 23:214
- ¹⁵⁵AAN, 7/5/72
- ¹⁵⁶VEL, p. 261

IS MOLECULAR EVOLUTION OF PROTEINS POSSIBLE?

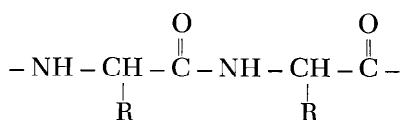
M. TROP AND A. SHAKI*

By statistical considerations, the probability that amino acids and other components would combine spontaneously to form a protein with a chain of one hundred amino acids is examined. The conclusion is that there are not enough amino acids available, nor enough time from the beginning of the earth, even according to the most liberal estimates made nowadays, to bring about even one molecule of any type of protein.

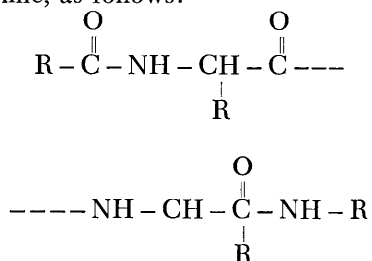
Introduction

Proponents of molecular evolution try to explain random emergence of protein or protides molecules as the result of polymerization of amino acids. Polymerization may have occurred in several ways, e.g. by thermal dehydration in hypohydral conditions,¹ by condensing agents such as dicyanamide,² or by activation on a mineral matrix.³

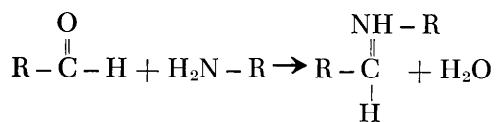
The general form of a peptide bond which joins two amino acids is:



where the carbonyl moiety is from one amino acid, and the amine moiety from the other. The same thermodynamic conditions producing the polymerization could just as easily have brought about the production of an acyl amide bond of any organic acid with the amine of an amino acid, or an amide bond of an amino acid with any organic amine, as follows:



If any of these forms are produced, there will no longer be a possibility of lengthening the polypeptide polymer from the terminal amino group, or from the terminal carbonyl group. Condensation of an aldehyde with an amine group, according to the reaction:



will also prevent further polymerization from the side of the terminal amino group.

*M. Trop, Ph.D., and A. Shaki, Ph.D., are with the Department of Life Science, Bar-Ilan University, Ramat Gan, Israel.

Generally Accepted Reasoning

According to the generally-accepted hypothesis, amino acids were originally formed from the first substances that were present at the primordial time. These substances are presumed to have been: formaldehyde, cyanic acid, ammonia, hydrogen, carbon monoxide, methane, and water. Supposedly this mixture of compounds underwent changes into more complex organic substances because of thermal energy, ionizing radiation, and electrical decomposition.

It is difficult to estimate the premise quantitative ratios of the various primordial substances, and also to determine the type and amount of the energy required. Nevertheless, the possibility of some such production of carbohydrates, organic acids, aldehydes, and amines, as well as more complex substances such as amino acids, hydroxyacids, sugars, purines and pyrimidines, has been demonstrated by laboratory experiments.

Any estimation of the relative amounts of these secondary substances produced is purely speculative, since it is impossible to reproduce precisely the primaeval conditions which may have prevailed. However, it is clear that there must have been considerably more simple-organic-acids or aldehydes, both lacking an α -amino group, or simple amines lacking an α -carboxylic group than α -amino acids.

It is reasonable to assume that the amount of organic acids and aldehydes was at least 10 times greater than the amount of amino acids produced.

In such a system, the probability of emergence of any polypeptide chain consisting of 100 amino acids, which would be capable to being a backbone for an enzyme, may be calculated with the aid of statistical modeling.

Assumptions and Calculations

Let us assign the symbol A-C to indicate an amino acid, where A represents the amino group and C the carboxyl group. Then the polypeptide polymer will have the form . . . A-C-A-C-A-C-A-C The second group of substances can be described as A-, containing only the amino group, and the other -C, having only a carboxyl or aldehyde group. When -C binds with an A-, or when A- binds with a terminal -C, the polymerization is then terminated.

In this framework the problem can be stated

as follows: Let us assume that there are n molecules of the form $A-$, also n molecules of $-C$, and r molecules of the form $A-C$, and we wish to know the limit probability of a chain consisting of P molecules of the form $A-C$.

For this purpose let us imagine a model consisting of n chains terminated by A and by C , in which it is possible to introduce all the r molecules $A-C$. It is required to calculate the limit of the probability of the appearance of a chain which includes P $A-C$ (amino acids).

Each amino acid is represented by the sign of its chain. If all signs will be delineated in a single line they will form a word. Let us find the limit for the amount of possible words such that each consists of one letter, at least P times, among others, from a language of n letters. This limit will be:

$$n^{r-p+1} \binom{r}{p}$$

This limit has to be divided by the number of words that could be built by the language in all possibilities. This is n^r and the probability limit will be:

$$\frac{n^{r-p+1} \binom{r}{p}}{n^r}$$

or:

$$\begin{aligned} \binom{r}{p} / n^{p-1} &= r! / n^{p-1} p! (r-p)! \leq r^p / n^{p-1} p! \\ &= n \left(\frac{r}{p} \right)^p / p! \end{aligned}$$

The percentage of nitrogen in the earth's shell (lithosphere, hydrosphere and atmosphere) is estimated as 0.03%, i.e. about 10^{22} grams. Even if we assume that all the nitrogen was bound in the form of simple amino compounds, then the number of molecules would be about 10^{44} .

The weight of all the carbon on the earth is also approximately 10^{22} grams, and even if we assume that all the carbon was bound in the form of simple acids containing two carbons, the number of molecules would then be 10^{43} .

According to the previous assumption that 1/10 of all the existing acids were amino acids, then the number of amino acids would be 10^{42} , the number of carboxyl acids, aldehydes, or amines is at least one order of magnitude greater, that is 10^{43} .

If these values are placed in the equation given above, then:

$$\begin{aligned} 10^{43} \left(\frac{1}{10} \right)^{100} \frac{1}{100!} &= \frac{1}{10^{57}} \frac{1}{100!} \leq \frac{1}{10^{57}} \cdot \\ 1 / (1.2.3 \dots 8.9) (10.20.30 \dots 90) &= \\ \frac{1}{10^{57} 91^2} \frac{1}{10^{90}} &\leq \frac{1}{10^{147} 3000000^2} \leq \frac{1}{10^{157}} \end{aligned}$$

This figure, then, is the probability of obtaining a protein with a chain of 100 amino acids, as a random product built from amino acids, carboxyl acids, aldehydes and simple amines. This number is so small that there are not enough amino acids (10^{42}), and not enough time from the beginning of the earth (10^{17} seconds, according to accepted geological time scale), in order to produce enough fast reactions (10^{13} /sec.), which could result in the number of peptide bonds (10^{72}) required to produce even one molecule of any type of protein.

References

- ¹Fox, S. W. 1971. Self-assembly of the protocell from a self-ordered polymer. (in) Prebiotic and biochemical evolution. North-Holland Publishing Company, p. 8.
- ²Steinman, G. 1971. Non enzymatic synthesis of biologically pertinent peptides. *Ibid.*, p. 31.
- ³Degens, E. T. and J. Matheja. 1971. Formation of organic polymers on inorganic templates. *Ibid.*, p. 39.



News Release

SECOND CREATION CONVENTION

Milwaukee, Wis.—Hundreds of scientists, educators and laypersons will convene in Milwaukee, Wis., August 18-24, 1974, to discuss techniques for presenting the creationist (as opposed to evolutionist) view to the public. Sessions will be held in the Red Carpet Inn, across from Mitchell Field Airport.

Spurred by encouraging discoveries in geology, space and oceanography, over 20 scientists will present data disabling evolutionary doctrine in all disciplines.

Creationists will concentrate on means for removing the "sacred cow" status of evolutionary thought which has engendered censorship of scientific data and opinion conflicting with evolu-

tion. Creationists want to facilitate free and open discussion of all scientific information in educational institutions.

Methods will be devised to supply the many speakers and scientific books, visual aids, etc. now in great demand by school boards and interested organizations. Many of these new materials will be on display.

Registration is \$35 for individuals, \$50 for families; students are \$25. The convention is sponsored by the Bible-Science Association, Box 1016, Caldwell, Idaho 83605 (208-459-0268), a national organization of scientists, clergy and laypersons interested in furthering scientific support for the creationist viewpoint.

PICTURING THE LIGHTER SIDE OF CREATION

WILLIS E. KEITHLEY*

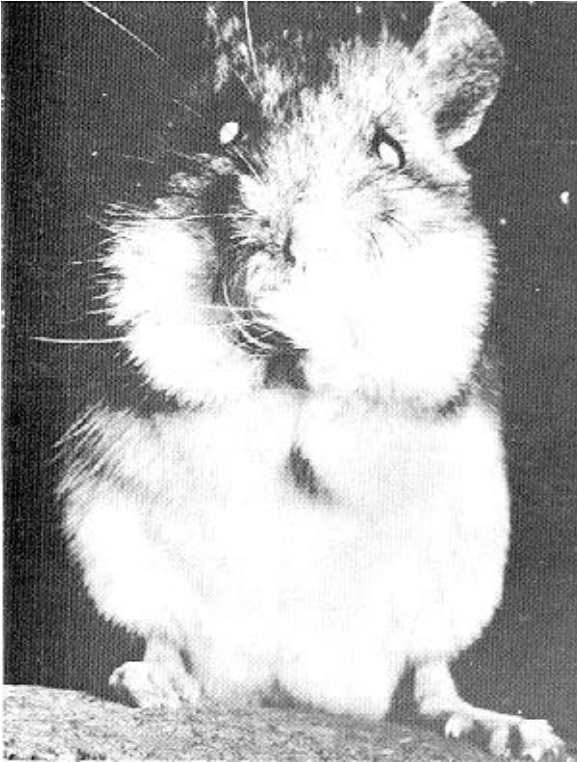


Figure 1. ". . . And I thank thee I am not like that poor blind creationist. . . . Amen." (Deer mouse, *Peromyscus maniculatus*, whose prominent cataracts on the eyes betray his own total blindness due to manipulation of genetic mutation.)



Figure 3. "Did you hear that uniformist say that geology wasn't cat-astrophic? No wonder he can't find the missing lynx." (Bobcat kittens, *Lynx rufous*, in den under log pile.)



Figure 2. "Now if I just keep staring at Point Omega, they'll never guess I'm standing in mud." (American bittern, *Botaurus lentiginous*, a peculiar bird of the bulrushes, who camouflages his position in the swamp by pompously putting his bill in the air.)



Figure 4. "Yes doctor, I got this hang-up when I tried to find that 'common ancestor' in my family tree." (Belding ground squirrel, *Citellus beldingi*, in the partial state of estivation or summer sleep.)

*Willis E. Keithley, 1819 N.W. 25th, Lincoln City, Oregon 97367, is an evangelist, Bible-Science teacher, and photographer of nature and wildlife.



Figure 5. "Please stick to the point—Are my quills vestigial scales, or will they 'evolve' into feathers?" (Porcupine, *Erethizon dorsatum*, ponders a pointed but rational puzzle.)

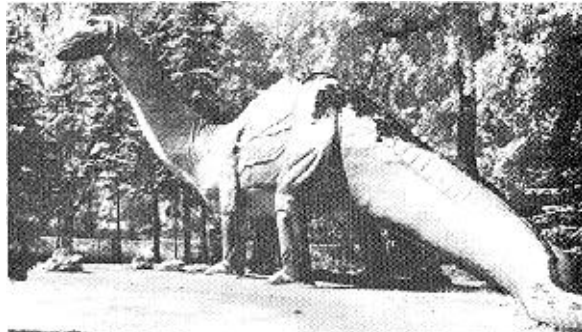


Figure 6. "Fail the survival course? Naw, I just 'evolved' too far. But I'll sure never try that polyploidy again! Look what it did to my figure."

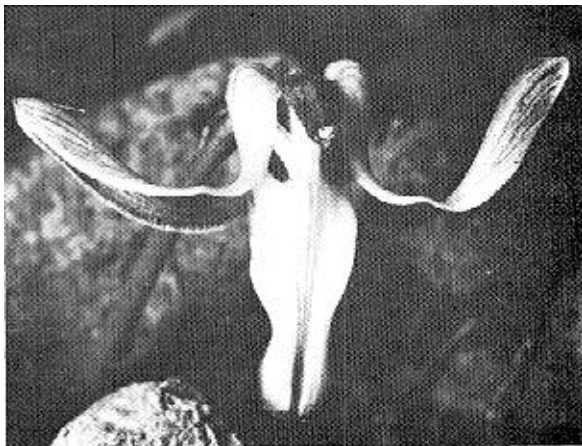


Figure 8. "Homology relates us if we look alike; then which of us is the bum steer?" (This dime-size steer-head, *Dicentra uniflora*, is a ridiculous example of comparative morphology; but more profound precepts have been built on equally nebulous concepts.)



Figure 7. "And then she tells me I ain't her natural selection; she just don't dig no non-scents." (Obviously a plaintive bit of nonsense from a deodorized *Mephitis mephitis*. More realistic is the "ab-scents" of evidence for his supposed evolutionary de-scent.)

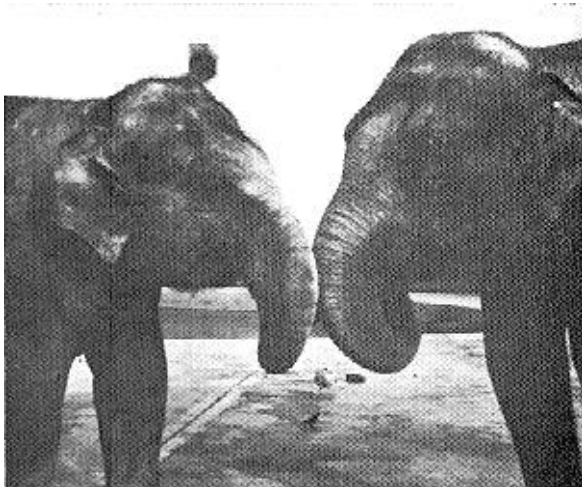


Figure 9. "Was great grandpa really a million years old, or did the old fossil just look that way?" (Circular reasoning grows to mammoth proportions when based on a mere skeleton of evidence.)

GEOCHEMISTRY OF THE STABLE ISOTOPES

DON B. DEYOUNG*

A review is given of geologic investigations using stable isotopes and changes in their abundance. Many natural processes tend to concentrate particular isotopes by a factor of several percent. Four creationist applications arising from this natural isotopic enrichment are considered. First discussed are large scale errors in C^{14} radiometric dating of fresh water Mollusk shells due to C^{12} isotope exchange. It is shown that this age-determination uncertainty may also affect all other radiometric dating methods. Popular concepts of evaporite deposition and continental drift, that are dependent upon long geologic ages, are discussed. Recent stable isotope data which can be used to contradict these ideas is interpreted. The final application concerns information from extraterrestrial isotopes. Looking ahead, future research with stable isotopes will concentrate on paleotemperatures which may provide additional evidence for a pre-flood vapor canopy.

I. Introduction

The controversial use of radioactive isotopes for radiometric dating has continued to increase since they were discovered by J. J. Thomson in 1913.

A similar but less familiar study involves the *stable* isotopes. The absolute abundances of stable isotopes do not change with time as a consequence of radioactive decay. Distribution of these isotopes provides important geologic information; their study is termed stable isotope geochemistry.

In this report the notation and techniques of stable isotope measurements will be described in order to elucidate the current surge of geochemical literature. Experiments to be reviewed involve precise measurement of variations in isotopic abundances.

Insight into the conditions and importance of chemical, physical, and biological processes that have been operative in various geological environments is gained from these experiments. Emphasis will be given to current literature, especially regarding the validity of data interpretation and future trends in stable isotope research, which apply to scientific creationism.

II. Techniques

Components of the same chemical element with different masses are called isotopes. An element with atomic number (Z) may have several isotopes, depending on the number of neutrons (N) in the nucleus.

There are 273 naturally occurring stable isotopes associated with 81 elements. The abundance of stable isotopes for the elements hydrogen, carbon, and oxygen are listed in Table 1. The listed values are the average relative abundances as determined from wide sampling.

On a local scale, however, isotopes of these elements and the isotopes of the other light elements often exhibit measureable variations in abundance from one environment to another. The variation results from unequal partitioning

of the isotopes of an element between two or more phases during natural processes due to differences of mass, vapor pressure, etc.

Hence in catalogs of isotopic abundances the warning is given that particular samples may have unusual isotope concentrations due to fractionation effects:

The isotopic abundances listed are the current best estimate for the naturally occurring elements. However, samples have been observed for which the measured values differ significantly from those listed.¹

This natural separation of isotopes is imitated in technology such as gaseous diffusion, where nuclear fuel is U^{235} -enriched.

As an example of natural isotope fractionation, consider the molecular constituents of water as listed in Table 2. The relative abundances are derived from Table 1. During evaporation of water the lighter molecules escape preferentially, so the water vapor is depleted in O^{18} and H^2 relative to the reservoir.

A comparative measurement, the isotope ratio normally reported is that of the heavier less abundant isotope to the lighter more abundant isotope such as O^{18}/O^{16} . The difference in the measured ratios between a sample and a standard then determines the extent of isotope fractionation that has occurred in the sample. In the literature this difference is conventionally expressed as a delta (δ) deviation between the sample and standard in parts per thousand (ppt),

$$\delta(O^{18}/O^{16}) \text{ (ppt)} = \left[\frac{\frac{O^{18}}{O^{16} \text{ sample}}}{\frac{O^{18}}{O^{16} \text{ standard}}} - 1 \right] \cdot 10^3$$

Oxygen isotope deviations for a number of sources are summarized in Figure 1. The chosen standard with zero $\delta(O^{18}/O^{16})$ value is ocean water. Atmospheric water vapor usually has a δ value between $-15 \rightarrow 0$ ppt, with values as low as -50 ppt (5% O^{18} depletion) in polar regions. The negative sign implies that evaporated water is depleted in O^{18} relative to sea water; the vapor is $0.0 \rightarrow 1.5\%$ lighter in O^{18} than the sea.

*Don B. DeYoung, Ph.D., is with the Department of Physics, Grace College, Winona Lake, Indiana.

Figure 1. Oxygen isotopic composition ranges for various samples. (References are shown by means of superscript numbers.)

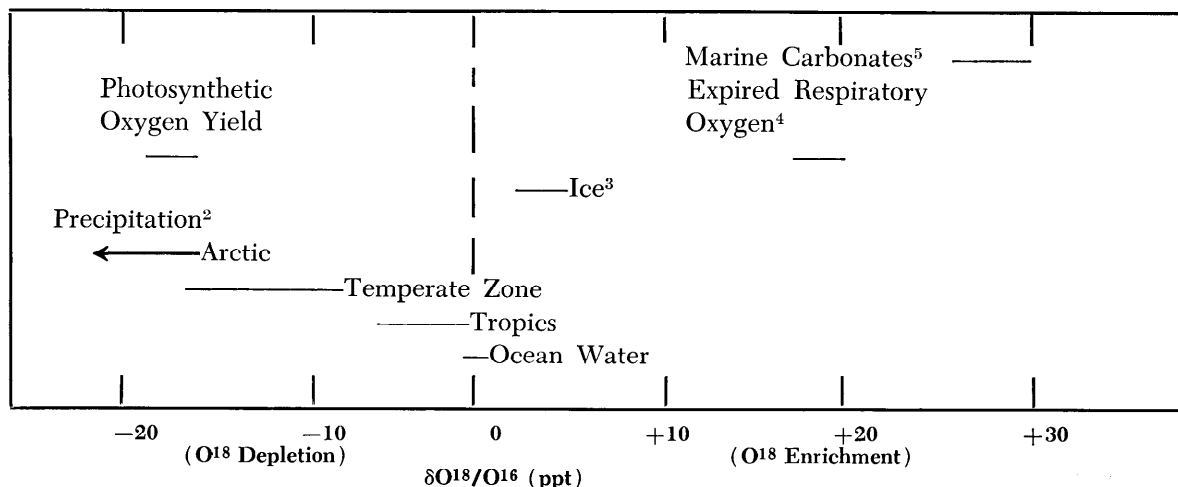


Table 1. Stable isotopes of hydrogen, carbon, and oxygen. Mass is given in atomic mass units.

Element	Z	N	Z + N	Atomic Mass (amu)	Atomic Percent Natural Abundance
H	1	0	1	1.007825	99.985
		1	2	2.01410	0.015
C	6	6	12	12.00000	98.89
		7	13	13.00335	1.11
O	8	8	16	15.99491	99.759
		9	17	16.99914	0.037
		10	18	17.99916	0.204

Table 2. Nine varieties of molecules present in water.

Molecule	Molecular Mass (amu)	Approximate Relative Abundance
H ¹ ₂ O ¹⁶	18.01056	10 ⁶
H ¹ ₂ O ¹⁷	19.01479	370
H ¹ H ² O ¹⁶	19.01684	300
H ¹ ₂ O ¹⁸	20.01481	2040
Trace molecules with small relative abundance:		
H ² ₂ O ¹⁶ , H ² ₂ O ¹⁷ , H ² ₂ O ¹⁸		
H ¹ H ² O ¹⁷ , H ¹ H ² O ¹⁸		

The heavy isotope content of water vapor is additionally depleted by precipitation as the water vapor is carried North by atmospheric circulation, as is shown in Figure 1. Other complex details can be studied in this way: the range of values for atmospheric water also results from seasonal, altitude, and temperature effects.² Other interesting examples of isotope fractionation appear in Figure 1:

1. Ice preferentially holds heavy O¹⁸ atoms, relative to local water.³

2. Plants prefer to fix and use O¹⁸ rather than O¹⁶ or O¹⁷ during photosynthesis. This is balanced by respiration, which consumes oxygen containing a lower O¹⁸/O¹⁶ ratio than that of the atmosphere. The O¹⁸/O¹⁶ ratio of the atmosphere has dropped to a point such that the ratios for photosynthetic oxygen delivered to the air and the oxygen extracted from the air by respiration are equal.⁴

3. Carbonates precipitated in oceans become enriched in heavy O¹⁸ relative to sea water. The O¹⁸ content increases with the strength of the oxygen-cation bond. Therefore O¹⁸ is concentrated in quartz and dolomite relative to other

silicates and carbonates.⁵

These isotope effects are widespread and not limited to oxygen. During photosynthesis, plants⁶ also fix C¹² rather than C¹³ or C¹⁴. Relative to atmospheric CO₂ plants are enriched in C¹² by 1 → 1.8%. These land plants eventually give rise to isotopically light humus in rivers and lakes (Section III A).

Actual delta δ determinations are made with a high precision isotope mass spectrometer. Quantitative analysis of the isotopic content relative to the standard is determined for each sample. The difficult experiment requires 100% conversion of the sample into a gas followed by ionization, mass separation, and detection. Present methods resolve δ variations as small as ± 0.0001 ppt, or $10^{-5}\%$.

As can be seen from Table 2, absolute isotopic abundances are not nearly as well known as the comparative ratios, a common situation in physical measurements. Isotope fractionation can be predicted and calculated, as shown in a classic 1954 reference in which the basis of stable isotope geochemistry was given.⁷

III. Application

A. Radiocarbon Dating Errors

Many applications may be made of light isotope fractionation. There is presently an active effort to improve instrument resolution and solve a variety of geologic problems. Four typical geochemistry experiments that involve creation research will be discussed, beginning with age measurements.

Mollusk shells generally yield radiocarbon ages which are anomalously large. Especially true of fresh water shells, one study of *living* fluvial mollusks gave an average radiocarbon age of 1733 years.⁶ This discrepancy is now understood to be the result of an extreme shell deficiency in radioactive C^{14} due to carbon isotope fractionation effects.

Modern mollusk shells have a C^{14}/C^{13} ratio as much as 2.5% smaller than the same ratio for modern wood. The reason for the lack of C^{14} is the incorporation of inactive (C^{14} -deficient) carbon from humus through the food web as well as carbon dioxide from humus decay. Present attempts to correct for this source of error in radiocarbon shell dating are very uncertain.

Troubles arise from other possible sources of carbon for shells including dissolved atmospheric CO_2 and dissolved limestone. A similar fractionation correction must be made for all C^{14} dating, including that of wood.

In wood analysis the situation is somewhat better since the soil and atmospheric sources of carbon are better known. The question of possible atmospheric carbon variation in the past is a separate problem.

Do Rb^{87} , U^{235} , or K^{40} fractionation effects invalidate other radiometric dating methods? Consider one possibility:

A potassium-rich magma crystallizes to form an igneous rock. Gaseous Ar^{40} begins to accumulate as a stable decay product of K^{40} . The K^{40}/Ar^{40} ratio is therefore a basic measure of the time interval since crystallization. But isotope exchange may also occur. Suppose that the rocks adjoining the sample have a preference for light isotopes of a given element. Gaseous diffusion exchange can then occur whereby the sample loses intrinsic Ar^{36} and gains additional Ar^{40} from the geological environment. This and other non-decay contributions of Ar^{40} would lead to a long and incorrect sample age by K^{40}/Ar^{40} dating, just as with the Mollusk shells.

Whether or not $Ar^{40} \leftrightarrow Ar^{36}$ exchange really occurs in nature is not known. Exchange is difficult to detect for the heavy elements. The delta values are too small to be studied by present spectrometry.

Nevertheless such slight effects would strongly control the radiometric age of samples. Improved technology which resolves heavy element isotope fractionation will likely lead to important dating corrections for the heavy isotope radiometric methods.

B. Origin of Evaporites

Oxygen isotope effects have been used to support the conclusion that the Mediterranean Sea has repeatedly evaporated to a desert basin during the span of geologic "history." Samples of evaporite mineral deposits beneath the sea have been obtained by means of the deep sea drilling vessel, Glomar Challenger:

The ratio of oxygen 18 to oxygen 16 in a sample can reveal its genesis. Evaporites precipitated from evaporated sea water have a narrow range of isotopic compositions. In contrast, those deposited on playas, or desert lakes, have a wide range of values. Analysis of Glomar Challenger Mediterranean samples shows a high variability of isotopic composition and thus provides additional confirmation of their playa origin.⁸

The reasoning here is that $H^1_2O^{16}$ escapes preferentially during sea evaporation, and the remaining surface waters should be isotopically homogeneous because of mixing currents.

Contrarily, in desert lakes, there is a lack of water movement and therefore little mixing. Large isotopic differences might build up between regions of the lake depending on patterns of evaporation and precipitation.

However these conclusions are not in agreement with those of Lloyd,⁹ who found no isotopic differences in evaporation from seas, ponds, and small vessels during his experiments. Isotopic variability in evaporation has been obtained in results of other experimenters.¹⁰

Thus the interpretation of isotope concentrations found in Mediterranean evaporites is uncertain. The fractionation may well have some explanation other than the drying up of the Mediterranean Sea.

The article by IIsü contains many other interesting geological finds and conclusions. Like the isotope results, however, the facts must be carefully interpreted. No doubt the Deep Sea Drilling Project will prove to be a continuing and exciting source of data for examination in the light of biblical creation.

Now the assumption that seas containing evaporites have dried up repeatedly should be considered. Evaporite salt domes on the Gulf Coast have been analyzed isotopically for cap-rock sulfur which occurs atop the domes. The same S^{32}/S^{34} ratio is found throughout the region:

It thus seems likely that all domes come from a single evaporite sequence rather than from a series of evaporation beds of widely different ages.¹¹

Thus even if large scale evaporation is assumed in the Gulf Coast area, there is no isotopic evidence for a *repetition* of the event.

At this time the formation of evaporites in the Mediterranean Sea and elsewhere around the world is little understood, with a variety of possible explanations. Some believe these seas were once shallow and continental in character and have since sunk. On the other hand, according to geophysical data the structure beneath these seas is oceanic rather than continental.¹²

A second interesting view of evaporite formation is based on a wind model by which salt precipitation is predicted without large-scale evaporation of water.¹³ A third interpretation is that natural floodgates opened and closed on these seas in the past, leading to periodic evaporation.¹⁴

Of course evaporite basins are rare today; evaporite deposits are forming at a rate much slower than the necessary rate assumed throughout geological ages.¹⁵ This has led some to consider a catastrophic origin of evaporites, perhaps connected with the appearance of glaciers.¹⁶

C. Continental Drift

A test of the concept of continental drift may be based on the distribution of stable isotopes. Continental drift involves ideas that the Americas, over geologic time, have relatively drifted away from Europe and Africa. The isotope application is given the name paleothermometry, the study of ancient temperatures.¹⁷

Isotope effects are temperature dependent. For example rocks crystallized at higher temperatures have relatively lower $\delta O^{18}/O^{16}$ values and a narrower range of δ variability.¹⁶ Thus rock samples from continental coast lines contain a possible record of local climates in the past.

Comparative results for samples from many coasts thus far have indicated that continental climates have been very different historically. There is no climatological evidence that land masses now separated were once joined.¹⁸ Additional worldwide paleoclimate data is being collected in the search for possible drift correlations.

In spite of wide acceptance of the continental drift model, even the much-publicized sea floor paleomagnetic data is evaluated as containing uncertain results. Interpretations of the magnetic data depend on the postulate that the earth's field has always been axial, a suspect assumption.

A better interpretation of data may be based on a quadrupole field concept.¹⁹ In addition, the geographic distribution of evaporite deposits (Section III B) has been used to argue that continents have not changed position since earliest geologic time.¹⁸ Thus the interesting proposal of continental drift (global tectonics) remains open to further evidence.

D. Isotopes of the Moon and Meteorites

The great interest in the isotopic composition of rocks from the moon has been a major impetus for returning lunar samples to earth for analysis. The search for organic material has not been successful: only traces of carbon (less than 0.001%) have been found. Water remains totally undetected.

Completed isotope studies show the creative similarity of the earth and moon. Fractionation δ values for a variety of lunar rocks and minerals are remarkably constant and identical with terrestrial values.²⁰

Comets are of special interest since the age of the solar system can be dated according to the decay of the comet population.²¹ Based on the accepted geologic time scale, astronomers still have difficulty postulating a continuing source of comets to replenish the supply:

Sad to say, few theories of cometary origin exist, and fewer still are even partially convincing.²²

Thus the presence of comets remains a strong challenge to popular long estimates of our solar system's age.

Isotope measurements have been made on meteorites, some of which may be debris from disintegrating comets. Thus far a large range of δ values has been found for meteorites and tektites.

The δ values are unlike those of earth or moon; therefore, the deduction suggested by some scientists, that the moon is not the source of meteorites, is quite logical. If the investigated meteorites are really comet debris, then comet material also is unlike the earth or moon. The significance of this is not known.

IV. Future Geochemical Research

Stable isotope geochemistry is a field which is increasing rapidly in popularity and data. Paleothermometry, a technique receiving current emphasis, has already been mentioned with respect to the continental drift model (Section III C).

Studies have been made of earth temperature fluctuations dating back to the earth's origin. A typical finding is that the earth's average temperature was warmer "80 million years ago" than it is today.¹⁷

When temperature history is checked by such stable isotope methods, rocks are dated according to the supposed sequence in which specific fossils lived. This is the usual unjustified circular reasoning assumption.

Thus the actual time dependence of the temperature data is very questionable. In fact some scientists reject the validity of paleothermometers because of complicating factors in isotope fractionation.¹⁹

However, the measureable δ factor for a given sample is dependent on the temperature at time of formation. This may be a useful tool for the creationist.

If the worldwide study of rocks results in more data to support the concept of a warm earth in the past, as initially suggested, then a vapor canopy is one valid explanation. The pre-flood existence of a water vapor shield surrounding the

earth could be a very useful interpretation of Genesis passages and other geological data.²³

Geochemistry will continue to be a source of checks on radiometric dating, as in the case of the Mollusk shells. One final example in this area involves comparative isotope measurements for limestones of recent origin and of assumed Precambrian (1 billion years) vintage.²⁴ The measured δ values are the same, much to the puzzlement of those who had predicted large δ differences arising during the time span. The validity of the geologic time scale may be challenged again on the basis of these results.

The stable isotope fractionation method presented here is one of many new and powerful research techniques. Efforts must be made to understand these experiments in order to realize their weaknesses and their valid applications to scientific creationism.

References

- ¹Holden, N. E. and F. W. Walker. 1973. Chart of the nuclides. General Electric Company, Schenectady, New York, p. 5.
- ²Dansgaard, W. 1964. Stable isotopes in precipitation, *Tellus*, 16:436.
- ³Epstein, S., R. P. Sharp, and I. Goddard. 1963. Oxygen isotope ratios in antarctic snow, Firn, and Ice, *Journal of Geology*, 71:698.
- ⁴Lane, G. A. and M. Dole. 1956. Fractionation of oxygen isotopes during respiration, *Science*, 128:574.
- ⁵Fairbridge, R. W. Editor. 1972. The encyclopedia of geochemistry and environmental sciences, Volume 4A. Van Nostrand Reinhold Company, New York, p. 618.
- ⁶Keith, M. L. and G. M. Anderson. 1963. Radiocarbon dating: fictitious results with mollusk shells, *Science*, 141:634.
- ⁷Rankama, K. 1954. Isotope geology. Pergamon Press, New York.
- ⁸Hsü, K. J. 1972. When the Mediterranean dried up, *Scientific American*, 227:27.
- ⁹Lloyd, R. M. 1966. Oxygen isotope enrichment of sea water by evaporation, *Geochimica et Cosmochimica Acta*, 30:801.
- ¹⁰Tan, F. C., J. D. Hudson, and M. L. Keith. 1970. Jurassic paleotemperatures from Scotland, *Earth and Planetary Science Letters*, 9:421.
- ¹¹Feely, H. W. and J. L. Kulp. 1957. Origin of Gulf coast salt-dome sulfur deposits, *Bulletin of the American Association of Petroleum Geologists*, 41:1802.
- ¹²Drake, C. L. 1970. The geological revolution. Condon Lectures, Oregon State System of Higher Education, Eugene, Oregon, p. 48.
- ¹³Stuart, W. D. 1973. Wind-driven model for evaporite deposition in a layered sea, *Geological Society of America Bulletin*, 84:2691.
- ¹⁴Matthews, S. W. 1973. This changing earth, *National Geographic*, 143:1.
- ¹⁵Painter, J. H. Editor 1973. Geology today. Communications Research Machines Publishing Company, Incorporated, Delmar, California, p. 156.
- ¹⁶Wickman, F. E. 1973. Department of Geochemistry and Mineralogy, Pennsylvania State University. Private communication.
- ¹⁷Emiliani, C. 1958. Ancient temperatures, *Scientific American*, 198:54.
- ¹⁸Meyerhoff, A. A. 1970. Continental drift: Implications of paleomagnetic studies, meteorology, physical oceanography, and climatology, *Journal of Geology*, 78:1.
- ¹⁹Stehli, F. C. 1973. Review of paleoclimate and continental drift, *Earth Science Review*, 9:1.
- ²⁰Clayton, R. N. 1972. The oxygen isotopic composition of lunar samples, *Earth and Planetary Science Letters*, 13:455.
- ²¹Slusher, H. L. 1971. Some astronomical evidences for a youthful solar system, *Creation Research Society Quarterly*, 8:55.
- ²²Smith, E. P. and K. C. Jacobs. 1973. Introductory astronomy and astrophysics. W. B. Saunders Company, Philadelphia, p. 101.
- ²³Whitcomb, J. C., Jr. and H. M. Morris. 1961. The Genesis flood. The Presbyterian and Reformed Publishing Company, Philadelphia.
- ²⁴Becker, R. H. and R. N. Clayton. 1970. C¹²/C¹³ ratios in a precambrian banded iron formation and their implications, *Transactions of the American Geophysical Union*, 51:452.

HYBRID CORN: MAN'S GLORY AND LIMITATION

WILLIAM J. TINKLE*

*Hybridization and heterosis are discussed in relation to development of hybrid corn. Brief consideration is given to early investigations of Shull and East; then tests by the author are described whereby he was able to demonstrate to students some of the aspects of hybridization of corn. After considering relationship of his subject to "evolution," the author concludes, "If corn had developed from some 'simple' plant, such as an alga, it would necessarily have been by the introduction of many new and improved genes. Instead of introducing new genes, the remarkable process of making *Zea mays* more useful to man involves experts rejecting undesired genes and collecting other genes into more desirable groups."*

Introduction

Maize or corn, *Zea mays*, was found growing in the American continents by Christopher Columbus; and, the appearance of the corn plant has changed but little since its discovery.¹ Vases found in tombs in western South America, antedating the white man, are decorated with likeness of modern dent corn.

American Indians cultivated all the main types now grown, including dent, flint, sweet, and pop corn. The Mandan Indians of Dakota developed a variety which was grown by white people also, as the best variety for that region, up until about 1935.

Now, however, 95 percent of the corn crop in the United States is hybrid, because hybrid corn yields 15 to 20 more bushels per acre than ordinary, open pollinated corn. Research establishing this improvement was a triumph for biologists, but they cannot use the results to support their general evolutionary ideas.

Nature of Hybrids

Hybridization means the same as crossing of varieties or breeds of plants and animals, and should not be confused with *crossing over*, which is defined as the exchanging of portions of chromosomes. Crossing usually is practiced between varieties or breeds within a species.

When practiced between genera it usually yields no progeny, or else progeny which are sterile: e.g. the mule.² Crossing of corn and sugar cane resulted in normal fertilization of the embryo nucleus, but growth stopped because of disharmony of the female cells with the nuclei of the pollen grain.³

Hybrids are of two types, according to the benefits to man. The first type has two desirable traits which have been found growing in different varieties or species.

For instance, a certain grass, *Agopyron*, is immune to wheat rust. When crossed with wheat, *Triticum*, some of the progeny have this immunity along with profitable grain production.⁴ This crossing brings together the undesired traits in

some of the progeny as well as the improved combination in others, necessitating strict selection and rejection for several years.

Hybrid corn is of the second type of hybrid, in which the selection precedes the crossing, and the benefits are realized from the elimination of defects, and also from the added vigor which the plants have following the crossing. This hybrid vigor, called *heterosis* by G. H. Shull who will be mentioned again below, arises from the condition that diverse genes are brought together in the same cell.

Heterosis is more pronounced in corn than in genera which normally are self-pollinated, such as beans and wheat. This fact is noted, but to explain the proposed reasons would make this paper too long.

Of course, both types of hybrid are brought about by making new combinations of genes. Neither type of hybrid involves a change in a gene. Thus hybrid corn does not illustrate, nor can it be used to help someone believe in natural or lasting development of kinds of plants.

Early Investigation

Self pollination or any type of inbreeding or mating of close relatives results in a reduction of vigor in many species of living things. This has been known for a long time. Such loss of vigor is very easily noted in corn. Once an instructor at a college near the author thought that inbreeding would finally cause corn to revert to its wild ancestor, whatever that unknown type might be. That he was mistaken in his estimate was shown by two geneticists who continued their experiments on inbreeding until there was no further reduction in size or vigor.

G. H. Shull (1874-1954) worked on corn at Cold Spring Harbor, Long Island from 1905 to 1916. E. M. East (1879-1938) did similar research, first at the Illinois Agriculture Station, then at Connecticut Agricultural Experiment Station, from 1905 to 1914.

In corn the staminate, or male flowers, are found on the "tassel" at the top of the stalk, while the pistillate, or female flowers, are on the shoot which develops into the "ear." The styles, one from each grain of corn and called "silk," are

*William J. Tinkle, Ph.D., who has worked in genetics for many years, lives at Timbercrest Home, North Manchester, Indiana 46962.

very long and protrude from the end of the ear.

Pollen from the tassel falls by gravity or wind from the tassel to the silk; then, from the pollen a tube elongates into the developing grain of corn. Nuclei traverse this tube and unite with other nuclei in the corn grain. New growth begins. Of course the nuclei carry a complement of genes from the male part of the plant.

Hybridization in Corn

The standard technique of hybridization of corn is to place a bag over the tassel to catch the pollen produced there and to exclude other pollen. At the same time the workers place a bag over the silk to exclude pollen.

When the silk is mature, the bagged tassel is cut off, pollen is shaken over the silk of the same plant, then the silk is covered again while the development of the self-pollinated seeds proceeds. At the proper time of the season these seeds are planted, and the process is repeated.

Many inferior plants appear, and seeds from such plants are not used to continue the experiment. Some plants do not produce seeds. Along with the defects there is a distinct reduction in vigor in each generation.

After six generations, however, no further reduction in vigor, nor any more defective stalks were found, but rather a uniform strain of corn was established. In an inbred strain of this kind, each plant has genes of the same kind as those of the other plants in that strain unless a mutation occurs, and this takes place very rarely.⁵

Next in order is the planting of rows of corn side by side, alternating two inbred strains. When the plants are mature, all the tassels of one strain are removed, causing plants of that strain to be pollinated by the other strain, thus making hybrid seed corn.

When this hybrid corn is planted the next season, all the vigor of the original open pollinated corn is restored and even more because of heterosis. Another advantage is that latent defects have been brought out and discarded during the years of inbreeding.

However, the increase of vigor is not the same for each cross; line A x B may not be so good as line C x D. Also commercial breeders consider their methods as trade secrets and may use tests of their own rather than following the above routine for six generations.

Tests by the Author

In instruction, in addition to printed pages and pictures, there is well-known value in demonstration. Accordingly I developed inbred strains and hybrids of Golden Bantam sweet corn to demonstrate the method to my students. Two generations were grown in a year, one in winter in the greenhouse, the other in summer outside.

During the inbreeding generations, the same loss of vigor was noted as was discovered by Shull and East. An added loss of size and vigor was typical of the greenhouse generations, and the ears averaged about two inches in length; yet the grains were of normal size.

After four generations of inbreeding and strict selection I planted seeds from several ears in a garden, an ear to a row. Plants in each row were marked by some peculiarity: row D plants were fairly tall and the stalks were of normal diameter but they did not grow erect; row F plants had so many branches (suckers) near the base that it looked like bunches of grass and produced but few ears; row C plants grew erect but the stalks were slender and the ears were small.

Just as expected, crossing two of the better strains produced seeds which were not superior in any apparent manner, but when planted they grew into uniform, vigorous corn plants.

After some years I planted the second filial generation of a popular sweet corn hybrid. The first filial generation is the one which usually is planted commercially, and it had been vigorous and uniform; but the second generation was otherwise. Both the stalks and ears lacked uniformity in length and vigor, and although the grains were supposed to be yellow, some were white. Lack of vigor was apparent also in the abundance of smut.

Farmers buy fresh hybrid seed each year to avoid such losses. Once the planning of intelligent beings is stopped, corn reverts and becomes inferior. This is the rule in nature, and this species illustrates the principle fully.

Relationship to "Evolution"

Quite evident from the above observations is the fact that hybrid corn is the product of human intelligence; the methods employed do not describe the working of unaided natural event. The idea that plants have developed from so-called simple beginnings by natural means, and struggle among themselves, is not elucidated in the least degree by the glorious success of man with production of hybrid corn.

Indeed, production of hybrid corn illustrates even the limitation of man. To make further improvement, breeders do not take the best inbred strains and attempt to make them better. Instead, they go back to open pollinated corn and employ the same slow, careful hybridization process to make new inbred strains, which may contain a better collection of genes for some soil or climate.

James F. Kidwell mentioned the following possibilities of change in an inbred strain: "1) reverse mutation, 2) linkage, 3) interactions among loci (epistasis), 4) genotype-environment interaction, 5) changing selective value for any reason."⁶

Then he stated that all of these possibilities are so slight that they will make no difference in the mathematical formulas used by geneticists.

Of course all geneticists know that environmental influence, otherwise known as "acquired characters," are not inherited. As for the other changes, practical corn breeders know that such changes would not be an improvement and would be discarded on the conveyor belt when seed corn is harvested.

If corn had developed from some "simple" plant, such as an alga, it would necessarily have

been by the introduction of many new and improved genes. Instead of introducing new genes, the remarkable process of making *Zea mays* more useful to man involves experts rejecting undesired genes and collecting other genes into more desirable groups.

Charles Darwin assumed that the improvement accomplished by man was a true sample of the working of natural events.⁷ Clearly that assumption was a mistake with regard to hybridization of corn.

Notes and References

¹Jenkins, Merle T. *Corn Improvement*. U.S.D.A. Yearbook 1936, p. 460.

²The few fertile mules which have been observed are explained thus:

Curiously enough there is no evidence that viable eggs produced by mules ever contain any of the chromosomes which the mule received from the jack. Thus, if a fertile mare mule is bred to a stallion, the colt is a typical horse colt, with no evidence of its donkey ancestry. Conversely, when a fertile mare mule is bred to a jack, the colt is a perfect mule. Obviously the eggs contain only horse chromosomes in these instances. (L. H. Snyder and P. R. David, *Principles of Heredity*. Fifth Edition. Heath, p. 242.)

³Vigendre Das, L. D. *Journal of Heredity*, Vol. 61, p. 290.

⁴Snyder, L. H. and P. R. David, *Op. cit.*, p. 232ff. Appearance of viable offspring when a cross between

genera occurs is very exceptional. However, since classification is based on morphology, while crossing depends upon similar cytology, the two genera may not be so different physiologically and genetically as they appear outwardly.

⁵As one researcher stated:

The studies just discussed lead to the conclusion that there is a long-time stability in the genetic basis of particular characters but such a stability has often been questioned. The author then adds that some say genes must have changed if evolution be true. (A. H. Sturtevant, *A History of Genetics*. Harper & Row, 1965, p. 115.)

⁶Kidwell, J. F. Effect of mutation and selection, *Journal of Heredity*, Vol. 62, p. 210.

⁷Found repeatedly in *Origin of Species* by Charles Darwin.

LET THE OCEANS SPEAK

HAROLD CAMPING*

Drawing from recent studies of the oceans, the author shows that there is much evidence for a young Earth. The amounts of various minerals dissolved in sea water, for instance, would have taken only a tiny fraction of the age of the Earth to accumulate, even according to the position of uniformitarian concepts. A similar statement may be made about the sediment at the bottom of the ocean.

Introduction

Creationists are certain that the Bible is accurate, authoritative, and trustworthy in every field of knowledge whether that be theological, historical, scientific, or any other. The Bible contains a very definite and precise chronological timetable that begins with the creation of this world and the first man, Adam, and covers the great historical events of the first 11,000 years of history.¹

Actually evidence in the secular record is not at all in disagreement with the sacred record, and the sacred record can be used to place the secular record in proper perspective. Because the Bible is true and accurate in its accounts of people, places, and time, men can use it to dis-

tinguish between what is true and false about the secular viewpoints.

Data from the observable universe concerning the earth's past history is becoming increasingly available as men search out the secrets of the universe. But is the world far older than 13,000 years as deduced from biblical evidence? Can creationists really expect to find correlation between the Biblical and secular records, if they insist on the literal interpretation of the creation story and the flood account? Isn't the evidence for a world that is billions of years old so conclusive that it is hardly worthwhile even to expect complete reconciliation between the Bible and true science?

A point must be emphasized. Because this world is under the bondage of decay with much of the record confused and obliterated by storms, floods, decay, fire, pestilence, and so forth, modern man cannot expect to reconstruct the history

*Harold Camping is President of Family Stations, Inc., and resides at 290 Hegenberger Road, Oakland, California 94621. He is host of the Open Forum program heard on the Family Radio Stations.

of the world in a complete and detailed manner. But, even so, some indication of the timetable of the past should be obtainable from the secular record.

The Oceans—A Key to the Past

In an earlier generation scientists suggested that the oceans might be of real help in determining the age of the earth. After all, the seas completely surround the land masses and thus receive the output of the rivers that flow into them. The rivers carry sediment and chemicals in solution which have eroded from the continents.

Scientists have assumed, therefore, that most of the chemical composition of ocean water is derived from the weathering of rocks. Sverdrup, et al wrote: "According to present theories, most of the solid materials dissolved in the sea originated from the weathering of the crust of the earth."²

H. Kuenen wrote in 1965: "Apart from meteoric dust and gaseous matter, the ultimate sources of all sediments are igneous and metamorphic rocks."³ And Kuenen continued:

Ground water containing dissolved matter including silica, calcium, sodium, iron, magnesium, phosphorus, humic acids, etc., reaches the sea by way of rivers, or directly by seepage along the shore. Apart from gases, including carbon dioxide, derived directly from the atmosphere, this is the main source of dissolved matter in the sea water. . . . A minor contribution comes from volcanic exhalations and from the expulsion of sea water trapped between the grains of the older marine sediments.⁴

Thus, today, scientists expect that much of the past history of the earth can be deduced from the chemical content of the oceans. For instance, the salt, NaCl, is the most abundant constituent of sea water, and both Na and Cl are present in the rocks.

Therefore, scientists have supposed that a knowledge of the amount of NaCl in the sea, as compared with the amount entering the seas each year by the weathering of the land, would give a close approximation of the age of the earth. An earth age of about 100 million years was estimated by earlier scientists by following this assumption.

But other dating methods have been developed. Based on radioactive decay analyses, scientists have decided that the earth must be some 4.5 billions of years old. The age of millions of years deduced from the ocean evidence was decisively rejected in favor of the longer radioactive ages.

Supposedly a much more acceptable timetable was gained for all of the developments imagined by evolutionists. Very little is heard today from

researchers investigating the content of sea waters as far as total earth dating is concerned.

But the oceans still exist. Since this world is presumably more than four billion years, and since oceans as well as continents have existed continuously, certain relationships and equilibriums must exist between the continents and the oceans.

Contentions of earlier scientists about an earth-ocean time relationship should still be valid. Assuming that present natural phenomena are a key to the past, examination of the relationship of the materials of the continents to those of the oceans should result in some kind of a timetable for geological history.

Time Schedule Based on Ocean Water

As noted, geologists concluded that the chemical composition of sea water and the ocean floor sediments is principally a product of the weathering of continental rocks. If this weathering of rocks was a very short time phenomenon, then, one would expect to find far different proportions of elements in sea water than are found within the average rocks of the continents.

This seems logical since some rocks erode more easily than others and, therefore, easily erodable chemicals should be most abundant in sea water. Differences in relative chemical proportions would also be due to other variables, such as the fact that some elements are not as readily transportable by rivers and ocean currents as others, and some are less soluble in water than others.

Nevertheless, if the duration of erosion were long enough, elements in the sea water and on the sea floor should quite accurately coincide with the chemical content of continental masses. Even the hardest of rocks would be eroded, and even the least transportable of minerals would ultimately be carried by the rivers to the sea.

Thus, when scientists talk about millions of years, on a world-wide basis, the proportion of one element in the sea water and on the sea floor to all other elements in the same environment should be approximately the same ratio as that element to all other elements in the continental masses, for in a very general way all the mass must somehow be conserved. For example, if the percentage of silicon in the continental masses is 27.5%, then if the oceans were old enough, the total of all the silicon in the ocean water and on the ocean floor should be 27.5%, approximately.

Furthermore, if the total quantities of various elements in the seas and sea floor, and the approximate rate of world-wide erosion could be known, then the length of time required to bring present elements into the ocean could be estimated. In turn, an approximate age for the earth might be deduced.

Fortunately, scientists have determined rather accurately the chemical composition of both the sea water and the land masses. Sverdrup et al prepared a table (Table I)⁵ showing the amounts of various chemicals that should have entered the oceans during a period of 260 millions of years. This is the estimated length of time which

TABLE I

Elements in Sea Water and in the Earth's Crust

Element	Sea Water	Potential "supply" in 600 gr. of rock (mg/kg of sea water)	Percentage in solution
Silicon	4	165,000	0.002
Aluminum	0.5	53,000	0.001
Iron	0.002	31,000	0.0001
Calcium	408	22,000	1.9
Sodium	10,769	17,000	65
Potassium	387	15,000	2.6
Magnesium	1,297	13,000	10
Titanium	---	3,800	?
Manganese	0.01	560	0.002
Phosphorus	0.01	470	0.02
Carbon	28	300	9
Sulphur	901	300	300
Chlorine	19,353	290	6700
Strontium	13	250	5
Barium	0.05	230	0.02
Rubidium	0.02	190	0.1
Fluorine	1.4	160	0.9
Chromium	p	120	?
Zirconium	---	120	?
Copper	0.01	60	0.02
Nickel	0.0001	60	0.0002
Vanadium	0.0003	60	0.0005
Tungsten	---	41	?
Lithium	0.1	39	0.2
Cerium	0.0004	26	0.002
Cobalt	p	24	?
Tin	p	24	?
Zinc	0.005	24	0.02
Yttrium	0.0003	19	0.002
Lanthanum	0.0003	11	0.003
Lead	0.004	10	0.04
Molybdenum	0.0005	9	0.005
Thorium	0.0005	6	0.01
Cesium	0.002	4	0.05
Arsenic	0.02	3	0.7
Scandium	0.00004	3	0.001
Bromine	66	3	2000
Boron	4.7	2	240
Uranium	0.015	2	0.8
Selenium	0.004	0.4	1
Cadmium	p	0.3	?
Mercury	0.00003	0.3	0.001
Iodine	0.05	0.2	25
Silver	0.0003	0.06	0.5
Gold	0.056	0.003	0.3
Radium	0.093	0.066	0.05

would be required to provide the present quantity of salt in the ocean water, assuming uniform weathering throughout this period of time.

He mentions an estimate by Goldschmidt in 1933 that accumulation of the present concentration of salt (NaCl) in solution would have required weathering of 600 grams of rock for each kilogram of water in the ocean. Thus, according to Table I, 17,000 mg. (17 gr.) of sodium were released and 165,000 mg. (165 gr.) of silicon were likewise released for accumulation in the oceans for each 600 grams of rock weathered.

With this estimate of potential elements available, one wonders what is the actual quantity of elements in sea water. An estimate for each element is given in the second column of Table I.

For example, in a kilogram of sea water there is on the average about .5 mg. of aluminum in solution. This is only .001% of the estimated 53,000 mg. expected if weathering had continued for as long as 260 million years, the estimated time required to provide the observed amount of salt.

In fact, after close examination of all of the elements listed in Table I, one concludes there is a total lack of relationship between the chemicals in the oceans and the continents. For example, chlorine is 67 times too prevalent in sea water, nickel is 500,000 times too scarce. Silicon, which is one of the most common constituents of rocks, should be 50,000 times more plentiful in ocean water if it were in proportion to that in continental rocks.

Perhaps one reason for this total disproportion between the expected volumes of elements in the sea water and their actual occurrence is that sea water will hold in solution only a tiny bit of each element. In other words, most of the silicon goes out of solution to the sea bottom either by precipitation or by the action of organisms. That sea water is not saturated with silicon is supported by F. A. J. Armstrong:

Sea water is undersaturated with respect to silica, although since reported values for its solubility are somewhat inconsistent, it is not possible to say how much.⁶

And Kuenen has written:

Under normal conditions sea water is not supersaturated with any product, and circulation is automatically set up in areas of excess evaporation, preventing the formation of excessive concentrations.⁷

Apparently, then, many elements are far too insufficient in ocean water as compared with the quantities that should be present, if the oceans were millions of years old. And further, the sea water in general is not saturated with chemical elements.

Therefore the oceans could be very young, because, if the oceans had existed long enough, those elements which are especially soluble would have reached a saturated condition in many parts of the world.

Using the unsaturated condition of the oceans, researchers should be able to measure the age of oceans, since an estimate can be made of the average annual quantity of chemicals flowing into the ocean from the rivers. Dividing the total quantity of an element existing in an unsaturated condition in ocean solution by the quantity of the same element flowing into the ocean should result in some concept of the ocean's age.

This information is found in Table II.⁸ Evidently 2.0×10^7 (20 million) years of continental weathering would have been required to supply all the lithium (Li) presently found in ocean solution. Presumably, sodium (Na) would have been accumulating for some 2.6×10^8 (260 million) years.

Nevertheless, a very strange fact becomes evident upon careful study of Table II. Some of the elements are in very *short* supply in the oceans. Therefore only 100 years of continental weathering would have been required for accumulation of the tiny quantity of aluminum in ocean solution. In fact, nineteen of the elements in sea water are found in such small amounts that the concentrations could have accumulated in 1000 years of continental weathering. Two conclusions are possible from this startling information:

1. The oceans must be very young because small quantities of many of the elements are in solution.

2. The oceans must be very young because of the wide discrepancy of residency periods of various chemicals. Differential erosion over a relatively short period of time together with other variables, such as water transportability and solubility of elements, could account for this wide spread in residency times.

One other fact should be noted in this regard. Chlorine, sulphur, bromine, and boron exist in much larger amounts (See Table I) than those which would be supplied while the elements, such as sodium, with which they are normally associated were being weathered from rocks into the ocean waters. Therefore a third conclusion is possible:

3. That salt (NaCl) and perhaps a number of other chemicals are in the oceans completely apart from normal rock weathering.

A Look at Sediments

But the question concerning the paucity of elements in sea water still persists. Because of the paucity of so many of the chemicals in the oceans, one might conclude that they must have been taken out of solution in some manner, even

TABLE II
Residency Periods for Chemicals in Ocean Solution (in years)

Lithium	2.0×10^7	Silver	2.1×10^6
Beryllium	150	Gadolinium	5.0×10^5
Sodium	2.6×10^8	Tin	1.0×10^5
Magnesium	4.5×10^7	Antimony	3.5×10^5
Aluminum	100	Cesium	4.0×10^4
Silicon	8.0×10^3	Barium	8.4×10^4
Potassium	1.1×10^7	Lanthanum	440
Calcium	8.0×10^6	Cerium	80
Scandium	5.6×10^3	Praseodymium	320
Titanium	160	Neodymium	270
Vanadium	1.0×10^4	Samarium	180
Chromium	350	Europium	300
Manganese	1400	Gadolinium	260
Iron	140	Dysprosium	460
Cobalt	1.8×10^4	Holmium	530
Nickel	1.8×10^4	Erbium	690
Copper	5.0×10^4	Thulium	1800
Zinc	1.8×10^5	Ytterbium	530
Gallium	1.4×10^3	Lutetium	450
Germanium	7.0×10^3	Tungsten	10^3
Rubidium	2.7×10^5	Gold	5.6×10^5
Strontium	1.9×10^7	Mercury	4.2×10^4
Yttrium	7.5×10^3	Lead	2.0×10^3
Niobium	300	Bismuth	4.5×10^4
Molybdenum	5.0×10^5	Uranium	5.0×10^5
		Thorium	350

though sea water does not appear to be saturated with many, if any of the chemicals that enter it.

Now the mechanisms of solution in, and the removal from sea water are rather complex. Scientists are busily engaged in attempting to understand them. But if the chemicals are not in the sea water, they must be on the sea floor.

Therefore, even though the chemicals in the water are not proportional quantitatively to those in the rocks, surely the remainder would be found on the sea floor, with the over-all chemical content reflecting an ancient ocean. Such an expectation, however, cannot be supported by the facts.

Obviously, much more work must be done before a complete analysis of the quantity and composition of the sea floor sediments can be known. However, many cores have been taken already, and there is much literature available concerning this question.

Present knowledge is summed up perhaps in the comment of H. Kuenen: "The differences in composition between oceanic and continental sediments, both as to major constituents and trace elements are large."⁹ In other words, whether the composition of sea water or the composition of the ocean sediments is studied, no data has been collected yet to substantiate a long time relationship between the oceans and the continents. Wilson sets forth these problems:

The failure to recover any rocks older than Cretaceous from the ocean floors suggests that the ocean basins may be younger than the continents. It has also become evident that the petrology, sedimentations, and structural geology of ocean chasms are quite different from these of continents . . . the ocean basins and oceanic islands are dramatically different from continents in crustal thickness, age, composition, ore deposits, structures, magnetic anomalies, and in the patterns and characteristics of their active mountain belts and earthquakes. Several continents have rocks at least 3.2×10^9 years old, which is 20 times the age of the oldest oceanic island, dredging, or core.¹⁰

Thus, because of the tremendous chemical disproportions between the oceans and the continents, the most probable conclusion is that the oceans are very young.

Another Look at Sediments

But let us now examine the ocean sediments from another aspect. If the annual amount of sediments flowing by rivers into the ocean basins, and some idea of the volume of sediments on the ocean floor are known, division of the second quantity by the first should result in an approximate age of the oceans. Or to put it another way, if the annual quantity of sediments flowing into the ocean is known, this figure could be multiplied by say 100 million years, 4.5 billion years, or any other length of time which supposedly approximates the age of the earth, and then the average thickness of sediments on the ocean floor could be estimated.

Let us compute the thickness of sediment that should be found if the oceans were 260 million years old as deduced in accordance with the salt content. Calculations of the quantities added to the oceans by the rivers of the world will be considered first.

Clarke¹¹ has estimated that the rivers contribute 2.73×10^{15} grams of dissolved solids to the sea each year. A total of 7.1×10^{23} grams of solids would have been dissolved in the 2.6×10^8 years required presumably for the present sodium to accumulate. Of this total, 5×10^{22} grams are presently in solution¹² in the ocean water.

Therefore $(71.0 \times 10^{22}) - (5 \times 10^{22})$, or 66.0×10^{22} grams, should have gone out of solution and become part of ocean sediment. A small part of this may have been recycled due to ocean spray, etc., but the major part must still be present somewhere in the oceans.

This estimate of 66×10^{22} grams of sediment might be checked by approaching the question from another viewpoint. Sverdrup, et al reported¹³ some estimates by Boldschmidt. Accord-

ing to Boldschmidt, for the present concentration of salt (NaCl) to accumulate in ocean solution, a total of 600 grams of rock has been weathered for each kilogram of water in the ocean. This is the basis upon which Table I was developed.

Since there are 278 kg. of water for each square centimeter of the earth's surface, and the area of the earth's surface is 5.1×10^{18} cm², the total weight of water equals $278 \times 5.1 \times 10^{18}$ kg. or 1.42×10^{21} kg.

Goldschmidt estimated further that, for every 600 gr. of rock that have been weathered, 65% or 390 grams actually should have become available for solution in the oceans or as sediment on the ocean floor. This equals $390 \times 1.42 \times 10^{21}$ grams = 5.53×10^{23} grams.

Since 5×10^{16} metric tons or 5×10^{22} grams are in solution, the amount that must have become sediment equals $(55.3 \times 10^{22}) - (5 \times 10^{22})$ or 50×10^{22} grams. This is very close to the 66×10^{22} grams based on Clarke's estimate of river sediments.

With the knowledge that there are presently an estimated 5×10^{22} grams of chemicals in ocean solution and at least another 50×10^{22} grams in sediments (based on an ocean age of 260 million years), let us determine what the ocean floor should look like. Svendrup¹⁴ estimated that, if the 5×10^{22} grams of chemicals, which are presently in ocean solution, could be extracted, then a layer of salts 45 meters thick over the entire earth would result. Since the oceans cover 70.8% of the earth's surface, this hypothetical layer would be 63.5 meters thick on the ocean floor.

Since sediments equal to a minimum of 50×10^{22} grams would accumulate in an ocean 260 million years old, then one could expect an average sediment depth of ten times 63.5 or 635 meters or 2100 feet (with the ocean area the same), that is, if the continents had been weathering uniformly for 260 million years.

Since the continents presumably have been here far longer (minimum 3 billion years), one could expect logically that the sediments should be far deeper than 635 meters. In fact, in that time the oceans should have almost filled up, and the land should have pretty well been eroded to level plains.

Conceivably these figures would have been changed some by presumed mountain building some hundred million years ago, but the basic concept of the oceans filling with sediment as the land masses eroded should hold true.

Ocean Sediments Analyzed

Let us now examine the evidence as far as the ocean sediments are concerned. In 1949 Maurice Ewing wrote in the *National Geographic Maga-*

zine concerning the exploration of the floor of the Atlantic Ocean. His comments are as follows:

In more than 3,000 places over vast areas of the Atlantic we have now measured with sound echoes the depth of the sediment on top of the bed-rock of the ocean floor. These measurements clearly indicate thousands of feet of sediments on the foothills of the Ridge. Surprisingly, however, we have found that in the great flat basins on each side of the Ridge this sediment appears to be less than 100 feet thick, a fact so startling that it needs further checking.¹⁵

Much of the Pacific floor, too, is covered by sediments under 100 meters in depth,¹⁶ with some areas as thin as 20 meters.¹⁷ The following statement relates to investigation of the East Pacific Rise:

A deep-towed magnetometer profile made across the East Pacific Rise crest shows sediment accumulation increases from less than 2 meters at the rise crest axis to about 20 meters at the western end and 10 meters at the eastern end of the profile.¹⁸

Evidence from the oceans, it seems, may not be used automatically to support the view of a very old earth. In fact, the opposite conclusion seems to be better supported. Patric M. Hurley wrote in the *Scientific American*:

The topography of the ocean floors has been rapidly revealed in the past two decades by the depth recorder. . . . It became a great puzzle how the total span of earth's history only a thin veneer of sediment had been laid down. The deposition rate measured today would extend the process of sedimentation back to the Cretaceous times, or 100 to 200 million years, compared with a continental and oceanic history that goes back at least 3,000 million years. How could three-quarters of the earth's surface be wiped clean of sediment in the last 5 per cent of terrestrial time? Furthermore, why were all the oceanic islands and submerged volcanoes so young?¹⁹

Kuenen wrote:

Two great problems challenge earth sciences in this domain. The huge wedge of terrace sediment underlying the shelf off the east coast of the United States has been built up in little more than 10^8 years, that is, in less than 2 or 3 per cent of geological time. What has happened to the terraces that must have been produced earlier? Have they subsided into the mantle and been absorbed; have they been pushed under the continents; or have they been incorporated into mountain chains? The second problem is the discrepancy between the estimated thicknesses on the deep sea floor, and the values actually found. Var-

ious suggestions have been offered: (1) the layers below the unconsolidated sediment are mainly consolidated deposits; (2) the rate of sedimentation has been much slower than in recent times, especially in pre-tertiary times; (3) creep of the sea floor under the continental blocks under the influence of convection currents in the mantle; (4) the ocean floor is relatively young; (5) the sedimentary carpet has been invaded from below and metamorphosed so completely as to become basic rock.²⁰

Here, then, is a great enigma. If the oceans are only hundreds of millions of years old, sediments averaging 600 or more meters (2000 ft.) should be found all over the ocean floor. Instead, sediments are found normally to be far less than this, and in many cases the ocean floor is almost bare of sediment. No idea, other than that of a very young ocean, has thus far been set forth that seems as plausible or direct; and if the age of the earth were billions of years, then the puzzle of the missing ocean sediments is increased enormously.

Summary

The following truths summarize this study:

1. A great discrepancy exists between the three or four billion year age date derived from radioactive decay data and the evidence obtainable from the oceans. Either the ocean data is completely untrustworthy, or there is a question regarding the dependability of the radioactive dating.

2. If the accumulation of sodium by the weathering of continental rocks as a part of NaCl in the oceans is used as a guide for the age of the oceans, a number of unanswerable problems remain:

a. Some chemicals, (Cl, Br, etc.), must have been a part of the oceans since the very beginning or must have been introduced apart from rock weathering.

b. The sediments in the ocean should be much thicker than actually found.

c. Almost all the other elements which supposedly weathered while the sodium was weathering are in far too short supply to allow for a weathering period of 260 million years, which is required to bring this amount of sodium into oceans. Therefore, using NaCl as a standard results in an untenable solution.

3. If accumulation of the other major constituent of the ocean salts, chlorine, is used as a guide for age dating, then the following points would obtain:

a. An accumulation period of about 2 to 3 billions of years would result. This is much closer to the radio active age determination.

The ocean can then be considered to have been devoid of chemicals in solution at one time in its history.

b. This would compound the sediment problem. In this long period of time the oceans would have filled with sediment.

c. This also provides no answer for the short supply of many of the ocean chemicals. This, too, gives an untenable solution.

4. If the accumulation of the very smallest amounts of chemicals is used for age dating, the following would obtain:

a. The apparent age of the ocean would be under 1000 years.

b. The ocean would have begun with essentially the present compliment of salt and several of the other chemicals. This solution is untenable on the basis of other histories.

5. Another conclusion remains as the only plausible one, both in the light of Biblical statements, as well as in the light of the evidence obtained from studies of the oceans. That conclusion is that the ocean and the earth are 13,000 years old. This conclusion may be supported by the following secular evidences:

a. Elements in the ocean water are not found in a saturated condition. From this, one could deduce the flow of chemicals into the ocean was a short-time phenomenon.

b. Proportions of elements found in the water or on the ocean floor are in no relationship whatsoever to the proportions found in the continents. Such variables as resistance to erosion, water transportability, solubility, and others, over a very short period of weathering accord with these extreme differences in chemical proportions. Again, the conclusion seems most logical that the oceans are very young.

c. The fact that many of the chemicals in ocean solution are present in amounts that could have accumulated within the last 1,000 years or less, if all rocks were equally susceptible to erosion, can be used dramatically to support a 13,000 year age of the earth. For this is precisely what would be expected in view of the differences in erosion resistance, solubility, etc. of the continental rocks. Elements in excess of those expected within 13,000 years could have accumulated from easily eroded rocks, whereas far less than that expected in 13,000 years of history would have accumulated from very hard rocks.

d. The concept of a very young earth is supported also by existence of a thin layer of sediments on the ocean floor. This is especially true when consideration is given to the

cataclysmic worldwide flood of Noah's day. That phenomenon alone could have caused erosion of enormous quantities of sediments for ocean solution and deposition. In fact, impact of a worldwide flood upon the oceans would have been so severe that no accurate estimate of time can ever be derived from ocean chemicals.

e. The fact that certain salts such as NaCl are in such abundance in ocean solution could be interpreted to mean that they have been present in essentially their present quantities from the very beginning.

The all-important conclusion remains, however, that even without considering the effect of the flood on the oceans, under no circumstance may the ocean evidence be used to deduce an age of millions of years. Then, when any recognition is given to the Noachian flood sediments which must be subtracted from the elements in the oceans, the contention for a very young ocean may be stated even more emphatically. The 13,000 year date of the Bible appears to be the only true alternative to popular concepts of a very old earth.

References

- ¹Camping, Harold. 1970. The Biblical calendar of history, *Journal of the American Scientific Affiliation*, September, p. 98.
- ²Sverdrup, H. U., Martin W. Johnson, and Richard H. Fleming. 1942. *The Oceans*. Prentice Hall, Inc., New York, p. 219.
- ³Kuenen, H. 1965. Geological conditions of sedimentation (in) *Chemical Oceanography*. Riley, J. P. and G. Skirrow. Editors. Academic Press, London and New York, Vol. 2, p. 1.
- ⁴*Ibid.*, p. 4.
- ⁵Sverdrup, H. U., *Op. cit.*, p. 220.
- ⁶Armstrong, F. A. J. 1965. Silicon (in) *Chemical Oceanography*. Riley, J. P. and G. Skirrow. Editors. Academic Press, London and New York, Vol. 2, p. 410.
- ⁷Kuenen, H., *Op. cit.*, p. 5.
- ⁸Kuenen, H., *Op. cit.*, Vol. 1, p. 164.
- ⁹Kuenen, H., *Op. cit.*, p. 20.
- ¹⁰Wilson, Teyo J. 1967. Theories of building of continents (in) *the Earth's Mantle*. T. F. Gaskell. Editor. Academic Press, London and New York, p. 447.
- ¹¹Sverdrup, H. O., *Op. cit.*, p. 172.
- ¹²*Ibid.*, p. 219.
- ¹³*Ibid.*, p. 219.
- ¹⁴Sverdrup, H. U., *Op. cit.*, p. 219.
- ¹⁵Ewing, Maurice. 1949. New discoveries on the mid-Atlantic ridge, *National Geographic Magazine*, November, p. 612, 613.
- ¹⁶Ewing, John et al. 1968. North Pacific sediment layers measured by seismic profiling, The crust and upper mantle of the Pacific area. William Byrd Press, Richmond, Va., p. 150, 165.
- ¹⁷*Ibid.*, p. 148.
- ¹⁸Larson, Roger L and Fred N. Spiers. 1969. East Pacific rise crest, a near bottom geophysical profile, *Science*, January 3, p. 68.
- ¹⁹Hurley, Patrick. 1968. The confirmation of continental drift, *Scientific American*, April.
- ²⁰Kuenen, *Op. cit.*, Vol. 2, p. 20.

SEX AND EAR SIZE IN THE BULLFROG

E. NORBERT SMITH*

*Ear sizes differ significantly in male and female frogs, **Rana catesbeiana**. If ears are a means of warning of impending predation, one would expect the ears of both sexes to be the same size. Or, if hearing is essential in feeding behavior no difference in ear size would be expected. Actually male frogs of this species possess greater hearing capability than female frogs. Research is mentioned, and relevance of all these ideas to a creationist framework is explicated.*

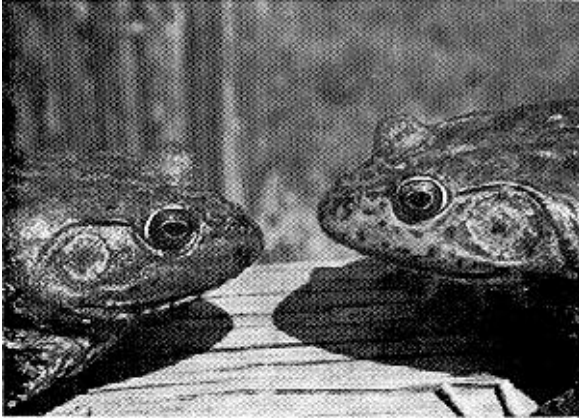


Figure 1. Male and female bullfrog, *Rana catesbeiana*. Male on the right has a much larger tympanum or eardrum than the female. This is reversed from what is expected if the primary function of the male's chorus is to attract females for breeding. Photograph by E. Norbert Smith.

So obvious is the difference in ear size of the bullfrog, *Rana catesbeiana*, that the sex can be determined visually before collecting the animals, according to Conant,¹ "The tympanum (eardrum) is larger than the eye in males, and only the size of the eye or smaller in females." Why this sexual dimorphism? Can it be of any possible help in reaching some conclusion about the animal's natural history?

Certain Expectations Considered

Other things being equal, there is a positive correlation between ear sensitivity and the "capture area" or cross sectional area of the tympanum. Apparently then male bullfrogs would hear better than females.

Yet, if the frog's ears served primarily as warning of impending predation, one would expect the ears of both sexes to be the same size as both male and female are victimized by the same attackers. Or alternately, if hearing is essential in feeding behavior no difference in ear size would be expected.

Many anurins have a characteristic species specific call. That the call of a male frog will hold a greater attraction for females of the same species than for other frogs has been demon-

strated repeatedly. The call then serves at least two functions (besides some possible aesthetic quality): that of genetic isolation (to keep a kind a kind) and to attract a mate. If these are the most important uses of the call (and ears) one would expect the female (who must be attracted) to have the larger ears.

Facts and Interpretations Compared

However, the facts of natural phenomena are not dependent upon men's ideas. Contrary to the expectation just stated that female frogs would have the larger ears, male frogs possess the greater hearing capability, as though the male was calling not so much for the female but to other males.

This fits nicely into a creationist framework involving intrinsic population control instead of an evolutionary viewpoint with an inherent obligate wide-open reproduction. As has been previously stated,^{2,3} a literal interpretation of the perfect creation prior to the fall would preclude predation and necessitate some kind of built-in population control. Conceivably the fall brought many changes including, disease, starvation and predation. But, possibly, traces of the original intrinsic population control are still active and can be found today.

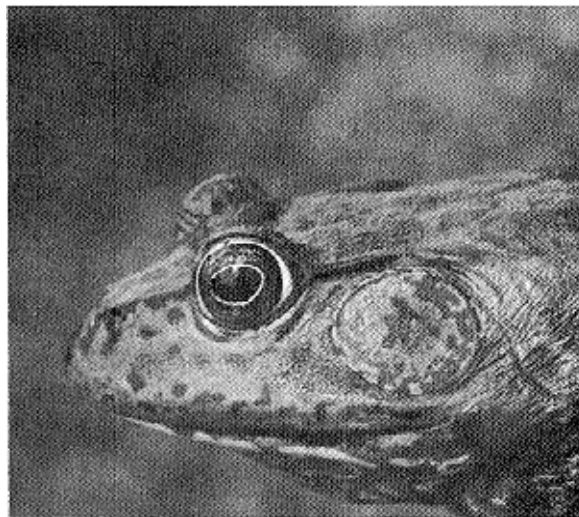


Figure 2. This is a close-up of a male bullfrog. Photograph by E. Norbert Smith.

*E Norbert Smith lives at 219 North Caddo Street, Geatherford, Oklahoma 73096.

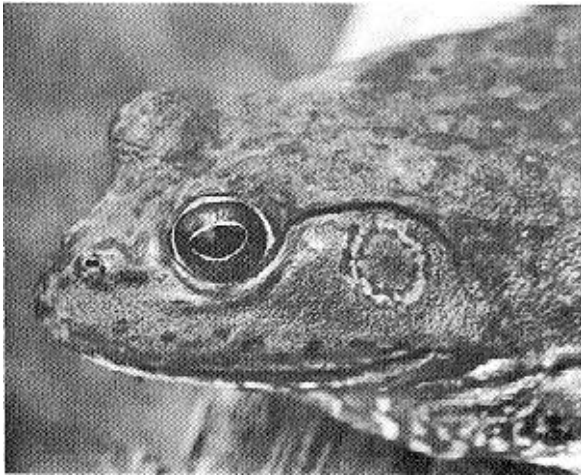


Figure 3. This is a close-up of a female bullfrog. Clearly the female has a much smaller ear than the male. Photograph by E. Norbert Smith.

Wynne-Edwards has convincingly stated^{4,5} that the call of the bullfrog is an epideictic display shared by a multitude of other species—the function of which is simply a head count or census. Evidently by means of the census, recruitment rate and finally density of the species are regulated. In a test⁶ of a prediction by Wynne-

Edwards, the primary function of the bullfrog's call has been found to be territorial, resulting in a parcelling out of living space so common among passerine birds.

Research Problem Suggested

The hypothesis relating bullfrog reproduction and the hearing of other bullfrogs calling could be tested by comparing density and reproductive success of two groups of frogs. One group could be artificially (and humanely) deafened or made mute and the control group left intact. Even in creation research "the fields are white unto harvest."

References

- ¹Conant, Roger. 1958. A field guide to reptiles and amphibians. Houghton Mifflin Company, Boston, p. 287.
- ²Smith, E. Norbert. 1970. Population control: evidence of a perfect creation, *Creation Research Society Quarterly*, 7(2):91-96.
- ³Smith, E. N. 1973. Crowding and asexual reproduction of the planaria, *Dugesia dorotocephala*, *Creation Research Quarterly*, 10(1):3-10.
- ⁴Wynne-Edwards, V. C. 1962. Animal dispersion in relation to social behavior. Hafner Publishing Co., N. Y.
- ⁵Smith, E. Norbert. 1969. Book review. *Creation Research Society Quarterly*, 6(1):73-74.
- ⁶Wiewandt, Thomas A. 1969. Vocalization, aggressive behavior, and territoriality in the bullfrog, *Rana catesbeiana*, *Copeia* 1969 (2):276-285.

EVOLUTION AND ARCHAEOLOGICAL INTERPRETATION

DONOVAN A. COURVILLE*

The few hundred years after the flood are crucial years for anyone who believes in a young earth; for in that time populations had to increase and disperse, and the arts and crafts of civilization had to be taken up again, after the destruction of the former order. The author shows that, in fact, the interval need not have been very long. In particular, no more than about 200 years need be allowed between the flood and the beginning of the dynastic period in Egypt.

Introduction

Evolution is commonly thought of as the counter-idea to the concept of creationism. This is altogether true, but evolution is more than this. Acceptance of evolution entails denial of the factual nature of the Noachian Flood.

Also interpretations in the field of archaeology, a discipline that involves the later history of man's existence, have been greatly influenced by the principle of uniformitarianism. A failure on the part of many creationists to recognize this situation has undoubtedly been a significant factor in not submitting archaeological interpretations to a critical scrutiny before acceptance, when such interpretations result in compromise of the dependability of Scripture.

Because of this situation, proponents of creationism have been in an inconsistent and indefensible position. The number and magnitude of such discrepancies between Scripture and archaeological interpretation are now so great as to give substance to the claims of some archaeologists that Scripture is not a reliable historical source.

If Scripture does contain repeated errors and inaccuracies for the later period of history, then a basis remains for questioning the dependability of the Genesis accounts of creation and the flood. Without doubt, because of numerous compromise interpretations, many people, who would prefer to retain a confidence in Scripture, have turned to such views as theistic evolution and a pre-Adamic creation; or have resorted to acceptance of an extended time period for man's existence which is far out of line with Biblical teaching.

*Donovan A. Courville, Ph.D., is Professor Emeritus of Biochemistry at Loma Linda University, Loma Linda, California. He lives at 42 Dart Street, Loma Linda, California 92354.

In order for the creationist's position to merit an evaluation as consistent, there is a dire need for effectively meeting this remaining deterrent to an unqualified recognition of Scripture as a dependable historical source for the post-diluvian period encompassed by archaeological methods. It should be obvious that it is not possible to *prove* dependability for each and every historical statement in Scripture.

But it is possible to demonstrate that the various claims of error in Scripture represent discrepancies between Scripture and the *interpretations* of archaeologists and not between Scripture and the *facts* of archaeology. The writer has undertaken such a task in a more complete work.¹

The aim in this article is to demonstrate (1) that the popular interpretations of archaeologists about the predynastic and early dynastic periods in Egypt are based on the same uniformitarian assumption that is basic to evolutionary thinking; and, (2) that when freed of the pressure of this unestablished assumption, there is no genuine demand for a time period between the Noachian Flood and the beginning of the dynastic period that is in significant excess of two centuries.

Evolutionary Interlude

During the critical period when scholars were attempting to organize archaeological evidences of man's past into epochs, popular thinking leaned heavily in the direction of recognizing evolution as the controlling factor in the rate of development of man's intelligence. The rate of intellectual development was in turn regarded as the controlling factor in the development of the culture observable at the opening of the dynastic period.

Millions of years of presumed geologic time were hypothesized for the development of an intelligence which could be clearly recognized as representing a pre-eminence over man's assumed beast ancestors. Evolutionary archaeologists started their story with the appearance of locally built fires and the production of crude flint tools and weapons as the earliest evidences of such pre-eminence. Their story is continued usually as follows:

(a) Up to about that point, man was supposed to have obtained his food from wild vegetation and from such animal sources as the remnants of his animal instincts permitted. This epoch is referred to as the epoch of "food gathering," a term roughly equivalent to what is called the Mesolithic Age.

(b) This was followed by the Neolithic Age during which man presumably learned to cultivate his own food and produce weapons for greater efficiency in hunting down more elusive game. With such developments, man

could limit his area of living and build protective structures for himself.

(c) With the multiplication of the population, families united in groups with protective walls. Eventually, he learned how to make pottery for the storage and preservation of his food.

(d) At the beginning of the dynastic period men supposedly united in larger groups governed by a common ruler. For this series of cultural developments, archaeologists imagine some 20,000 years, more or less.

This "narrative" of cultural developments is illustrated archaeologically *only* at the site of Jericho among all the sites thus far investigated.² Nevertheless it is not feasible to deny a cultural development through *some such* sequence. It is extremely doubtful, however, that developments were the same in variant areas, or even that there was any necessary coincidence of developments in various areas. In fact the opposite direction is deducible from the evidence. Actually, there are peoples yet today who are living in the Neolithic period culturally.

Predynastic Archaeological Interpretations

Nothing should be more obvious than the impossibility of converting observed cultural changes to elapsed time in years. Whether man *gathered* his food for 5000 years or 5 years before undertaking cultivation is pure guess work based on one's starting premise. The same is true for the elapsed time to the invention of pottery making.

The most that can be said for assumed long periods of time for the predynastic is that they are roughly consistent with the starting premises of evolutionists based on the concept of uniformitarianism. But, even so, one may look askance at the deduction that many centuries separated man's ability to make a fire or a flint arrow head from the discovery of pottery making.

In spite of the vehement claims to the contrary, evolutionary change as a starting premise, has never been established. Further evidences in contradiction to that premise are now of such magnitude that there is a notably diminished inclination on the part of evolutionists to further debate the premise. That evolutionary thinking *was* the basis for assigning these long periods for the predynastic is clear from the writings of early archaeologists. Petrie reasoned thus in his interpretation of observed graves of early Egypt:

It appears, then, only reasonable to grant the evidence of the numbers of graves as dating the prehistoric graves to 8,000 to 10,000 B.C. To be asked to end them with the Ist dynasty at 5,500 B.C. is as late as we can ask geology to grant, and we may well put the beginning of that age to 8,000 or 10,000 B.C.

In any case, the suppositions which would bring the 1st dynasty to 3400 B.C., and crowd the prehistoric into a few centuries of time before that, would seem to be quite irreconcilable with the geologic scales of time action.³

The reader should understand that Petrie was not suggesting that the *beginning* of the predynastic age could be dated as late as 8,000 or 10,000 B.C. The graves all contained pottery and the invention of pottery was a notably later development of the predynastic period. One can recognize in the statements of Petrie the conflict of opinion between those who interpreted their data on the basis of evolutionary principles and those who attempted to retain some degree of confidence in the chronology of Scripture. A similar and earlier view was expressed by Budge at the opening of the century:

On early Egyptian chronology opinion was hopelessly divided, the principal reason being that many investigators attempted to confine the whole period of Egyptian dynastic history within the limits assigned by Old Testament history by the impossible system of Archbishop Usher. Those who did this lost sight of the fact [sic] that they were not allowing sufficient time for the rise and growth and development of Egyptian civilization, and they wrote as if they thought that the wonderfully advanced state at which the religion, and art, and sculpture, and architecture, and education, and government of ancient Egypt had arrived at the beginning of the IVth Dynasty [pyramid age] had been reached after the lapse of a few centuries.

No system of chronology which may at present be devised can be accurate in the modern acceptation of the term, and none can ever, with truth, pretend to be approximately so, except in respect to isolated periods of time of relatively limited duration. But the system which will have the best chance of survival, and at the same time be the most correct, seems, judging by the evidence before us, to be that which will take into due consideration the extreme antiquity of civilization of one kind and another in the Valley of the Nile, and which will not be fettered by views based upon the opinions of those who would limit the existence of civilization of ancient Egypt to a period of about 3000 years.⁴

Dates by Creationists Inconsistent

The figures proposed by Petrie and by Budge are as inconsistent with the concept of creation as is the concept of evolution. It is thus strange that many proponents of some form of creationism continue to quote figures for man's origin,

which have a strange resemblance to those given by Petrie and Budge.

The difficulties facing creationists when they attempt to support Scripture as historically reliable for the later period can be traced to this error. Acceptance of the principle of uniformitarianism can be demonstrated clearly as the basis for interpretation of archaeological data in the later period, just as has been true for the predynastic period.⁵ Therefore, as long as the figures for the predynastic period are accepted by creationists, there is little basis for challenging the claimed fixity for later dates.

The net result of accepting this insecure chronology for the later period is that the incidents of Scripture are then set against faulty backgrounds. Obviously discrepancies between Scripture and archaeology will result in such a case. Such discrepancies are then being pointed to as errors and inaccuracies in Scripture.

This unfortunate situation will be eliminated when, *and only when*, creationists recognized that it is not Scripture that needs to be brought into line with archaeological interpretations; rather the interpretations of archaeologists must be brought into line with Scripture. But the attainment of such harmony is impossible so long as a chronology is accepted that is off-set from Bible chronology.

Thus creationists find themselves in increasing difficulty in their attempt to explain why one should have confidence in the creation story, if Scripture cannot be depended upon with regard to the later period of history.

Early Views Reexamined

Strangely, during the interim since the above quotations were written, scholars have been compelled, because of more recent evidence, to revise the date for the beginning of the dynastic period to dates in the era 3300-2850 B.C. The error in the earlier dating of Mena and the beginning of the dynastic period amounts to something over 2000 years.

Hence the question must be raised as to what confidence should be placed in the currently accepted chronology, based on the same principles of interpretation, if such a premise led to an unrecognized error of this magnitude. Actually the earliest of the dates by this more recent dating of Mena is *later than the latest* date regarded as allowable on the basis of the geologic time scales.

What has happened to these geologic scales of time action? The writer has heard nothing about any abandonment of this premise for the interpretation of either geology or archaeology.

Worthy of note is the fact that all of the 2000-year correction of the date for Mena was made by condensing the period previously allotted to

the first eleven Egyptian dynasties. This strange type of correction was necessary because of the assumed "fixity" of the date for the beginning of Dynasty XII.

But if an error of 2000 years or more was made in assigning elapsed time for the first eleven dynasties, then what confidence is to be placed in a chronology for the subsequent period for which *no* error was recognized? This error is greater than for the total period of Egypt's history from the XIIth Dynasty to the fall of Egypt to the Persians in 525 B.C.

In point of fact, the currently accepted date c. 2000 B.C. for the beginning of Dynasty XII is *not* fixed, astronomically or by any other means.⁶ The combined inability of modern scholars to devise a satisfactory chronology of antiquity may be traced to this error of assumed fixation of certain dates. This "fixation" is on the same level as is the assumed "factual" nature of evolution.

Factors Limiting Predynastic Period

As noted in a preceding section, the only limiting factor to the *assumed* rate of cultural development during the predynastic period was the time necessary for the development of man's intelligence, as based upon accepted scales of geologic time. In making the correction for the date for Mena necessitated by data from the newly introduced carbon-14 dating method, an abbreviation of the time allotted to the predynastic was not necessary, since the evidence from this period is obscure in any case. The real pressure on "geologic time" became apparent with the necessary reduction of the period to be allotted to the first eleven Egyptian dynasties, and more specifically for the period of the three dynasties preceding the pyramid age.

With the date for Dynasty XII accepted as "fixed," and with the demand of the evolutionary time scale for maximum time prior to the beginning of the pyramid age (see quotation of Reference #3 above), scholars would evidently have preferred to take all of the 2000 year correction from the time allotted to Dynasties VI to IX. This was not feasible since hardly this amount of time had been allotted to these dynasties.

Hence, a floating chronology has been adopted generally for the early dynastic period which is not at all specific as to time periods to be assigned to individual dynasties. At best, the time squeeze on the evolutionary time scale is of such magnitude as to confirm as rational the concept that the rate of development of man's intelligence was *not* a factor in defining the necessarily allowable time for the period from the flood to the dynastic era. It is thus not surprising that scholars have been exceedingly reticent in recognizing the further reduction of half a millennium in the chronology as proposed by Scharff.

A more recent appreciation of the exceedingly high level of intelligence required to design and construct the Great Pyramid at Giza has not made this evolutionary interpretation of the data any more respectable from a scientific standpoint. Evidently the pyramid builders were quite on a par intellectually with modern man, if not actually excelling the present level of intelligence.⁷

From the creationist point of view, factors limiting the rate of cultural development were in no way related to an increasing intelligence. Man's intellectual abilities had been *deteriorating* since the fall. There is no reason for believing otherwise than that a significantly high level of intellect survived the flood in the persons of Noah and his family.

Furthermore, any scholar should recognize that one cannot possibly judge elapsed time, even as an approximation, on the basis of assumed rate of cultural progress.⁸ Hence, with the rejection of the concept of evolution by creationists, there remains no reason why this group should continue to think in terms of extended time for the predynastic period, beyond the maximal demanded by such factors which *did* control the rate of the observed developing culture.

Since, by the Biblical account, Noah emerged from the ark to face a totally ruined world, with little or no evidence to indicate that there ever had been any previous human culture, his family was obliged to start from zero level in the development of a new culture. *The era represented archaeologically by the first evidence of locally built fires or the use of flint weapons or tools then represents the immediate postdiluvian period.* The rejection of the Noachian flood as historical obscures, in the thinking of evolutionists, the true meaning of this evidence of a near-zero cultural level.

The factors to be considered in estimating the minimal time to the beginning of the dynastic era are thus quite different from those proposed by evolutionists. Two such major factors can be noted. Any others may be disregarded since these can be accounted for within the period necessitated by these two, which are (1) the time necessary for the multiplication of the population to that demanded by the archaeological evidence at the beginning of the dynastic period, and (2) the time demanded for the rise of the ancient mounds of occupation to a point which may be correlated with the beginning of the dynastic period.

Time for Population Growth

On the basis of the stated rapid increase in population,⁹ on the basis that three generations may be allowed to a century,¹⁰ and on the basis of the stated longevity of life in that era,¹¹ multiplication of the population by a factor of ten per

generation is not at all improbable. The population could increase to 10,000,000 during a period of two centuries.

Such a population is more than adequate to account for development of all the archaeological evidence from the era of the opening of the dynastic period. Hence, as far as this limiting factor is concerned, there is no genuine demand for recognizing a period in significant excess of two centuries for the period from the flood to Mena. The small size of villages at the beginning of the dynastic period and the small number of graves for the total period of their duration is in line with such a deduction.

Mounds of Successive Occupation

More significant than population increase, that must be considered in arriving at a minimal figure for the predynastic period back to the flood, is the appearance of many mounds which clearly represent sites of occupation in antiquity. These mound sites are particularly characteristic of areas where construction was of mudbrick.

This situation holds for the areas of Palestine and Mesopotamia and perhaps to a lesser degree for the area to the north of Palestine. These mound sites, in some cases, reach the astonishing heights of 50 feet or more of successive levels of occupation before a level is reached which can be dated to the dynastic period.

At Jericho,¹² for example, a layer of some 13 feet of clay was found above bed rock composed of a series of mud floors, each marked by the mere outlines of foundations of mud dwellings. Above this were the remains of foundations of three successive constructions within the life of a city wall. Above this were the remains of successive constructions amounting, in one place, to twenty-six.

Only above all this was evidence found for the use of pottery representing two distinct cultures in succession, followed by an undefinable period of nonoccupation estimated to have been of perhaps a thousand years duration. Only then was a level reached that could be dated to the dynastic period.

An even more astonishing series of occupation levels was found at the site of Mersin in Anatolia.¹³ Such evidence is regarded as unequivocal proof for the necessary recognition of a plurality of millennia back to any point which creationists can rationally identify with the immediate post-diluvian period. This is the evidence that creationists have not adequately explained within the limits of Bible chronology.

That these occupational levels represent a sequence is not debatable. The same holds true for the relative chronological relations between the levels. Certainly any given level is older than

the one above it and younger than the one below it.

Unfortunately, no such mound has revealed any basis by which absolute dates can be assigned. Deductions for such absolute dates, even as approximations, will depend on the starting premises.

If one starts with the premise of uniformitarianism, one may deduce these time periods amounting to a multiplicity of millennia. By allowing a duration of from 50 to 100 years for a mud-brick structure,¹⁴ and by allowing extended hiatuses as deemed necessary,¹⁵ such extended time periods have been calculated.

But is the premise of uniformitarianism necessary to explain the conditions that existed in the predynastic period? Quite the opposite seems logical according to the evidence at hand. A major factor in the duration of a mud-brick structure is the amount and severity of rainfall. Ceram commented on the instability of such adobe dwellings in *modern* times and under conditions of *sparse* rain:

. . . The buildings which make up these villages are still constructed of bricks of unfired clay—bricks which crumble under the baking sun and slowly dissolve under the sparse rain. . . . Such adobe houses seldom last more than twenty years.¹⁶

What then would be the situation in an area that has even occasional heavier rains? Glueck described an experience while in Arabia where the rain is sparse. The occasion was a terrific *freak* rain storm of very rare occurrence.

. . . In April, 1940, a terrific rain-and hail-storm literally washed half of the mud-brick village (Aquabah) away. Many of the mud-brick walls simply dissolved. . . . Small wonder that such bricks go to pieces during the first heavy rain!¹⁷

Miss Kenyon has given an idea of the relation between rainfall and the rate of rise of these mounds.

. . . The growth of these tells is particularly characteristic of those areas in which the local building material was mud-brick, for a destroyed building of mud-brick disintegrates into mud again, which cannot be used again in the same way that stone from a building can be. The growth of the tell is therefore more rapid.¹⁸

Garstang commented in a similar vein relative to the specific site of Jericho.

Even before the Neolithic settlement a part of the original channel [water-spring] seems already to have become covered, so the earliest floors of occupation within the excavated area were based upon a wet deposit, the traces of which rose through successive floor

levels to a height of 12 or 15 feet. This may explain to some extent why the earlier buildings are found to have been frequently rebuilt. . . . It is true that mud bricks, such as were used throughout the life history of Jericho, were peculiarly liable to decay. . . . Sometimes too, in winter, rain falls very heavily so that unless the outer walls are protected from the elements, they would be liable to perish.¹⁹

Very apparently, rainfall is a large factor in the duration of a mud-brick structure; and under conditions of heavy or frequent rainfall, rebuilding might well be required annually or even more than once a year. If such conditions in the pre-dynastic era can be identified by archaeological research, then one may deduce that the period involved in the numerous reconstructions at the Jericho site may preferably be measured in *decades, not millenniums*.

Archaeological Data on Prehistoric Rainfall

There is abundant archaeological evidence that even areas which are now desert once had adequate rainfall for cultivation of crops ample to support a significant population. Areas, like that of Jericho, which still have an abundance of rain with occasional severe rain storms, may then be presumed to have had a most hostile climate, requiring the rebuilding of dwellings frequently. Excerpts from the archaeological reports are here reproduced as examples.^{20a, b, c, d, e}

. . . It would be interesting to know just what were the changes in climate which led to the abandonment of sites like Ghassul, situated far out in the Jordan plain where the soil could not be irrigated without prohibitive effort. It seems reasonably certain that there were more lateral streams flowing into the Jordan than there are today.

. . . The abundant evidence of ancient occupation in the Baluchi hills or the Indus plain implies less exacting climatic conditions in the past than at present, and, though historical evidence implies that by the time of Alexander conditions in Baluchistan approximated to those of today, yet . . . there is good evidence for a heavier rainfall, and extensive forests in the Indus Valley in ancient times.

In his explorations in Baluchistan these problems of climate and population were, of course, much before Sir Aurel Stein's eyes, and he was able to identify a large series of artificial stone-built dams and terraces, known locally in Jhalawan as *gabarhands*, clearly designed to aid the irrigation of fields. The date of these is unknown but, as Stein remarks, they must reflect not only climatic conditions with a greater rainfall, but also a large popu-

lation to provide the necessary labour for their construction. . . . Even though the age and culture of these works are still unknown, their presence is important in indicating greater rainfall in antiquity, and it is by no means improbable that they do, in fact, date back to the prehistoric occupation of the Baluchi Hills.

. . . There remained in the Sahara and adjacent regions stream channels "not now occupied by water courses" that obviously carried great quantities of water.

And Lot lifted up his eyes, and beheld all the plain of Jordan, that it was well watered every where, before the Lord destroyed Sodom and Gomorah, even as the garden of the Lord, like the land of Egypt, as thou comest unto Zoar.

A dozen settlements of antiquity were observed along the now dry Ghaggan River in the desert area of Bahawalpur in India.²¹ Numerous scholars have observed evidences of a past exposure to torrential rains in areas of the temperate zone.

What Caused Greater Rainfall?

Evolutionists, with their denial of the Noachian Flood, have no satisfactory explanation of these evidences of a notably greater rainfall in the pre-dynastic (Neolithic and Chalcolithic) era. Evolutionists do recognize that such conditions prevailed during the so-called ice age.

However, the ice age of geology belongs back in the Paleolithic where there are no evidences of any significant population. The exceedingly meager evidences of human remains in areas involved in the "ice age," may well be but isolated cases of antediluvian remains.

Otherwise, such limited remains might be evidence of persons who migrated from Ararat into distant regions, and who were overwhelmed by a sudden climatic change in the immediate post-diluvian period. In any case, the confusion of archaeologists lies in the rejection of a world catastrophe which caused a restart from zero cultural level.

A completely satisfactory explanation to this problem is provided by Scripture when one recognizes that the era in question is that of the early centuries of the post-diluvian period. Granting the factual nature of the account of the Genesis Flood, it follows that when the flood waters subsided, the waters were *at first* retained in the natural depressions of the altered geography.

These depressions may well have varied in size from relatively small inland lakes or seas to sizes comparable to some of our modern oceans. Thus distribution of land and water bodies was notably different than that which now exists.

Present conditions have resulted from the rupture of many of the land barriers that earlier confined the early water bodies, the waters having been drained to a more or less degree into what are now the oceans. This explains the many geological evidences of severe, and even violent, drainage. Many such evidences have been noted to confirm this picture.

High water marks on the mountains in the Great Salt Lake area are evidence that waters of this lake were at one time a thousand feet higher than now, and covered a vastly larger area. The same situation has been reported for the water body now known as Lake Victoria in Africa.²²

The Great Lakes seem clearly to be residues of a far more vast inland sea which once may have covered much of what is now the Mississippi Valley. Herodotus possessed legendary evidence that at the beginning of the dynastic period, Egypt was under water as far south as Lake Moeris.²³ Petrie noted evidence that even much of what is now the Sahara Desert was once covered by waters of an inland sea.²⁴

There is legendary evidence, confirmed by archaeologists, that the Persian Gulf and both arms of the Red Sea extended many miles further inland than now.^{25a-e} Evidence of an ancient lake or sea in what is now the Arabian desert has been reported.²⁶

One large factor in the amount and severity of rainfall in a given area is the proximity to water bodies of significant size. A different distribution of land and water areas following the flood may then be regarded as a major factor in producing the climatic conditions in the predynastic era. Change in temperature is also a factor related to rainfall and this factor may also be regarded as having followed the flood.

Correlations made to support the evolutionary concept of the ice ages, and to support the long time period for the predynastic period, are made principally because of the prevalent evolutionary thinking of most scholars. Without a knowledge of the prevailing conditions, it is not possible to estimate the time involved in the formation or recession of the ice flows.²⁷

Problem of Dispersion from Babel

The problem of locating chronologically the incident of the dispersion from Babel has not been given the consideration it deserves in previous attempts to deal with the period between the flood and Abraham. Since the Archaeological Ages have been defined in terms of major changes in culture, such a widespread migration of peoples, as is deducible from the Biblical account of the dispersion, could be expected, above all other such migrations, to be detectable archaeologically.

Obvious reasons for the absence of any serious attempt to deal with this problem are (1) the belief that the incident, like the Noachian Flood, was not an historical incident, or (2) that if factual, the expanded chronology of the predynastic period, as commonly accepted even by some creationists, requires placement of the incident so far back in the predynastic that it would not be detectable archaeologically.

Against the background provided by the evidence given in support of a relatively brief duration of this period back to the flood, the problem has a new significance. Against this background, evidence for the dispersion should be found at a point not significantly distant from the opening of the dynastic era.

Or, conversely, if archaeological evidence exists of an extensive migration out of Mesopotamia into the surrounding territories such as Anatolia, Syria, Palestine and Egypt, such evidence can be used to confirm not only the historical nature of the Biblical account, but also to substantiate the general correctness of deductions in this article as derived from such evidence. The fact that the incident is mentioned in the Mesopotamian inscriptions should be taken as adequate evidence for the historicity of the Biblical account. The inscription has been translated and, in part, reads:

. . . Babylon corruptly to sin went and small and great mingled on the mound. . . . Their [work] all day they founded, to their stronghold in the night entirely an end he made. In his anger also the secret counsel he poured out to scatter [abroad] his face he set, he gave a command to make strange their speech. . . . Violently they wept for Babylon, very much they wept.²⁸

The statement in Genesis 10:25 has been interpreted to refer to the incident of the dispersion dated to the birth of Peleg, a name which means *division*. The figures there given, however, would make the birth of Peleg a scant century after the flood, a period which seems rather short to allow for the necessary increase in population.

The verse has also been interpreted to refer to the division among the people as to whether to accept the decree that there would not be another flood, or to make preparations to meet a repetition of such a possible disaster by building a tower.

If this interpretation is allowable, the limitation of the period to the dynastic as hardly in excess of 200 years remains reasonable. Other scholars have claimed that the division must refer to a division in the geography of the earth. If such an interpretation is demanded, the verse has no significance to the present problem.

Archaeological Data for the Dispersion

That there occurred, late in the predynastic period, an extensive migration of peoples out of Mesopotamia into the surrounding areas of Anatolia, Syrophenicia, Palestine, Egypt and even into the islands of the Mediterranean is clearly detectable archaeologically. The migration can be dated to the so-called *Jemdet Nasr* culture of Mesopotamia, a culture that had but a brief duration.

The migration is evidenced by the appearance of this culture in widely scattered areas. This wide-spread cultural change is taken as the basis for marking the beginning of the Early Bronze Age just before the beginning of the dynastic period. Albright commented on this placement of the *Jemdet Nasr* era.

In the transitional period which led from Late Chalcolithic into Early Bronze I . . . may be placed Stages VII-V/IV on the eastern slope of Megiddo. . . . In Stage V were discovered a number of sherds impressed before baking by cylinder seals with animal and floral designs. They were first attributed by Frankfort to the Early Dynastic I or II of Mesopotamia, but in 1945 Dunand published some thirty similar impressions from the lowest urban level of Byblos which have altered the picture. There can be no question that Dunand is substantially right in correlating them with the *Jemdet Nasr* period in Mesopotamia.²⁹

The proximity to the dynastic period was sufficiently close to allow a provisional date for *Jemdet Nasr* at c. 3000 B.C., which is within the range of those determined by carbon-14 dating for Mena. It is at this very point that the evidences of an intensive migration from Mesopotamia into surrounding areas are to be found. Albright continued:

. . . Towards the end of the fourth millennium [sic] there must have been an exceedingly intensive transfusion of culture going on in the Near and Middle East. Syria and Palestine naturally became the cultural intermediates through which Mesopotamian influences streamed into Egypt in the period just before the First Dynasty, as has been demonstrated particularly by Frankfort and Scharff.³⁰

According to archaeological evidence, at this time, the beginnings of numerous cities in Palestine are a reflection of an extensive migration.

. . . and there can be little doubt but that the new city [Jericho] was founded and fortified by a people migrating either from further north in response to pressure from beyond, or from Mesopotamia itself.³¹

In his more complete work (see note at end of article for availability), the author has provided evidences of this migration from archaeological discoveries in Syria, in Anatolia, in Palestine, and in Egypt. At no other time in the history of the Near East are such clear evidences found for an extensive dispersion from Mesopotamia into these areas. Surely, this is the point of the Biblical dispersion from Babel, and just as certainly has the correctness of these Biblical accounts been confirmed. The logical corollary is that there was *no* extended time between the flood and the dispersion.

Evidence of No Long Time Lapse

In Upper Mesopotamia, remnants of occupational sites have been found that bear names that are recognizably derivable from the names Peleg, Arphaxad, Serug, Terah, Haran and Nahor.³² All these names occur in the lineage of Noah to the time of Abraham.

While cities exist for a significant time duration, there is no reason to suppose that these early sites had durations measured in millenniums. Various cultures of Mesopotamia, later than the very earliest, had pottery which can be used to define the distinction between them. So also in Egypt, in Anatolia, and even in the island of Crete, there are evidences of well-developed pottery in the early predynastic, that in Crete and Mesopotamia reaching back to the earliest Neolithic Age.

The picture is incongruous when one assumes millenniums of time at Jericho before the appearance of pottery. Only Jericho is recognized as illustrating this supposed sequence of food gathering, food cultivation and pottery making. The interpretation is more logical that, if there was a definable sequence at all, the steps followed in some time interval such that no great period of time elapsed between the earliest evidences of man at Jericho and the discovery of making pottery. Certainly a few decades is adequate for the prepottery era at Jericho as well as elsewhere.

According to the Genesis accounts, Mizraim was a grandson of Noah and hence of the same generation as Arphaxad who was also a grandson of Noah. While the age of Mizraim at death is not given, Arphaxad is stated to have lived to an age of 402 years. Granting even half this age to Mizraim, he could have been alive still at the time of the dispersion into Egypt, just before the dynastic period. Egypt and the Egyptians were named by the Hebrews after Mizraim, and legendary evidence, cited by early historians of the Christian era, has been used to identify Mena as the Mizraim of Scripture.^{33a, b}

. . . Mestram was indeed the founder of the Egyptian race, and from him the first Egyptian dynasty must be held to spring.

. . . The memory also of the Mesraites is preserved in their name for we who inhabit this country [Palestine] called Egypt Mestre, and the Egyptians Mestraeans.

Whether the identification is correct or not, it would seem that Mizraim did not belong to an era ending millenniums before the dynastic period.

Summary

Evidence has been noted that, while the predynastic period of archaeology has been popularly interpreted on the basis of evolutionary (uniformitarian) concepts, this early period was actually characterized by a climate totally different from that which now exists. The cause of this different climate is traced to the existence of a totally different distribution of land and water bodies following the flood than now exists.

As the flood waters receded, one could expect that the waters were first confined in natural depressions of the altered geography to form numerous inland lakes and seas. Archaeological evidences of a much heavier and wide-spread rainfall in this early era are thus explained on the basis of more uniform proximity of land bodies to water bodies of significant size.

The originally confined waters have since, in large measure, drained into presently existing oceans, as a result of rupture of the land elevations that confined them. Thus archaeological and geological evidences of severe and even violent drainage, which are observable still, are also explained.

Since mud-bricks used in the construction of dwellings and walls were readily susceptible to decay under such conditions, the rapid rise of these early occupational mounds may be accounted for within a relatively brief period, probably measured in decades rather than millenniums. A period not significantly in excess of 200 years is adequate for multiplication of the population from four families to the population that probably existed, according to archaeological evidence, at the beginning of the dynastic period.

Further evidence to this same end is to be seen in the appearance of well-developed pottery in virtually all areas back into the very early Neolithic period. The assumption that the first appearance of pottery at Jericho is an exception, and that it was preceded by millenniums of cultural development, is thus incongruous.

The belief among the ancients that Egypt and the Egyptians were named after Mizraim, grandson of Noah, and that Mizraim was the same person as Mena, first king of Egypt, is congruous with this view, as is also the discovery of sites in

northern Mesopotamia with names derived apparently from the names of the immediate descendants of Noah.

It is the author's contention that retention of a long period of time for the predynastic is inconsistent with a retention of the accounts of creation and the flood. Such views should be repudiated by all who accept the Scriptural accounts of creation and the flood.

Inconsistencies regarding the predynastic period are due to acceptance of the principle of uniformitarianism, which has been used in setting up a chronological structure for the later period. As currently interpreted, gross compromises of Scripture are practiced. As a result, the incidents of Scripture are being set against faulty backgrounds, and the resulting discrepancies with Scripture are then pointed to as evidence for the unreliability of this source historically.

This situation *can be* remedied, as shown by the author in his more complete work, but not until this later chronology is also "liberated" from the premise of uniformitarianism, and from deductions based on invalid dating methods.

Note

The more complete work referred to in the above article is available as a two-volume set under the title *The Exodus Problem and Its Ramifications* through Crest Challenge Books, Box 993, Loma Linda, Cal. 92354; price per set postpaid, \$9.95 plus tax where applicable.

References

- ¹Courville, D. A. 1971. *The Exodus problem and its ramifications*. Crest Challenge Books, Loma Linda, California.
- ²Kenyon, K. M. 1960. *Archaeology in the holy land*. Ernest Benn, London, p. 56.
- ³Petrie, F. 1920. *Prehistoric Egypt*. British School of Archaeology in Egypt, p. 5.
- ⁴Budge, E. A. W. 1904. *Books on Egypt and Chaldea*. Vol. IX: Neolithic and archaic periods. Kegan Paul, Trench, Trubner & Co., Ltd., pp. 3, 4.
- ⁵See Reference #1.
- ⁶*Ibid.*, Vol. II, p. 46ff.
- ⁷Tompkins, P. 1971. Notes on the relation of ancient measures in the great pyramid (in) *Secrets of the great pyramid*. L. C. Stecchini, Harper and Row, New York, pp. 287ff.
- ⁸Libby, W. F. 1965. Reflections upon the significance of radiocarbon dates (in) *Radiocarbon dating*. F. Johnson, University Press, p. 143.
- ⁹Gen. 9:1, 7.
- ¹⁰Gen. 12:11ff.
- ¹¹*Ibid.*
- ¹²See Reference #2, pp. 39ff.
- ¹³Carstang, J. 1953. *Prehistoric Mersin*. Oxford University Press, London, p. 2.
- ¹⁴Woolley, L. 1955. *A forgotten kingdom*. Penguin Books, Baltimore, Md., p. 84.
- ¹⁵See Reference #2, p. 70.
- ¹⁶Ceram, C. W. 1966. *The secret of the Hittites*. Translation by R. C. Winston. Alfred A. Knopf, New York, p. 6.
- ¹⁷Glueck, N. 1940. *Bulletin of the American Schools of Oriental Research*, No. 79, p. 12.
- ¹⁸See Reference #2, pp. 30, 31.

- ¹⁹Garstang, J. and J. B. E. Garstang. 1948. The story of Jericho. Marshall, Morgan & Scott, Ltd., London, pp. 57, 58.
- ^{20a}Albright, W. F. 1961. The archaeology of Palestine. Pelican Books, Baltimore, Md., p. 69.
- ^bPiggott, S. 1961. Prehistoric India. Pelican Books, Baltimore, Md., pp. 67, 68.
- ^c*Ibid.*, p. 69.
- ^dVelikovsky, I. 1955. Earth in upheaval. Doubleday & Co., Garden City, New York, *Op. cit.*, p. 135.
- ^eGen. 13:10.
- ²¹See Reference #20b, pp. 133, 134.
- ²²See Reference #20d.
- ²³Herodotus. The histories. Penguin Books, Baltimore, Md., p. 106.
- ²⁴See Reference #3, p. 46.
- ^{25a}Hoggarth, D. G. 1899. Authority and archaeology. Sacred and Profane, John Murray, London, p. 20.
- ^bVan Beek, C. W. 1952. Recovering the ancient civilization of Arabia, *The Biblical Archaeologist*, Vol. XV, p. 17.
- ^cSee Reference #20d.
- ^dErich, R. W. Editor. 1954. Chronologies in old world archaeology, *The Relative Chronology of Mesopotamia*. . . . Edith Porada. University of Chicago Press, p. 135.
- ^eGlueck, N. 1940. The other side of the Jordan. American Schools of Oriental Research, New Haven, Conn., p. 90.
- ²⁶See Reference #20d, p. 95.
- ²⁷See Reference #8, p. 148.
- ²⁸Sayce, A. H. Editor. 1876. Records of the past. New Series. Vol. VII, Assyrian Texts, London, p. 131.
- ²⁹See Reference #20a, p. 71.
- ³⁰*Ibid.*
- ³¹See Reference #19, pp. 76, 77.
- ³²Merdenhall, G. E. 1948. Mari and the patriarchs, *The Biblical Archaeologist*, Vol. XI, p. 16.
- ^{33a}Manetho. Translated by W. G. Waddell. 1956. Harvard University Press, Cambridge, Mass., p. 9.
- ^bJosephus, F. Translation by W. Whiston. John C. Winston Co., Philadelphia, Bk. I, Chap. VI, paragraph 2.

ADDITIONAL NOTES CONCERNING THE LEWIS THRUST-FAULT

CLIFFORD L. BURDICK*

A paper, "The Lewis Overthrust," by Burdick appeared in the September, 1969 issue of the *Creation Research Society Quarterly*. Field data was reported that had been gathered in recent years from study of the so-called thrust contact along the visible exposures. The standard physical evidences for thrust or low angle faults are: 1) mylonite or ground-up rock along the upper and nether plates of the natural mill, 2) tectonic breccia, or angular fragments of rock along the contact, and 3) slickensides, or grooves made by the differential movement. In the exposures visited these criteria were missing; therefore the author concluded that the Lewis block may not be a genuine overthrust.

In the summer of 1973 geologists Malcolm Fargher and Walter Peters accompanied the field trip sponsored by the Bible-Science Association under the personal direction of Rev. Walter Lang. Fargher reported the existence of slickensides and other physical criteria in the vicinity of the thrust contact, thus perhaps causing a re-evaluation of previous conclusions regarding the Lewis Overthrust.

Accordingly a special plane was chartered to fly Fargher and Burdick to the scene in October, 1973. Geoffrey McMahon kindly offered to pilot the plane and, as it turned out, pay for a large portion of the expense of the trip.

Introduction

For some time thrust faults have been accepted as a matter of course where the evolutionary order of the fossils in the rocks was inverted, without much recourse to study of the physical criteria. This point of view is well illustrated in a book by Nicholson:

It may be said that in any case where there should appear to be a clear and decisive discordance between the physical and paleontological (fossil) evidence as to the age of a given series of beds, it is the former that is to be distrusted rather than the latter.¹

This concept of the "taken for granted" certainty of the evolutionary sequence quite permeated the science of geology. This attitude was further emphasized by Billings:

Parts of some of the great overthrusts in the Alps were so devoid of slickensides, gouge, and mylonite that they passed unnoticed and were for a time mapped as sedimentary contacts. It was only after paleontological evidence was obtained . . . that the existence of the great faults was recognized.²

Eventually some geologists recognized the illogical course others had taken, wherein certain lines of evidence were ignored.

Structural Studies

Some years ago a mechanically minded geologist and engineer by name of Field called atten-

*Clifford L. Burdick, M.S., is a consulting geologist, and lives at 924 N. 6th Ave., Tucson, Arizona 85705. Partial support funds for field research were allocated from the Research Fund of the Creation Research Society.

tion of paleontologists and others willing to listen that, even with the most competent rock, there was a theoretical limit to the size of a block of rock that could be pushed over another block. Field maintained that as the size of the block to be moved increased, so would the energy required to move such a block.

Further he pointed out that on the average rock surface, the crushing strength of rock would be exceeded after the block of the thrust exceeded about half a mile. With larger thrust blocks, supposing sufficient moving force, the thrust block would fracture and end up a mass of rubble, with little if any forward movement.

This interpretation jolted paleontologists and stratigraphers. Evolutionism was at the crossroads—some adequate mechanical solution must be discovered, or biological evolution was clearly in deep trouble, and would soon become merely another speculation that failed the test; the assumed evolutionary sequence of advancing life during the geologic ages as evidenced supposedly by the fossils in the rocks would end up as just that—another assumption.

Some scientists began to wonder how such vast blocks of the earth's crust could be moved over foundation rocks without disturbing the overall horizontal stratification of the beds, without faulting and indeed making a mass of rubble of the whole block. The writer first began to doubt the validity of these giant so-called overthrusts upon hearing a remark Dr. Leith, structural geologist, made in class at the University of Wisconsin: "I often wondered what giant lubricator was used to enable such giant blocks of earth's crust to slide over their base without rendering the beds a mass of rubble."

A. C. Lawson stated that there is a limiting factor on the theoretical size of overthrust blocks beyond which no rock was strong enough to withstand the stress without crushing:

This estimate . . . serves to indicate an approximate limit to the extent of a thrust plane in the direction of slip. . . . It is apparent that the mechanics of an overthrust are not well understood, or that these thrusts are not overthrusts.³

The writer's observations concerning true overthrusts, where the physical criteria are evident, is that the thrusts are of small size, perhaps half a mile in width, such as the Santa Rita Overthrust.

William Bowie,⁴ of the U.S. Coast and Geodetic Survey, has spent much time in the study of isostasy and the mechanics of earth movements and appears well qualified to express an opinion, "The theory that a mountain system has been caused by lateral thrusts originating from a distance supposes a very anomalous condition."

Hubbert and Rubey⁵ have studied the mechanics of earth thrusts and have concluded that, for large thrusts, the pressure required to move blocks of earth crust would far exceed the crushing strength of the most competent rock unless some compensating factor were discovered that would help to equalize the stress required. They advanced the *theory of pore water pressure* to partially float the thrust plate, thus reducing the coefficient of friction.

However, since the specific gravity of most rock is at least 2½ times that of water, pore water pressure could not entirely eliminate friction.

K. J. Hsu⁶ pointed out that Hubbert and Ruby had overlooked the coefficient of cohesion factor. Unfortunately, instead of pursuing the more straightforward approach of discarding the "must order" of fossils, Hsu tried to invent a more difficult solution, that of flowage at 300-400 degrees centigrade. He thus introduced metamorphism, which is not applicable certainly in much of the Belt Series sedimentary strata overlying the Cretaceous shale or limestone of Glacier Park. The more or less horizontal sedimentary stratification is not disturbed enough for flowage.

The present writer has not studied the good thrust contact on Chief Mountain, but some years back Dr. Walter Lammerts⁷ did make such an examination and photographed a regular sedimentary contact with only a few inches of clay along the contact, which is common along unconformities or paraconformities, representing a change of type of sedimentation, or an hiatus between pulses of the same type.

Recent Observations

Burdick reported, in the September 1969 issue of the *Creation Research Society Quarterly*, observations made at various points along the thrust contact of the Lewis Overthrust where the actual contact was visible.

1) **Marias Pass:** Here is a definite unconformity, where the underlying Cretaceous shale has been faulted and has a westward dip of about 45 degrees. The contact between the overlying Altyn dolomite and the underlying Cretaceous shale was examined.

Although dipping at about 45 degrees westward, the Cretaceous surface had been eroded and truncated before the overlying Belt Series dolomite was precipitated. Subsequent to the Altyn precipitation both strata were again warped or tilted a few degrees further westward; however, at the contact, there was no physical sign of differential movement, such as gouge, breccia or slickensides.

The Appekunny formation, overlying the Altyn, consists of greenish shales and argillites; and, on top of that, lies the red Grinnell argillites, a very conspicuous formation.

Although no apparent movement has occurred at the Precambrian-Cretaceous contact, there is plenty of evidence of movement in the Belt Series, caused by or accompanied with strong metamorphism. (The term *argillite* signifies a metamorphosed shale or slate.)

The movement has indeed been so intense that in places the original flat-lying shales have been raised 90 degrees and stand on edge, similar to the vertical slabs in Mount Ishbell near Banff in Canada. The rotational metamorphic movement has in one place thinned out the Altyn dolomite to a thin sliver.

All in all Marias Pass is not a place to study thrusting but metamorphism, and it is not along the so-called thrust contact, but above that between Precambrian Belt series formations. The movements were more rotational than translational.

2) **Dry Creek at Two Medicine:** This location has been studied several times. There is a very striking contact where the Altyn dolomite lies on the black Cretaceous shale; a sharp contact with no ground-up rock, breccia, nor physical evidences of a giant thrust as one might suspect.

In the summer of 1973 United Nations geologist Malcolm Fargher visited the location with the Bible Science field trip. He subsequently reported what he believed to be evidences of thrusting. This necessitated another visit to the location promptly before Malcolm returned to the Isle of Man.

A special expedition was hastily organized. Mr. Fargher had not visited the Marias Pass contact, but he pointed out places in the area where both Cretaceous shale and Precambrian Altyn dolomite had been disturbed and deformed, though not at the same locations. If the shale had been much disturbed to the point of metamorphism, we would have found schist rather than shale.

Mr. Fargher pointed out that much of the overlying dolomite had been deformed to the point of brecciation, even low grade metamorphism. The crushing and brecciation was local, however, which helped explain why no gouge layer appeared at the Precambrian-Cretaceous contact.

At the Cretaceous contact, the rock was not sufficiently competent—it had been crushed and brecciated before it could be translated as a thrust block. There was no uniformity of tectonic activity along various contacts of the Lewis overthrust, as one would expect if the thrust block had acted as a unit. Deformation was local in character and varied from place to place.

About a mile south of the Dry Creek contact, the Altyn had been tightly folded into sharp

anticlines at two places. Thus one can conclude that the crushing strength of the Altyn had been surpassed long before a major thrust could develop.

3) **Roes Creek Contact:** This contact had been visited many times. In *The Geological Story of Glacier National Park*, James Dyson has written, concerning the Roes Creek contact:

At only one location does a trail provide a close approach to the actual contact between Belt and Cretaceous rocks. The latter site occurs along Roes Creek only a few hundred yards from Rising Sun campground.

A razor-sharp contact is apparent between the underlying black Cretaceous shale and the overlying buff colored rock which at first appeared to be the Belt Series dolomite, indicating a sedimentary contact rather than a thrust fault contact. The Cretaceous shale was replete with clam shells, some index fossils for the Cretaceous.

In the summer of 1973 Malcolm Fargher had critically examined this area, and concluded that what appeared to be Altyn dolomite was actually limestone, and perhaps not Belt Series rock at all. Near the contact the rock in question actually had contained sea shells, and inside was black in color like the shale; yet, the mineral composition was definitely neither Cretaceous shale nor Belt Series Altyn dolomite. The final conclusion seemed to be that many contacts, along radically distinct types of rock, contained mineralogy of both rocks. This appeared to be true of Roes Creek. However there was no evidence of thrusting.

4) **Cut Bank Contact:** This contact, well up on a mountain side had been pointed out to this writer on previous trips but had not been reached because of a swiftly running stream. However, in the summer of 1973, Mr. Fargher found the shortest route to the contact up a canyon where a branch stream flowed down the mountain.

This contact line was different from anything previously seen in the Park by the author. The contact was razor sharp, with no gouge, nor brecciation in the overlying Altyn dolomite, as had been the case at Dry Creek. But at Cut Bank the situation was reversed—the underlying Cretaceous shale had been severely broken and brecciated.

Had this been caused by overthrusting, both surfaces should have been brecciated, with slickensides and gouge. Therefore a logical conclusion would be that the brecciation of the shale took place before the overlying Altyn had been deposited. So here again the evidence does not appear to fit the thrust fault model at all.

5) **Crowsnest Pass:** This is located along the highway at the Continental Divide at the bound-



Figure 1. Altyn dolomite (light colored) resting on black Cretaceous Shale. Altyn dolomite is overlain by metamorphic Grinnell Precambrian Schist-movement apparently involved Precambrian rock, not along supposed thrust plane.



Figure 2. Thrust contact: Altyn-Proterozoic Precambrian dolomite resting on black Cretaceous shale at Dry Creek-Two Medicine location.

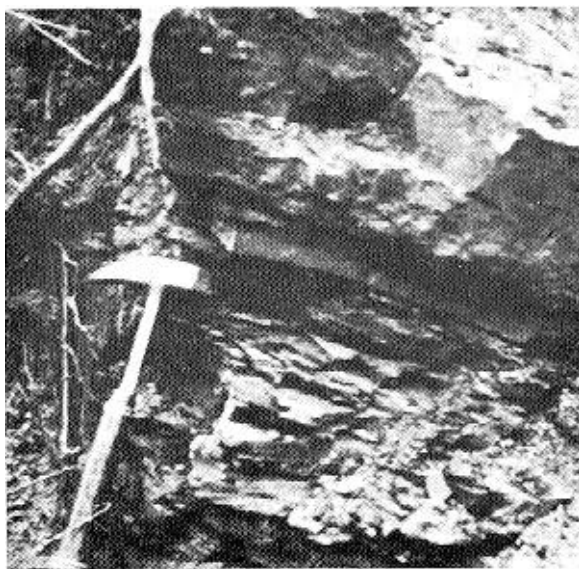


Figure 3. Roes Creek contact, Glacier Park. This is a knife-blade contact between the lower formation of cretaceous shale and overlying limestone. (The junction, slightly convex upward, extending from just over the head of the hammer, can be seen much better in color; the two kinds of rock being different.) The overlying rock actually contains some fossils, and seems to be a transition bed with some features of both Cretaceous and Belt Series rocks.

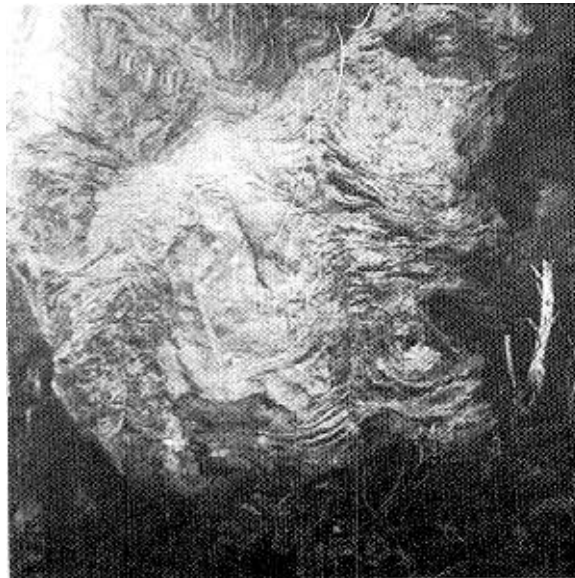


Figure 4. This shows the Colenia Algae, an index fossil for the Precambrian Belt Series rocks near Logan Pass, near Continental Divide.

ary between Alberta and British Columbia. Here the overlying Precambrian Belt Series Altyn lies apparently conformably on the underlying Cretaceous limestone which is coal-bearing at the mining town of Frank, where a disastrous slide buried the town half a century ago.

A sharp contact is visible although the rock beds lie at an angle of about 40 degrees. There is a very slight brecciated seam of an inch or so, as one would expect from the differential movement due to folding. However no thrust-fault evidence.

Conclusion

To sum up, the following by Dr. R. C. Emmons of the Geology Department of the University of Wisconsin seems appropriate:

Under-thrusting and upwelling appear to have bypassed the usual period of scrutiny, into one of intransigent acceptance, and are widely invoked, though unestablished in the geologic literature, as for example is over-

thrusting. Both vagrant concepts have assumed a sacrosanct status under geophysical husbandry that denies communion to opposition.⁸

References

- ¹Nicholson, Henry Alleyne. 1897. Ancient life history of the earth. D. Appleton Co. New York, N. Y., p. 40.
- ²Billings, Marland P. 1955. Structural geology. Prentice-Hall, New York, N.Y., p. 151.
- ³Lawson, A. C. *Bulletin of the Geological Society of America*. 1922. Bulletin 33, p. 340.
- ⁴Bowie, William, Isostatic investigations, etc. Special Publication 99, 1924. U.S. Coast and Geodetic Survey.
- ⁵Hubbert, M. King and William Ruby. 1965. Role of fluid pressure in mechanics of overthrust faulting, *Bulletin of Geological Society of America*, p. 470.
- ⁶Hsu, K. J. 1969. A preliminary analysis of the statics and kinetics of the Glarus overthrust, *Ecology Geologicae Helvetiae*, 62:143-154.
- ⁷Lammerts, Walter E. 1972. The Glarus overthrust, *Creation Research Society Quarterly*, 8(4):251-255.
- ⁸Emmons, Dr. R. C. 1973. Underthrusting and overthrusting, *Geotimes*, Washington, D. C.

VARIATION AND FIXITY IN NATURE

FRANK L. MARSH*

This article is the substance of a paper delivered at Lansing Community College, Lansing, Michigan, in October, 1973, as part of a Special Creation-Evolution Seminar, and is presented here as being of interest to a larger number of people. Using quotations from writers who assume evolution, the author points out that there is no evidence, from fossils or from anything else, for the vast changes between kinds, which are required according to the evolution model. The evidence may be used much more conclusively to support the special creation of the various kinds, followed, in some cases, by their limited diversification.

Introduction

I am most appreciative of this opportunity of speaking to you on the subject of origins. We might gain the impression occasionally that there are really a great many points of view on this subject. However, with regard to which views are really of importance in this fair land of ours, I think my erstwhile professor of zoology at the University of Chicago, Dr. Horatio Hackett Newman, very definitely cleared the air, as follows:

There is no rival hypothesis [to evolution] except the outworn and completely refuted one of special creation, now retained only by the ignorant, the dogmatic, and the prejudiced. (p. 407, *Outlines of Zoology*)

(Once upon a time, after he had written this book, I received an A in a course on genetics under Dr. Newman because no opportunity had arisen for him to discover that I was a special creationist.)

*Frank L. Marsh, Ph.D., is Professor Emeritus of Biology at Andrews University, and lives at 216 Hillcrest Drive, Berrien Springs, Michigan 49103.

In titling this present Seminar on origins, I note that you agree with Newman as to which points of view in this specific area are the most important. Your name for this course reads, *Special Creation—Evolution Seminar*. I am delighted to know that among the professors of Lansing Community College (LCC) there is a breadth of mind which leads them to wish to study both sides of the problem of origins.

To discover from whence we came, I submit, is a very honorable quest. Some extremely important matters of the present time, and of the future, hang upon our origin as an order of beings. Tonight for a few minutes I invite your thinking upon this important topic by way of observable variation and fixity among fossil and living things.

One of the obvious characteristics of our living world, which make it so attractive to most of us, is the fact of variation in color, form, and structure. What a delight it is to stroll down the aisles of a good dog, or cat, or pigeon, or rabbit show, and along the lanes of the horse, cattle, pig, and

sheep barns of our fairgrounds, to study the multitudinous varieties present.

And then, to saunter through the horticultural, field-crop, and floral exhibits and to behold the wide variation in corn, and wheat, and tomatoes, and beans, and roses, and gladioli, and dahlias might lead us to conclude that there is just *no limit* to the variation and change which can be produced in our domesticated plants and animals.

The naturalist who wanders the fields and swamps and woods and deserts experiences amazement as he sees the extent to which variation has proceeded in natural habitats without assistance from the plant or animal breeder. For example:

- 1) Hitchcock lists 64 species of bluegrass in the United States.
- 2) Gray lists 17 species of the common thistle, and 51 species of violets.
- 3) Sargent catalogs 24 species of willows, 54 species of oaks, and 153 species of hawthorn or red haw.
- 4) Walker lists 12 species of true cattle in the world.
- 5) Hall and Kelson list, for the United States, 66 subspecies of the deer mouse, and 66 subspecies of the northern pocket gopher, and 214 subspecies of the southern pocket gopher.
- 6) Over 30 subspecies of the song sparrow have been cataloged across the United States.
- 7) Griffith Taylor names 160 distinct breeds of men on the earth.

If variety is the spice of life, then we live in a delightfully flavorful world.

In Contrast: What Darwin Was Taught

With us who are so accustomed to live in a world where just about every domesticated plant and animal is a latest improved hybrid, and where new varieties bloom on almost every sod and in every flower bed, it is hard to recall that even as recently as the early 19th century educated people were taught in some universities that in the world of living things variation *did not occur*.

This was still the point of view of the theological teachers at Cambridge in the late 1820's when Charles Darwin was studying for a degree in theology in that school. He was told that Genesis taught that in reproduction the offspring were exactly like their parents.

Furthermore, he was told at Cambridge that according to Genesis (we marvel that it would appear that he never read Genesis for himself) the plants and animals of his day had been created as they then appeared and in the places they occupied in the late 1820's. At this we are nonplused because no statement is found in the entire Bible which presents a picture of such immobility in the busy world of living things.

The sequel constituted a great tragedy for the civilized world when Darwin actually observed, on his voyage around the world, that variation *did* occur within the kinds in the form of geographical races, and because of this observation concluded that Genesis was wrong. Even to our day misinformed individuals are of the opinion that in his recognition of variation within basic types, Darwin disproved Genesis.

Actually all Darwin disproved was the inaccurate interpretation of Genesis given by the scholastics. Even Genesis 1:12 RSV, "The earth brought forth vegetation, plants yielding seed according to their own kinds," does not begin to suggest that no variation within kinds could occur.

After Darwin discovered an abundance of field evidence that variation *was* occurring among plants and animals, and had finally refused Genesis as misinterpreted to him by the schoolmen, he permitted his imagination to run most unscientifically without let or hindrance. His mind appears to have experienced an emancipation, and he reminds us of a small boy with a new toy.

By his fantastic speculations he became the "great emancipator" of the imaginations of men of science. In fact he claimed to recognize no law-bound necessity or force in nature—and men of science fell upon their faces before him.

In his first edition of *Origin of Species*, page 165, Darwin writes of bears swimming in North American rivers and snapping at insects in the water. He wrote that it was not impossible that, if this kind of food were abundant and there were no serious competition, some of the bears would become aquatic animals and would gradually acquire larger and larger mouths, eventually becoming as monstrous as whales.

True, Darwin modified these statements in later editions, but the sky was still largely his limit when he began to speculate. This mantle of freedom with regard to the building of hypotheses has fallen upon the majority of scientists today, and they, with Darwin, speak fantastically of unlimited variations.

Extremes of Men's Thoughts

Throughout history man has ever shown a tendency to swing in his opinions from one extreme to the other. With regard to origins, the theologians from the 17th to the middle 19th centuries, became progressively narrower and more dogmatic in their doctrine of an unbiblical fixity among individual plants and animals, meanwhile holding all scientists in extreme bondage to authority by threat of excommunication.

Then with the arrival of the middle of the 19th century, Darwin became a Pied Piper of Hamelin (Down), who with an offer of freedom from authority, drew men of science to the other ex-

treme of unlimited variation among organisms. But alas! The men of science had traded belief in an unnatural low-level fixity for an obsession of unnatural unlimited progression. All that was necessary for a blob of protoplasm to become a man was merely sufficient time.

Accompanying this more recent swing in scientific opinion is a raw, discriminatory dogmatism in academic circles which only he who has had the courage to stand against the scientific majority can describe for you. The dogmatism of the Dark Ages pales into insignificance in comparison with that manifested in many of our modern universities where higher degrees in science are denied those who dare to refuse an hypothesis of organic evolution.

Perhaps you would like to read a book filled with the experiences of these young scientists who, because they would not fall down and worship the sacred cow of modern speculative scientism, have been banished from the popular halls of learning. This minority group is branded, "ignorant, dogmatic, and prejudiced," because they cannot accept the concept of unlimited progression.

Let us assume that for the moment each of us is a very rare individual, for instance a biological scientist interested in the natural *facts* of variation. Since the far day when the schoolmen tried to harmonize Genesis with Aristotle and Galen, and more recently when the scientific world through the accurate observations of Darwin, appears first to have become aware of variation among plants and animals, a vast amount of knowledge has come to light with regard to the changes which actually occur among living organisms of the world.

Let us take an over-all, up-to-date survey of the appearance of the plants and animals of the world through the eyes of an outstanding evolutionist of our day, Theodosius Dobzhansky, presently professor of genetics in the University of California at Davis:

Organic diversity is an observational fact more or less familiar to everyone. It is perceived by us as something apart from ourselves, independent of the working of our minds. Individuals, although limited in existence to an interval of time, are the prime reality with which a biologist is confronted. While the uniqueness and unrepeatability of individuals are aspects falling primarily within the province of philosophers and artists, the scientist concentrates his attention on their similarities and differences. Indeed, a more intimate acquaintance with the living world discloses a fact almost as striking as the diversity itself. This is the discontinuity of the variation among organisms.

If we assemble as many individuals living at a given time as we can, we notice at once that the observed variation does not form any kind of continuous distribution. Instead, a multitude of separate, discrete, distributions are found. In other words, the living world is not a single array of individuals in which any two variants are connected by unbroken series of integrades, but an array of more or less distinctly separate arrays, intermediates between which are absent or at least rare. Each array is a cluster of individuals, usually possessing some common characteristics and gravitating to a definite modal point in their variations. (pp. 3 and 4, *Genetics and the Origin of Species*, Revised Edition)

Thus we discover that variation does not occur in straight lines without limit, but rather, a discontinuity is present which divides the variants of one basic kind, or separate array, from those of another basic kind, or separate array. I believe that if Charles Darwin had had this information he would not have committed himself to an hypothesis of unlimited variation which assumedly developed the complex and specialized from the simple and generalized.

Fact: Discontinuity of Variation

When thinking of the individual organisms in the world we must always bear in mind the easily observable fact of discontinuity of variation. Even he who runs can distinguish a horse from a cow, a man from a chimpanzee, a rose from a camellia, wheat from oats, maples from oaks, and so on.

Really ancient accounts of origins, in so far as they actually did mention origins and did not merely assume things already in existence, seem to have been accounts of creation. As early as the time of the Greek philosophers, however, in the 4th and 5th centuries B.C., there were theories which today would definitely be classed as evolutionary.

Even some of the Christian fathers, especially Augustine, wrote things which could be interpreted as borrowing some form of evolution; and the philosophers of the Middle Ages tended to follow the lead set by their predecessors. However, in the 16th century the Catholic Church was led back to a literal Genesis largely through the leading of the Spanish theologian Francisco Suarez.

In the 18th century the French naturalist, Charles Bonnet, set forth what is usually termed the first "scientific" theory of creationism. In his popular view all living things, from microbe to man, could be arranged in a linear series, a Ladder of Being, according to the complexity of their bodies. The position of Bonnet, of course, was an

echo of Aristotle. This view was finally overriden in the same century by the scientific findings of the creationists Linnaeus and Cuvier.

Then came Charles Darwin with his eventual concept of no law-bound force in nature. He adopted this point of view completely; and, being a "supersalesman," he was able to persuade scientists quite generally so that the majority swung to the intriguing idea that all living things had developed from a progression of simple toward more complex or specialized.

Bonnet's concept of a Ladder of Being could not hold up against the later discoveries in comparative anatomy. I ask you, friends, how does the concept of progression hold up against the universal and easily observed biological fact of discontinuity in both the living and fossil world?

I believe the obsession of organic evolution which has laid hold upon the minds of scientists has caused them to overlook the tremendous significance of discontinuity. The caution of the English evolutionist G. A. Kerkut, is apropos here:

It might be suggested that if it is possible to show that the present-day forms are changing and evolution (microevolution) is occurring at this level, why can't one extrapolate and say that this in effect has led to the changes we have seen right from the Viruses to the Mammals? Of course one can say that the small observable changes in modern species *may* be the sort of things that lead to all the major changes, but what right have we to make such an extrapolation? We may feel that this is the answer to the problem, but is it a satisfactory answer? A blind acceptance of such a view may in fact be the closing of our eyes to as yet undiscovered factors which may remain undiscovered for many years if we believe that the answer has been found. (p. 154, *Implications of Evolution*)

I think these words of evolutionist Kerkut are very wise words.

The extremely serious problem for believers in origin by progression is the lack of connecting links between the major taxonomic categories, i.e., between the families, orders, classes, and phyla. If you have read Darwin, you know this lack caused him very serious concern because a universal lack of connecting links was a lethal blow to his idea of organic evolution. Evolutionists characteristically, when other lines of evidence fail to demonstrate a possibility of production of new basic types, fall back upon paleontology.

Evolutionists Rely on Paleontology

A number of years ago, Dobzhansky and I exchanged some eight letters, nine his way and eight my way, in a discussion of variation and

fixity. I pressed him to give me even one coercive laboratory proof of macroevolution having occurred among living organisms. He explained to me, with consummate patience, that because of the universal discontinuity between groups of living plants and animals it was impossible to give any specific cases where organic evolution could be or had been observed to occur.

Dobzhansky wrote that evolution, like all historical facts, could not be reproduced in the laboratory. We had to accept it by faith. However, he said that evolution can be demonstrated paleontologically by the presence of connecting links between basic kinds among the fossils. He told me that his friend George Gaylord Simpson had just written a new book, *Tempo and Mode in Evolution*, which to him explained the fossil evidence for evolution very satisfactorily.

I hastened to secure a copy of the Simpson book, and found some most interesting assertions about the evidence among the fossils. For example:

The facts are that many species and genera, indeed the majority, do appear suddenly in the fossil record, differing sharply and in many ways from earlier groups, and that this appearance of discontinuity becomes more common the higher the level, until it is virtually universal as regards orders and all higher steps. . . .

The face of the record thus does really suggest normal discontinuity at all levels, most particularly at high levels, and some paleontologists . . . insist on taking the record at this face value. Others . . . discount this evidence completely and maintain that the breaks neither prove nor suggest that there is any normal mode of evolution other than that seen in continuously evolving and abundantly recorded groups (microevolution). This essentially paleontological problem is also of crucial interest for all other biologists, and since there is such a conflict of opinion, nonpaleontologists may choose either to believe the authority who agrees with their prejudices or to discard the evidence as worthless. (p. 99, *Tempo and Mode in Evolution*)

As you may well imagine, I hastened a letter off to my friend Dobzhansky, enclosing this quotation and several other similar statements from his friend Simpson's new book, and asked him to tell me how he could say that the fossil record demonstrated evolution when the same discontinuity between living types which, according to his statement, made a demonstration of evolution impossible, was present also between basic types in the fossil record.

That question is the reason why in our correspondence there were nine letters from me to

him and eight from him to me. He never answered my ninth letter. I assume he concluded by that time that I was just too dumb and dull to perceive evidence for evolution even when it was plainly before me.

Because paleontology is thought by most unread evolutionists to be the mother city of the strong which demonstrates in a coercive way the assumed fact of organic evolution, I will read to you assertions from several other well-known paleontologists. All these authorities are evolutionists. But, first, I will read another statement from Simpson's book:

As it became more and more evident that the great gaps remained, despite wonderful progress in finding the members of lesser transitional groups and progressive lines (microevolution), it was no longer satisfactory to impute this absence of objective data entirely to chance. The failure of paleontology to produce such evidence was so keenly felt that a few disillusioned naturalists even decided that the theory of organic evolution, or of general organic continuity of descent, was wrong, after all. (p. 115, *Tempo and Mode of Evolution*)

In Simpson's book, *The Major Features of Evolution*, written nine years later, we read:

In spite of these examples, it remains true, as every paleontologist knows, that most new species, genera, and families, and that nearly all new categories above the level of families, appear in the record suddenly and are not led up to by known, gradual, completely continuous transitional sequences. (p. 360)

In his text, *An Introduction to Paleobotany*, Chester A. Arnold wrote:

It has long been hoped that extinct plants will ultimately reveal some of the stages through which existing groups have passed during the course of their development, but it must be freely admitted that this aspiration has been fulfilled to a very slight extent, even though paleobotanical research has been in progress for more than one hundred years. As yet we have not been able to trace the phylogenetic history of a single group of modern plants from its beginning to the present. (p. 7)

Austin H. Clark, for many years an invertebrate zoologist and paleontologist with the National Museum in Washington, D. C., remarked:

When we examine a series of fossils of any age we may pick out one and say with confidence, "This is a crustacean"—or starfish, or a brachiopod, or annelid, or any other type of creature as the case may be. . . .

Since all the fossils are determinable as members of their representative groups by

application of definitions of those groups drawn up from and based entirely on living types, and since none of these definitions of the phyla or major groups of animals need be in any way altered or expanded to include the fossils, it naturally follows that throughout the fossil record these major groups have remained essentially unchanged. This means that the interrelationships between them likewise have remained unchanged. (p. 100, *The new Evolution—Zoogenesis*)

Alfred S. Romer, veteran paleontologist of Harvard, has written:

The chances of obtaining a complete graded series (if one existed) are hence obviously vastly less than in the case of more normal phyletic evolution (microevolution). "Links" are missing just where we most fervently desire them, and it is all too probable that many "links" will continue to be missing. (p. 114, *Genetics, Paleontology, and Evolution*)

Norman D. Newell of the American Museum of Natural History, has remarked in the *Proceedings of the American Philosophical Society*:

These finds (of assumed connecting links) are, however, rare; and experience shows that the gaps which separate the highest categories may never be bridged in the fossil record. Many of the discontinuities tend to be more and more emphasized with increased collection. (p. 103, Vol. 103, No. 2)

D. Dwight Davis, curator of vertebrate anatomy, Chicago Natural History Museum, has made the following frank statement about the fossil evidence:

The sudden emergence of major adaptive types, as seen in the abrupt appearance in the fossil record of families and orders, continued to give trouble. The phenomenon lay in the genetical no-man's land beyond the limits of experimentation. A few paleontologists even today cling to the idea that these gaps will be closed by further collecting, i.e., that they are accidents of sampling; but most regard the observed discontinuities as real and have sought an explanation for them.

But the facts of paleontology conform equally well with other interpretations that have been discredited by neobiological works, e.g., divine creation, innate developmental processes, Lamarckism, etc., and paleontology by itself can neither prove nor refute such ideas. (pp. 74 and 77, *Genetics, Paleontology, and Evolution*)

These statements are typical of what one finds throughout paleontological literature. Here among the fossils, the assumed history of the past, we are not dealing with subjective matters but with real objects which we can see with our eyes and handle with our hands.

And behold the discontinuity between clusters of forms is every whit as striking and universal as it is among living forms. True connecting links are found only between groups which are obviously all members of the same basic life form. Individuals of each basic type possess common morphological characteristics, and, as Dobzhansky expressed it, "gravitate to a definite modal point."

Some Connecting Links Proposed

In paleontological literature one occasionally comes across the assertion that such and such a fossil is the connecting link between two otherwise discontinuous groups. *Archaeopteryx* is an example. Progressionists often assert that it is the link between reptiles and birds. But the careful student of origins will perceive that in making such a statement the scientist departs from demonstrable science and becomes a speculator who may be thinking wishfully.

Actually many more fossil specimens than the *Archaeopteryx* would be necessary to demonstrate that birds developed from reptiles. Where intergrades *do occur* among the fossils, as for instance among ammonites, it would appear that the paleontologist is dealing with a polytypic species in which all the individuals are variant members of a single basic type.

Among living organisms when we find intergrades between two groups we know that the individuals are actually all members of a single larger genetical group. In paleontology the *Archaeopteryx* and all other assumed connecting links may well be independent basic types.

On this very point we have the following interesting statement by Ernest Mayr, well-known evolutionist taxonomist of the American Museum of Natural History in New York City:

Many of Darwin's followers, including most of the taxonomists of the old school, thought that the problem of species formation was solved when they found that intermediate forms connect what were formerly considered two perfectly distinct species. They concluded that species are transformed into new species as they spread into new areas. This complacent attitude was distinctly associated with the old morphological species concept and it reigned supreme until the new biological species concept began to replace it. Then it was suddenly realized by the more progressive systematists that those species between which they found intergradation were their own creations, and not biological units. As the new polytypic species concept began to assert itself, a certain pessimism seemed to be associated with it. It seemed as if each of the polytypic species . . . was as clearcut and as

separated from other species by bridgeless gaps as if it had come into being by a separate act of creation. And this is exactly the conclusion drawn by men like Kleinschmidt and Goldschmidt. They claim that all the evidence for intergradation between species which was quoted in the past was actually based on cases of infraspecific variation, and, in all honesty, it must be admitted that this claim is largely justified. (p. 114, *Systematics and the Origin of Species*)

In their search for the natural units of the living world, biologists in general and taxonomists in particular consistently have fixed their attention at too low a level and consequently repeatedly have become confused and have tripped over the many variants of large polytypic groups of general basic types. To use a common expression, they haven't been able to see the forest because of the trees.

In their search for real natural units they need to step back and fix their attention at a higher level, at a level where discontinuity clearly marks off the horses from the cows, the chimps from the men, the oaks from the maples.

This discontinuity among basic types is one of the most obvious and universal phenomena in both biology and paleontology. Connecting links between these basic types *do not exist*. If assumed links are found then the material under study very possibly all belongs to a single large polytypic cluster.

DNA: Stability, Not Unlimited Change

The molecular biologists and geneticists tell us today that deoxyribonucleic acid (DNA), located in the chromosomes, is the essential hereditary substance. They give us the rather startling information: (1) that DNA constitutes the genetic material of *all* organisms (except where RNA serves instead in certain viruses), and (2) that only two purines (always adenine and guanine) and only two pyrimidines (always thymine and cytosine), constitute the key material of this most important hereditary substance.

To illustrate, in the matter of their hereditary mechanisms, the only difference between man and mouse consists of the longitudinal sequences of these same four nucleotides (always joined adenine to thymine and guanine to cytosine). Each different arrangement in the longitudinal order of these nucleotide pairs in a chromosome results in a specifically different chemical situation in the cells of the organism. This different chemical picture within the cells produces the different morphological characters which distinguish one basic type, like a man or a horse, from all other basic types, like mice and cows and sheep and roses.

Not only do these different cell chemistries produce different morphologies, but it is becoming more and more obvious that they, through chemical incompatibility, make it impossible for hybrids to be formed between basic types. The sperm of one basic type, like a man, cannot enter into true fertilization with the egg of another basic type, like a chimpanzee.

The time is long overdue when taxonomists recognize that two basic criteria: (1) similar morphological characters and (2) true fertilization of the egg in which the whole paternal chromosome complement joins compatibly with the entire maternal chromosomal complement in building at least the early stages of the embryo, reveal the true basic units among living things.

A recognition of these true basic units will shift the systematist's attention from the confusion among variants at the low level of individuals, breeds, and subspecies, to the larger natural units which generally enjoy chemical compatibility among the members of their respective populations.

In 1941 I called these natural units "baramins," and since have tried to draw the attention of biologists to these units which, I would assume, are the modern descendants of the originally created kinds. It would appear that the modern polytypic species stands as a revelation of how far the various mechanisms of variation can go in the matter of producing change in the original basic types.

Terminology Reviewed

Perhaps at this point I should refresh in your minds the use in biology of the word "polytypic." This word was first applied biologically in 1940 by the English biologist Julian Huxley. "Polytypic" is a good word and used generally in biological circles. In these circles it refers to a species which is composed of two or more subspecies.

At the beginning of my remarks you will recall I made reference to the southern pocket gopher being a polytypic species in which Hall and Kelson presently list 214 subspecies. These polytypic species are the most obvious natural units in the world of living things, and have been and are being built up by processes of variation which some refer to as "microevolution."

For creationists the word, "microevolution," is unfortunate because the creationist accepts all demonstrable facts, including the processes of variation which work within basic types, and by so doing he appears to be an "evolutionist," i.e., a "microevolutionist." In the realm of semantics, all you need to do to become a microevolutionist is to recognize that variation has been and is going on within basic types, e.g., southern pocket

gophers. The evolutionist may refer to this type of change as "intraspecific."

The term, "macroevolution," is defined by evolutionists as the sort of change which would occur if one species were to produce a new species. However, because of the confusion which arises when the word "species" is used, it is better to say that macroevolution is an assumed process whereby one basic type produces a new basic type. In other words, macroevolution is synonymous with the expression "organic evolution." Thus all evolutionists and most creationists are microevolutionists, but only evolutionists are macroevolutionists.

Macroevolution is only a philosophy or hypothesis because it has never been demonstrated that one basic type can produce a new basic type. However, microevolution is occurring everywhere about us, and because of confusion on the part of evolutionists generally, they think that examples of microevolution demonstrate macroevolution. Beautiful books are published in which authors assumedly prove organic evolution by displaying examples of microevolution.

The book *Evolution*, authored by Ruth Moore and the editors of *Life*, and the *Atlas of Evolution* by Sir Gavin de Beer are beautiful volumes, but they present not even one case where organic evolution is illustrated. These books are filled with examples of the development of varieties within basic types.

Yet the authors seem unaware that every case they offer merely, more completely establishes the natural fact that all variation results only in new variants within basic types, which were already in existence. Such changes would never produce organic evolution.

Through his lack of acquaintance with creationists, the evolutionist believes they are too dull witted to recognize the occurrence of microevolution, and on the strength of this misunderstanding he righteously declares that they are "ignorant, dogmatic, and prejudiced." We need to understand each other better, and at the same time perceive the fact that all known processes of variation only result in new variants which are still 100%-members of the basic type to which their parents belong.

By processes of variation creationists mean those produced by environmental factors, hybridization, and the genetical types of recombinations, gene mutations, and chromosomal aberrations or chromosomal mutations. This latter group includes deletions, duplications, translocations, and inversions.

Search carefully through standard genetical texts and you will discover, that as a result of all these processes of variation, only a new variant

within an *already existing* basic type has ever been observed. This is variation (microevolution), but not progression (macroevolution).

Shall we give ourselves over unnaturally and fantastically to an obsession of progression which will lead us into error, or abide with that which is in harmony with all demonstrable facts?

Concluding Remarks

In my remarks this evening I have given most of my time to just two of the several areas from which evolutionists draw what they consider to be proof for organic evolution; namely, paleontology and variation. I have budgeted my attention in this way because these two areas are considered by progressionists to be the best sources of evidence for their hypothesis.

Other categories of assumed evidence for evolution are biogeography, comparative anatomy, comparative physiology, embryology, and taxonomy.

When we get right down to fundamentals, the evidence from all these areas leaves much to be desired because there is nothing compulsive or coercive in them. Instead, they are all subjective or circumstantial or persuasive in quality. This is the situation from the points of view of both creationists and evolutionists.

Permit me to illustrate what I mean by an item from comparative anatomy. Let us take a problem involving the bones of the forelimbs of vertebrates. Let us clean the bones of a forelimb of a man, a horse, a cow, a dog, a cat, an ape, a bird, a bat, and a whale.

With these bones cleaned and laid out on a table, we proceed to study them. This study discloses the interesting fact that the forelimbs of these vertebrates have the same three bones, the humerus, the radius and the ulna.

Having done this and made the discovery of the presence of the same three bones in all these vertebrate limbs, we have reached the end of demonstrable (sometimes called real or laboratory) science. We are now ready to enter the second phase of science, the speculative.

We sit down with the bones before us and ponder the significance of their similarity. Finally two hypotheses are reached: (1) the evolutionist says, "Here is proof that all these animals had a common ancestor. Therefore, macroevolution must have occurred"; (2) the creationist says, "Here is confirmation of Genesis, one Creator with a master plan."

Both suggestions are reasonable and logical. Which one is correct? Your answer here will depend upon where you wish to place your faith. The careful student must always bear clearly in mind which in science is *demonstrable* and which is merely *speculative*; and all the while maintain respect for the other man's decision.

Interestingly, every item of evidence which bears on origins is subject to interpretation from the points of view of both the creationist and the evolutionist. For that reason it is a sad day when any man maligns another because he chooses a different point of view on origins.

Today we weep that in our enlightened age when we congratulate ourselves on our alleged openminded study of all the problems of natural science, so much narrow-mindedness and dogmatism should be manifest when the subject of origins comes up for study.

In this day when we are fostering the erasure of all unbrotherly discrimination, how dare we clamor for the crushing or ostracizing of any point of view on origins which differs from ours? Dare we as scientists who laud openmindedness on all issues demand that only one point of view on origins shall be taught in our tax-supported schools?

I honor those legislators who right here in this city labored hard to pass a law which shall require that when the subject of origins arises in Michigan's public schools, equal time shall be given to special creation and evolution. May Michigan soon join Tennessee in such a fair, non-discriminatory law regarding this tremendously basic and important issue!

Many people hold the mistaken belief that evolution is a scientific theory, and that special creation is only a religious doctrine. I ask you, friends, have you felt this evening that I was presenting a religious discourse?

The truth is that both points of view can actually serve as models for correlation and prediction of scientific (observational) data. They should be evaluated on that basis. There is no known fact of science which cannot be at least as adequately explained by the special creation model as by the evolution model.

In the sense that historical events are not reproducible, any theory of origins must ultimately rest on faith. Neither special creation nor macroevolution can be observed to be taking place today. Neither type of origin is accessible to scientific observation or experimentation. In its acceptance, as much faith is required for one as the other.

Albeit, the natural fact that variation, without exception, only results in new varieties within an already existing basic type, joined with the most obvious fact of discontinuity between kinds, in my opinion, is at the same time opposed to the assumption of endless progression; and, is also in complete harmony with the concept of special creation and a literal Genesis.

I have studied and taught special creation for 43 years, and wish to recommend to you its de-

lightful harmony with all demonstrable facts of the natural world.

In view of the subjectivity of the evidence upon which a decision on the matter of origins must be made, creationists and evolutionists should each hold the other in respect. Because all men

are equal before God, and every one is a free moral agent, we must eschew demeaning and derogatory assertions about, and condemnatory opinions of, a man just because he is a creationist, or an evolutionist.

KOHOUTEK, COMETS, AND CHRISTIANITY

PETER A. STEVESON*

When compared to predictions and expectations of many, the comet Kohoutek was the disappointment of the century. Still, the immense publicity which it received raised questions to which creationists should find answers. The author notes that, while comets do not, as some have hoped, contain evidence about the origin of the universe or of the solar system, they can be considered as evidence for a young system, and hence for a young earth.

Introduction

Though analysis of the data is still continuing, a brief look at the 1973-74 winter phenomenon, comet Kohoutek, seems appropriate. No comet since Ikeya-Seki in 1965 has received the publicity which welcomed Kohoutek. Of course a unique study of the comet was possible since the comet arrived at the same time as the Skylab 3 trip.

Extreme predictions were made. Following are only three representative statements:

Kohoutek is believed to be a piece of debris left over from the birth of the solar system. The pictures hopefully will reveal many of the chemical elements of the comet and thus provide clues to the early history of the sun and planets, believed to have been formed 4.6 billion years ago.¹

It is very probably a new comet and so the determination of the orbit is very important. If it is a new comet it should leave some information not only about comets, but about the origin of the solar system.²

All through the space program, we've been looking for a Rosetta stone—what is the primordial material out of which the solar system is made? We looked for it on the moon and we didn't find it; we found other things instead. Now we're down to our last chance—the comets.³

Kohoutek is just one of many comets which have been observed over the years. Halley's comet, named for the man who first plotted an approximate orbit for it and who predicted its return in 1758, is probably the most well-known. Chinese observations of this comet date back almost two thousand years.

Biela's comet was first discovered in 1826. On its third return, in 1846, its nucleus split into two cores. These reappeared in 1852 but, on subsequent expected returns, only bright meteor showers were observed. Today, due to orbital perturbations, no trace remains of Biela's comet.

Encke's comet, however, has returned many times since its discovery by Pons in 1818. This comet is distinguished by having the smallest known period of any comet, 3.3 years.

For years, comets were little understood objects which were greatly feared. They were believed to represent evil spirits and were connected with human tragedies. John Maplet set forth the common belief in *The Diall of Destiny* in 1581:

These Comets doe prognosticate Warre, Commotions, sturres, stryfes; Treasons, and such like, because yt in the tyme of their Generation and continuance, exceeding heate ruleth and boyleth in men, which Incenseth and sturreth forwards thereto, the bodyes and myndes of men. And besides this, it signifieth more especially the death of Princes and Noble Personages, for that the Ayre which then is more grosse and viscourse through the corrupted matter of ye Comet, is not so wholesome for delicate and delicious Persons, as for the lusty and course Constitution of the bodyes & appetites of Labourers and Husbandmen.⁴

Even with Kohoutek, we have had a continuance of such superstitious belief. A group of young adults, all members of the controversial "Children of God" sect, carried signs in front of the United Nations building in New York to indicate that the United States would be destroyed in 40 days, by January 31, 1974.

According to the leader of the sect, David Berg, comet Kohoutek was a sign of this destruction.⁵ Astrologers have also predicted that the visit of Kohoutek is a bad sign for President Nixon.⁶

*Peter A. Steveson is the Chairman of the Bible Department, Bob Jones Academy, Greenville, South Carolina 29614.

The *Catalogue of Cometary Orbits*, published by the British Astronomical Association (1961) lists only 566 individual comets known at that date. These included 94 short-period comets, 40 of which had one apparition only; 117 long-period comets; 290 comets with parabolic orbits, i.e., insufficient observation to allow a more accurate orbital determination; and 65 comets with hyperbolic orbits, i.e., in the process of being ejected from the solar system.⁷

Some General Details on Comets

The mass and size of comets vary widely. Because of the gaseous nature of the coma, it is not possible to observe a comet directly. However, an upper limit to cometary masses may be set by the fact that comets do not exert any measurable gravitational influence on even the minor planets, while the comets themselves may be perturbed substantially.

A lower mass limit is set from the rate of loss of mass at perihelion. This mass loss occurs at a rate on the order of 100 tons/sec, equalling a total mass loss on the order of 10^{13} gr. for a single passage. Total cometary masses thus are estimated to be between 10^{15} and 10^{17} gr.⁸

The size of the nucleus is given an upper limit from the fact that, in the case where comets have transited the face of the sun, they could not be seen. Thus the diameter must be less than 70 km. The average diameter of the cometary nucleus is estimated to be about 1 km.⁹

Spectrographic analysis of comas and tails has been conducted. A number of common substances are usually present, including the hydroxyl (OH) and imino (NH) groups, cyanogen (CN), various hydrocarbons (CH, CH₂, C₂, C₃) and other radicals (CH⁺, CO⁺, N₂⁺). Traces of many metallic elements have been observed (Fe, Ni, Cr, Cu, K, Na, Ca, Mg) in the heads of sun-grazing comets. The "forbidden lines" of O I have been observed in some comets. Observation of Kohoutek indicates the presence of methyl cyanide and hydrogen cyanide, never before observed in any comet.¹⁰

The most spectacular part of a comet, the tail, is actually nothing more than a good vacuum, with a density estimated to be 10^{-20} that of air, i.e., one molecule/cc, about that of empty space. A comet's nucleus is heated as it nears the sun, causing dissociation and ionization processes to take place. Solar radiation pressure drives the molecular particles radially away from the sun. Some scientists have suggested that solar corpuscular radiation, or the ejection of high-velocity particles from the sun, may be an important factor in tail formation.¹¹

Long straight tails, which normally are associated with comets, are formed by the above

repulsive forces on the lighter molecular particles. Curved tails, which also occur in comets, are due to the combination of attractive gravitational forces on the heavier particles and the repulsive forces, with the centrifugal force of orbital motion and, perhaps, interplanetary magnetic fields also acting upon the tail.¹²

Analysis of the orbits of known comets has shown the definite influence of planets upon them. The distribution of cometary nodal distances shows a large number near Jupiter's orbit.¹³

An interesting example of a significant perturbation is found in Comet Oterma. During 1936-39, this comet made a prolonged close approach to Jupiter. As a result of this, the period of its orbit was reduced from 18 to 7.9 years. During 1962-64, however, the comet again approached Jupiter, within 0.1 astronomical unit, and the orbit was enlarged again to a period of 19.2 years.¹⁴

Problem: Origin of Comets

The origin of comets has long puzzled astronomers. Currently, Jan Oort has suggested that comets were formed in the same general region as the planets; and, then, were set into large elliptical orbits through planetary perturbations. This idea is favored by the majority of astronomers.

Oort cites statistical investigations by Fayet (1910) and van Woerkom (1948) which show that approximately half of all comets thus formed would be ejected from the solar system, while the other half would be set into elliptical orbits with aphelion distance on the order of 10,000 astronomical units, and periods of about 40,000 years.¹⁵

From such a reservoir, estimated by Oort to be on the order of 10^{11} comets, perturbations by passing stars and planetary perturbations may have caused some comets to assume short-period orbits.

Many other proposals of cometary origin have also been developed. Oort himself has suggested that "the occurrence which gave birth to the belt of asteroids formed, in addition, a large number of fragments moving in unstable orbits . . . a number of the small condensations suffered large perturbations, bringing them into orbits of considerable eccentricity."¹⁶

Some have suggested that Jupiter or one of its moons has ejected planetary mass into cometary orbit. Whipple points out that this seems to violate the physical conditions necessary for an icy comet structure.¹⁷ Lyttleton also comments that the orbits of the long-period comets show no relation to Jupiter.¹⁸

R. A. Lyttleton has developed what is probably the second most commonly held speculation of cometary origin. He has proposed a process of accretion from interstellar dust clouds.¹⁹ Abell, however, has pointed out that, if comets were interstellar objects, there should be a preponderance of them approaching the solar system from the direction of Hercules due to solar motion.²⁰ Moreover, there is no known case of a comet approaching on a hyperbolic orbit as would be true if it came from interstellar space.²¹

Possible Biblical References to Comets

Comets are of only minor importance in the Bible. Of course, they can be included in the reference in Genesis 1:14 where the "lights in the firmament of the heaven" are said to "be for signs . . ." The word "sign," *'ot*, is used 80 times in the Old Testament. Regularly, it indicates a religious symbol, a mark with spiritual significance.

Certainly, as we look up into the heavens, whether there be a comet or not, we are reminded that "the glory of God" is being declared. Realizing, though, that comets have often been connected with fearful superstitions, we should heed the admonishment of Jeremiah 10:2, "Be not dismayed at the signs of heaven; for the heathen are dismayed at them."

Unusual activity in the heavens should not cause Christians to be concerned; rather, they should look upon the awesome revelations of power and the infinite variety displayed as evidence of the omnipotence of God.

There are two passages in the Bible in which the appearance of a comet is disputed: (1) I Chronicles 21:16 contains the picture of the angel of the Lord standing "between the earth and the heaven, having a drawn sword in his hand stretched out over Jerusalem." While the long tail of a comet might be interpreted as an angel with a drawn sword, it is highly unlikely that this was the actual case in this passage. The "angel of the Lord" regularly appears in the Old Testament as an actual being.

Further, in v. 27, the angel is commanded by the Lord "and he put up his sword again into the sheath thereof." The whole picture seems to be of a literal judgment executed by the Lord's messenger upon Israel.

(2) In Revelation 8:10, the author tells of that yet future judgment when "there fell a great star from heaven, burning as it were a lamp, and it fell upon the third part of the rivers, and upon the fountains of waters." Commentators seem to be about evenly divided as to whether this should be taken literally or symbolically.

Older writers seem to prefer a symbolic interpretation, with the "star" representing some great

world leader who spreads poisonous doctrine to corrupt the souls of men. More recent authors, however, tend to take this literally and represent a comet or meteor as striking the earth and polluting the water supply of many nations. While it is difficult to visualize the actual happening, there is no doubt but that the Lord is able to judge the nations of the earth in this manner.

The single passage of the Bible which most clearly refers to a comet (though this is disputed by some) is found in Jude 13, where false teachers are described as "wandering stars, to whom is reserved the blackness of darkness for ever." The picture is one of a comet, ejected from our solar system, traversing its hyperbolic orbit through the emptiness of a vast universe.

So, one day, those who have appeared to shine for a brief moment in this life through the promotion of false doctrine will one day experience the unending, lonely torment of hell. Kohoutek, as all comets, should remind us of this sad fact.

Comets and Origin of Solar System

One other question of importance should be discussed. May comets, as scientists have suggested, be used to deduce anything about the origin of the solar system? In the author's opinion, even a direct probe which would allow a detailed analysis of a comet's nucleus would not afford any more than is known already of creation.

Scientists in Project Mohole failed to find the expected depth of sediment covering the ocean floor; and, astronauts failed to find the expected layer of dust covering the moon. Therefore, it seems unlikely that the study of a comet would uncover material to support the evolutionary thinking of scientists.

As a matter of fact, based on what is already known of comets, a recent creation is most logical. Even secular scientists realize that comets have limited lifetimes, as is noted in the following:

The distinguishing feature of a comet is the ability to release relatively large amounts of dust and gas when the nucleus is heated by solar radiation, especially at small distances from the sun. Observationally, this may be translated into a minimum requirement of a more or less diffuse appearance on at least some occasions. The material released is lost to the comet; hence, the lifetimes of comets in the inner solar system must be limited.²²

As the comet begins to approach the Sun through the inner precincts of the solar system and starts developing a tail, it is bound to lose mass irretrievably to the interplanetary substrate. How long can a comet afford to sustain such a loss and avoid complete dis-

integration? . . . an assessment of the amount of mass lost in the course of each orbital cycle discloses that the average lifetime of a comet that approaches the Sun within less than the distance of the Earth is limited to centuries rather than millenia.²³

R. A. Lyttleton has estimated that "probably no short period comet can survive more than about 10,000 years."²⁴ He has concluded:

In the whole age of this system, a comet with average period 100,000 years would make 4.5×10^4 returns to the sun, and if at each one of these it lost only 1/1000th of its mass, through tail-formation and meteor-stream production, the initial mass would have been more than 10^{19} times as great as the present mass—which at a minimum means several times the mass of the sun!²⁵

Thus creationists can use the continuing loss of mass by comets as a strong argument for a recent creation.

Secondly, the existence of comets with periods as great as 100,000 years can also be used to support a young solar system. For, if the solar system were as old as 4.5×10^9 years, then comets would have been perturbed out of the system long ago.

According to the statistical work referred to above by van Woerkom, approximately half of all comets would be ejected from the solar system under the influence of Jupiter and the other planets. Even if the percentage of comets affected were not this great, if repeated often enough, then a comet's travels through the solar system must surely bring it under planetary influence and convert it into a short-period comet, or eject it from the solar system.

Of particular interest, in this connection, is the fact that the very existence of so many short-periods comets is the major reason for development of the Jovian ejection concept by S. K. Vsekhsviatskii and his associates.

From the comet-density in space, based on the known comets, they estimate that the number of comets in the Jupiter family is about 100,000 larger than could have been captured by the planet during the lifetime of the solar system. Further, "they find the lifetime of the short-period comets to be so brief that Jupiter could not conceivably acquire replacements as fast as the old members of his family wear out."²⁶

From this point, a speculation has been developed which has no observational basis in fact, and which is in contradiction to what astronomers think is known about planetary structure. But the fact still remains that these scientists have recognized the inherent short lifetime of a comet.

A person's faith need not be shaken by the speculations of scientists regarding comets. The observations of secular scientists confirm the teaching of the Bible regarding creation. Clearly, creationists can say with the author of the book of Hebrews: "Through faith we understand that the worlds were framed by the Word of God."

References

- ¹ *The Greenville Piedmont*, December 26, 1973.
- ² *The Greenville News*, December 29, 1973.
- ³ *Time*, special Report/Science, December 17, 1973, p. 95.
- ⁴ Kocher, Paul H. 1953. *Science and religion in Elizabethan England*. The Huntington Library, San Marino, p. 166.
- ⁵ *The Greenville News-Piedmont*, December 30, 1973.
- ⁶ *The Greenville News*, December 12, 1973.
- ⁷ Porter, J. G. 1963. The statistics of comet orbits (in) *The solar system*. Vol. IV. University of Chicago Press, Chicago, p. 551.
- ⁸ Struve, O. and V. Zebergs. 1962. *Astronomy of the 20th century*. The Macmillan Company, New York, p. 163.
- ⁹ *Ibid.*
- ¹⁰ *The Greenville Piedmont*, January 12, 1974.
- ¹¹ Struve and Zebergs, *Op. Cit.*, pp. 162f.
- ¹² Pannekoek, A. 1961. *A history of astronomy*. Interscience Publishers, Inc., New York, p. 424.
- ¹³ Porter, *Op. Cit.*, p. 560.
- ¹⁴ *Ibid.*, p. 570.
- ¹⁵ Oort, Jan H. 1963. Empirical data on the origin of comets (in) *The solar system*. Vol. IV. University of Chicago Press, Chicago, pp. 668f.
- ¹⁶ *Ibid.*, p. 671.
- ¹⁷ Whipple, Fred. 1963. Structure of the cometary nucleus (in) *The solar system*. Vol. IV. University of Chicago Press, Chicago, p. 661.
- ¹⁸ Lyttleton, R. A. 1968. *Mysteries of the solar system*. Clarendon Press, Oxford, p. 146.
- ¹⁹ *Ibid.*, p. 134.
- ²⁰ Abell, George. 1964. *Exploration of the universe*. Holt, Rinehart and Winston, New York, p. 291.
- ²¹ Porter, *Op. Cit.*, p. 555.
- ²² Roemer, Elizabeth. 1963. Comets: Discovery, orbits, astrometric observations (in) *The solar system*. Vol. IV. University of Chicago Press, Chicago, pp. 527f.
- ²³ Kopal, Zdenek. 1973. *The Solar System*. Oxford University Press, London, p. 105.
- ²⁴ Lyttleton, *Op. Cit.*, p. 110.
- ²⁵ *Ibid.*, p. 147.
- ²⁶ Richardson, Robert S. 1967. *Getting acquainted with comets*. McGraw-Hill Book Company, New York, p. 221.

PANORAMA OF SCIENCE

(Formerly "Comments on Scientific News and Views")

BY READERS OF *C. R. S. Quarterly*

Possibly it might be a bit unfair for the editor of the Creation Research Society Quarterly also to publish a column. On the other hand, there is some evidence that "Comments on Scientific News and Views" served a purpose. Accordingly, retention of the column seems advisable, more or less as it has been.

However, other authors will now be included. Actually, this is nothing entirely new, for Dr. W. E. Lammerts has always helped with the column, in selection of material, arrangement, and editing. Now several others will take a hand.

And appropriately, in good Scriptural fashion, the change is noted by a change of title.

Hopefully, readers will send in items suitable for this column, already written. The author of each item will be printed to establish responsibility for review comments. All unsigned comments have been submitted by the Editor.

Meanwhile, perhaps I can promise, having a hand in this column, never to write another editorial, or at least, as Captain Corcoran of the H. M. S. Pinafore said: "Well—hardly ever."

—Editor H. L. Armstrong

The Intricacies of Natural Sonar

The fact is well known by now that several creatures use a sort of sonar, or sonic radar, to help them to find prey or to avoid enemies or obstacles. Yet the more the characteristic is investigated, the more surprises are found, as special features are detected.

Horseshoe bats, Rhinolophidae, for instance, emit a cry in their echo-location technique, and listen for an echo, as do the others. However, the cry is especially designed for the job. The cry consists of a relatively long part, in which the frequency of the sound is constant, followed by a short part of which the sound is frequency-modulated.¹

The nature of the cry, of course, can be found by recording and analyzing it. The use of the two parts, its is proposed, is as follows:

(1) The short part, frequency-modulated so as to be distinctive, is used in determining the distance to the "target," i.e., to whatever it may be that makes an echo. The distance, of course, is proportional to the time between the cry and hearing the echo. This is the principle used in the common radar, and in sonar.

(2) The long part of the cry has another use. An echo comes back from it, of course; but the frequency of the echo is different from that of the cry if the bat and the target are in relative motion. This phenomenon should be recalled as the Doppler effect. The same effect occurs when a train passes a listener, and the pitch of the whistle seems suddenly to change; and the effect is discussed in the part on sound in most general books on physics.

Presumably, by having information about the motion, as well as the distance, of the target, the bat is able more efficiently to pursue, or to avoid it.

Of course the above is the principle used in "radar speed traps." Radio waves, sent from the police car, are reflected off the speeding car, and return with a slightly different frequency. This, again, is the Doppler effect. So while this principle has been used in this way in electronics for maybe less than thirty years, the bats have been doing it for a long time.

Maybe someone who gets a ticket from one of these "traps" will consider that he has additional reason to call the whole thing batty!

Seriously, though, how could such an elaborate system have "evolved"? A perfect system would have been required before it would have been any advantage; how, then, could it have been "selected" in its early stages? Or how could such a system come about by accident? Ask a radar mechanic whether he would expect to put a pile of electronic parts on the floor, mix thoroughly with a shovel, and come up with a radar set!

One additional point might be made. Here is another case in which a technique, originally used in nature, has been applied in technology. Often those doing the technology have not known about the technique as it occurs naturally. Might it not be useful if there were a great compendium of such natural techniques? Certainly such a listing would be of general interest to many, and would also be a useful source of ideas to be tried in technology.

In-Fighting Should Be Out

When I was a soldier, at times, when our own fire would come a little too close, as would happen now and then, we used to have a saying: "We're working for George too" (i.e., King George VI).

This occurs to me when I find that creationists are starting to argue among themselves. Should

not creationists make a special point of remembering that all are working for God? One would expect that certain people will have one opinion, others another, on matters on which Scripture is not very explicit; but let us be sure that we differ in a spirit of Christian charity.

One matter on which disagreement is easy is the question whether or not there was a "gap," between Gen. 1:1 and Gen. 1:2. For my part, I am not persuaded that there was a gap; but I hope that those who do believe so will agree to disagree with me on that point, while we continue to agree, and maybe to collaborate, on many other matters.

Presumably those who accept the gap believe that they solve, or simplify, some of the problems with which a creationist must deal. In that case, those who do not use the gap have taken on what must appear to be the more difficult job. So it would be fair to say:

Let us go on with our researches. For, if we can find a solution to questions in which the gap is not utilized, then we could still fit in a gap if we should be convinced that it belongs.

One might say also that the situation from the flood on will be about the same whether or not there was a gap, and that there is a good deal of study needed there, in which everyone could profitably join.

Everyone who believes in God and creation will surely agree that the aim of re-evaluating science from a Christian viewpoint is a worthy one. Nor is there any lack of work to be done.

Would not the best approach for each person to "have a go" at that part of a problem about which study seems possible, and concerning which one believes that a contribution can be made? Then, drawing on Scripture and on other evidence, one can contribute a little here, another person a little there, until a Christian account of science and natural history is constructed, not only in outline but also in some detail.

Dating by Amino Acids, or by Tree Rings?

Now that the weaknesses of carbon 14 as a means of determining ages are admitted, quite naturally scientists are looking for other methods.

One proposal, which has been discussed recently, involves aspartic acid (or possibly similar amino acids). These amino acids, like screws, can exist in right-hand and left-hand forms.

And, just as in a hardware store one finds only right-hand screws, so in living things one finds only the left-hand amino acids. However, when a living organism dies, some of the left-hand amino acid begins to change slowly into the right-hand form.

This is entirely analogous to the way in which radioactive carbon changes into nitrogen. In either case, the amount left, at any later time, can be found by suitable means of analysis, and then, if the rate of change is known (which is represented by the half-life of a radioactive material), the time elapsed can be calculated, and hence the age of the sample estimated.

Generally, scientists believe (although there may be room for some doubt) that the rate of decay of radioactive material depends only on the material. However, the rate of the chemical process by which amino acids change certainly depends on circumstances.

Like the rates of most chemical reactions, the amino acid change rate is very sensitive to temperature, as is admitted. Also, chemists know that rates of reactions may be influenced enormously by catalysts. To date, the possibility of catalysis has not yet been established in this case of amino acid changes.

Actually the work described in this research involved calibration of the chemical method in terms of radioactive carbon; so unless great care is taken, any errors involved in using radioactive carbon may show up in the new method.²

Researchers stated that the methods described may be useful in the range of 5,000 to 70,000 years (of course, uniformitarianism is assumed), and that slightly different methods might extend this somewhat.

Another attempt to correct for deficiencies in radioactive carbon methods involves the old method of tree rings. Nowadays, of course, bristlecone pines are used. Of course, the ideal would be to have historical information, i.e. chronologies; but researchers conducting studies do not want to use Biblical chronologies, and other chronologies are not very reliable admittedly before a few hundred years B.C.

Some recent intercomparison of results from radioactive carbon, tree rings, and chronology in Egypt, has been published.³ Researchers concluded that ". . . the . . . errors associated with the radiocarbon dates have been grossly underestimated . . ."; and that as for chronology ". . . deficiencies in the Egyptian dates preclude . . . any exact comparison . . .".

Of course, this is what creationists have been saying for some years. Apparently some scientists have concluded that the tree rings are the most reliable. And these, of course, do give the kinds of age which seem more believable.

Yet, if tree rings become the accepted method, creationists should know how reliable they really are. Here is a field for some creationists to study, e.g., whether it is possible to get two rings in one year.

The Germ of an Idea?

The origin of coal, petroleum, and, of course, related materials such as natural gas, is a problem which creationistic scientists, and flood geologists, must investigate. Explanation of the origin of coal, in terms of the burial of huge amounts of vegetation at the time of the flood, seems fairly straightforward. And possibly the origin of other materials can be explained along similar lines.

There is, however, some information which might throw light on some of these problems. Scientists have found that Lake Kivu, in eastern Africa, has quite a lot of methane dissolved in the water.⁴ What is suggested is that the methane is formed by bacteria, from carbon dioxide and hydrogen.

Apparently certain bacteria can, in fact, accomplish such a transformation. Neither the hydrogen nor carbon dioxide may be of organic origin, but are possibly volcanic.

The age of some of the gas was estimated at around 20,000 years, evidently by radioactive carbon. Of course such ages are exaggerated quite often.

Is it possible that such bacterial action, maybe since the flood, caused some of the world's natural gas? During the flood there may have been much volcanic activity, that gave off hydrogen and carbon dioxide.

There seems to be no doubt that bacteria continue their activities under quite severe conditions; reports contain mention that yeast cells remain active at e.g. pressures of 1,000 atmospheres.⁵ (This writer has not seen this reference, but mention of it is made for whatever use it may be.)

If bacteria can produce methane, could they go on (or other bacteria take over the job), eventually to produce conditions preliminary to formation of petroleum? There seem to be a great number of questions here worth investigation.

Would it be possible to use such bacteria, under artificial conditions, to produce methane on a large scale? Is there a possibility here of a way of helping to overcome the threatened shortage of fuel?

Might there be bacteria which could take the hydrogen from water, and not need the volcanic supplies? It would seem to be no more difficult a job for bacteria than fixing atmospheric nitrogen.

Finally, while considering things which bacteria might have done at the time of the flood, is there any likelihood that suitable bacteria might have had something to do with the hardening of the sediment from the flood into stone?

There may be a very broad field of investigation here.

Comets: Evidence of Young Solar System

In a recent letter, a person who took part in a symposium on comets at Leningrad in 1970, stated emphatically that Oort's notion of a cloud of comets on the outer edge of the solar system, from which a comet occasionally enters the system, will not work.⁶ Oort's cloud, the author wrote, ". . . if it existed would have dissipated fairly quickly." And stated further that the ". . . lack of hyperbolic initial orbits is fatal to the idea. . . ."

Is it not surprising that, although there is so much evidence against this cloud of comets in cold storage and none for it, one often sees it mentioned as if it were an established fact? Of course, the same is true of many other pieces of evolutionary dogma.

Once the truth is admitted, namely that the universe is quite young, then any need of a supply of comets vanishes.

The letter writer, however, was not arguing for a young universe. He seemed to argue for the origin of comets from the larger planets. (Velikovsky also has proposed something of that sort.) The writer proposed that: ". . . mighty processes of eruptive evolution have taken place and are taking place in the Solar System. . . ." The term, "evolution," of course, has nothing to do with Darwinism; it means merely "change."

In other words, there are catastrophic happenings. In that, creationists can agree with the author of the letter, although disagreement might exist about the catastrophes. And creationists can agree completely that uniformitarianism is inadequate when one tries to develop an account of the universe.

Optical Design by the Creator

From time to time it has been suggested in these pages that engineers might learn some ideas from nature. A case is reported in which this has happened.⁷

Studies with an electron microscope have shown that the corneal lenses of certain moths are covered with a "regular array of conical protuberances" about 2×10^{-5} centimetres high. Researchers have suggested that these protuberances, being of a size and spacing comparable with the wave-length of light, might act as a layer of reduced index of refraction, like the coating added to lenses. (The same principle is used to make the nonreflecting windows used in some stores.)

Next the principle was investigated with microwaves. These waves, radio waves having wave lengths of the order of maybe an inch, behave much the same as light. But, since their wave lengths are some tens of thousands of times as

great as those of visible light, the model of the eye lens, with which they are to interact, can be scaled up by the same amount. This makes it much easier to build a model.

The constructed model was successful, the "bumpy" surface being as effective in stopping reflection as a multi-layer (i.e., coating).

There may be two advantages in stopping reflection. First of all, more light may pass through, giving greater sensitivity when illumination is poor. That is usually the reason for coated lenses in optical instruments. Secondly, reduced reflection may possibly make the moths less apparent to predators.

Of importance is the fact that the size and spacing of the "bumps" are quite crucial. How could such an arrangement have "evolved"?

Like so many other features, spacing of the "bumps" would have to be about perfect to be of any use at all. A few random bumps on the lens would be, if anything, a hindrance rather than a help. Here is another example of a very good design, by the Designer of all nature.

As for the possibility that the natural design might be copied in engineering, apparently some "bumpy" lenses were made, and they worked more or less as expected. There are problems about putting on a regular array of tiny bumps, but apparently there may be several applications of the principle.

Uniformitarian Dates Struck by Lightning?

There is more evidence, if more were needed, that determination of the ages of relics by radioactive carbon is not the simple process that it once seemed to be. There are many ways in which the amount of radioactive material can be affected, and spurious results produced.

Two scientists have found that discharges of lightning in the vicinity of relics can have an effect.⁸ Apparently the discharge produces neutrons. These may penetrate the material concerned, for instance wood in a tree, either growing or dead.

After penetration the neutrons may collide with nitrogen, and produce carbon 14, just as neutrons from cosmic rays do high in the stratosphere. Thus anomalous proportions of carbon 14 are produced.

This effect has been investigated, especially in trees, where it may cause strange variations in the indicated age from one ring to another. In most of these cases the effect has not been very great; perhaps the indicated age was changed by one hundred years.

Nevertheless, one more aspect of carbon 14 dating must be examined; moreover, it would seem possible that there might be analogous processes which might cause much larger errors

in the indicated ages. Creationists should watch for further developments in this matter.

Bacteria Put Termites in Clover

All cases of symbiosis offer difficulties for evolutionists. One very difficult case is that of legumes and the bacteria which fix atmospheric nitrogen.

For why should symbiosis with the bacteria be advantageous to the legumes, but not to other plants? If, on the other hand, it would have been advantageous to other plants, why did not they, as well as the legumes, develop symbiotically with the bacteria?

Besides, there are plants such as the Venus' Flytrap, which live in swampy places and seem to be in especial need of nitrogen, supplementing what they get from the soil by catching insects. Why could they not have formed a partnership with bacteria?

These difficulties are compounded when quite different creatures are found living in symbiosis with bacteria which fix nitrogen. And just that has been found; certain termites, *Kaloterms minor*, have living in them bacteria, which can fix atmospheric nitrogen.⁹

It seems amazing, by any evolutionary view, that a few plants, and one kind of insect, should have developed this particular symbiosis. Or is someone prepared to say that this behavior of termites and of legumes is an example of "convergence"?

The argument has been repeated so many times that only brief mention is necessary. But a case of symbiosis, like so many other characteristics and abilities, must be just about perfect before it is of any use at all. How, then, could it develop by "selection" over vast ages?

Another scientist has reported that certain bacteria in symbiosis with certain insects provide also vitamins and amino acids.¹⁰ This reference has not been read yet, but it may be of use to someone.

There is a point here which may deserve some thought. Bacteria which fix nitrogen are able to live in quite diverse surroundings. Would it be possible for them to live, and to carry out their work, *in vitro*? If so, here might be a source of nitrogen for fertilizers, etc. Maybe this matter deserves some investigation by someone who is familiar with that kind of work.

Decay Constant: Really Constant?

Commonly scientists state that the rate of decay of radioactive materials is independent of any external influence, and depends only on the nature of the materials that decay. Now it is becoming clear that such a statement is too sweeping.

Certainly there is at least one exception. In an atomic explosion, the decay of uranium or plutonium proceeds much more quickly than it would were the circumstances different. So change in the decay rate is possible, in an extreme case.

Also, some not so extreme cases have been reported.^{11, 12} (Also, another reference might be useful although the original article has not yet been located.¹³)

Apparently simple pressure can affect the rate of decay of beryllium 7. Carbon 14 has been investigated, incorporated into ethylbutyric acid and stearic acid, and the application of electric fields seems to affect the decay.

The changes studied so far seem not to have been very large. Nevertheless, if a small change is possible it would seem that a large one might likewise be possible.

The fact that the changes have been observed under rather extreme conditions would not seem to matter. For conditions in living things, in particular, may well be as effective as very extreme artificial conditions.

Legumes, for instance, can fix nitrogen easily, while to do so artificially requires high temperatures and pressures, and the presence of powerful catalysts.

Further, some radioactivity is found in lava. Surely lava, at some stage, has been under conditions as extreme as anyone could imagine.

So there seems to be more evidence that estimates of the ages of things, obtained from the proportions of radioactive materials, need to be viewed with considerable skepticism.

Behavior of Lava on Water Contact

Authors have suggested in the *Quarterly* that there are formations in Oregon for instance, which must have been laid down after the flood.¹⁴ There seems to be no reason to doubt that there has been geological activity since the flood, sometimes considerable activity. But let a plea be made here for extreme caution in proposing any long period, many thousands of years for instance,¹⁵ after the flood.

In the first place, as Dr. W. E. Lammerts has pointed out, there are certain lines of evidence which make one wonder that the flood was as long ago as Scripture indicates that it was.¹⁶ In the second place, should not events that occurred during the flood be considered as on a scale of which we have no experience?

For instance, certain lava rock shows signs that it was not ejected into water. Is it possible, though, that criteria have been developed with regard to relatively small flows?

If there should be many cubic miles of lava, is it possible that much the same kind of rock might

be produced, whether ejected into air or into water? For in water, it seems conceivable, that a covering, negligible in thickness compared with the whole molten mass, might form and protect the rest.

As the covering broke up when the lava moved, the broken parts would be remelted; and for the most part the eventual result might be much the same as if the lava had not encountered water. Maybe something similar might happen to other kinds of material, if the amounts were very great.

An article, which appeared not so long ago, might provide a clue to some of these imagined conditions. Two scientists proposed that, in some volcanic outbursts, the intimate mixing of lava and water may have caused especially destructive explosions.¹⁷ The reader should understand that the mixing had to be intimate. Then much water would be quickly turned into steam.

The difference is the same as if one lump of metal on the one hand, and on the other hand the same weight of shot, were heated and thrown into water. The shot would cause a much more spectacular effect.

Ways were suggested in which, once things started, the very action might keep the lava dispersed, and thus the mixing intimate. The authors mentioned that explosions have occurred in foundries, when molten metal was mixed with water. Maybe some such mechanism as this was active during the flood, and caused some of the peculiar deposits.

Bacteria May Alter Element Concentration

Creationists are always interested in the various ways in which scientists try to determine the ages of rocks and fossils. As is well known, many of these methods involve various minerals, uranium and others. Of some worth might be the notice that certain bacteria may have a great influence on the solution of uranium in rocks.¹⁸

Apparently the *Thiobacillus* is one kind that can do such work, and there seem to be other kinds, not yet completely identified. The bacteria, researchers claim, may speed up the process as much as one hundred fold.

Plainly the presence of such bacteria might have a great effect on concentrations of uranium, and hence on ages which are supposed to be determined by those concentrations. Whether the same kind of thing can happen with other elements is not discussed.

The article contains a good many details about the method of the experiment; there should be enough information to enable anyone, who might wish to do so, to try the same or similar experiments.

An Attractive Thought about Magnets

For a long time scientists have supposed that magnetic fields were useful in navigation with a compass, but had little other effect on anything. That seems now to be changing.

There have been reports of effects of magnetic fields on living things; and, now a scientist has reported that the presence of a fairly strong magnetic field affects a chemical reaction—the reduction of haematite.¹⁹

The magnetic fields ranged in strength from about 500 to 1,400 oersted units, and caused the reduction to proceed more quickly, or even to proceed when it would not otherwise have done so at all. Of course, the reaction was carried out at a fairly high temperature.

One reason for particular interest by creationists in the rates of reactions is that such rates may be very important in attempts to determine the age of ancient things. Rather strong magnetic fields have been found to have an effect on certain reactions.

Is it possible that weaker fields, even such as that of the earth (which may have been different formerly from what it is now), might have some effect? Is it possible that the magnetic fields might have some influence on the rates of even nuclear reactions, such as the decay of radioactive carbon? One can see the effect that such things might have on the determination of ages.

Here, it might be remarked, are some possibilities of investigations which might be done in schools. An investigation might be started with say a war surplus magnet, and maybe some reaction of a compound of iron.



On the Age of Universe, Elements

David N. Schramm's article²⁰ in the *Scientific American* (January, 1974) started out in the usual way when he stated that the age of the universe can be estimated by studying the processes of radioactive decay. Then crediting Edwin P. Hubble with first noting the expansion of the universe in 1929, Schramm maintained that this expansion "is now generally conceded to be explained by some version of the 'big bang' theory."

Of much interest is a count of the number of times he uses such phrases as "it is possible," "only if," "must be," "probably can (or cannot)," "if it," "inferred," "considerable uncertainty," and "assumed." In just the first four pages, Schramm used such words a total of 19 times.

Schramm stated that Allan R. Sandage, working with the 200 inch Hale telescope on Palomar mountain, has recently measured the *rate* of expansion. Sandage calculated that *if* the rate has been constant, then the universe is about 18 billion years old. The writer wishes Schramm had

related exactly how Sandage measured such an esoteric factor as the rate of universe expansion.

But even supposing this can be done *accurately*, how certain is the concept that the rate has been constant? Is it not more reasonable to assume that the rate originally was almost infinitely more rapid, and that we are now witnessing the final stage of the explosion or "big bang" when the rate has decreased to practically zero?

The second astronomical method of dating the universe is by observation of the stars in the globular clusters. This is indeed a remarkable exercise in assumptions based on evolutionary premises. Schramm referred to Icko Iben, Jr.'s article on globular clusters in the *Scientific American*, July, 1970 (pp. 27-39). In that article Iben admitted that none of the bulk properties of these stars can be determined. These include mass, radius, and intrinsic brightness.

Actually only three facts can be determined: (1) surface temperature from the color of the star (red to blue), (2) relative luminosity (comparison of one star with another), and (3) spectrum analysis of the elements heavier than helium.

The distribution of the stars can be plotted in a two coordinate scheme using the horizontal axis for surface temperature (as inferred from a star's color) and the vertical axis for relative luminosity. This is known as the Hertzsprung-Russell diagram.

The pattern recorded is sort of like the head or beak of a bird thrown back so that the beak points to upper right hand corner of the diagram. The breast of the bird is then almost horizontal. The coolest (reddest) stars are then on the "red giant branch" leading to the tip of the beak.²¹

The majority of the stars are in the "main sequence" or shoulder and back of the bird and along the breast of the bird ("horizontal branch"). These "horizontal branch" stars are up to 50 times brighter than the sun with temperatures up to 11,000 degrees Kelvin. Schramm stated,

If we assume that all the stars in a cluster are nearly the same age [a reasonable creationist assumption also] . . . it is reasonable to assume that they all started out with the same relative abundance of hydrogen and helium (since they all have the same content of heavy elements, only .1%).

Of course creationists do not accept Schramm's assumptions for surely the stars of a globular cluster *could have* been created with varying amounts of hydrogen and helium. The arrangement of the stars in the Hertzsprung-Russell diagram would then reflect the various *created* systems of fueling *designed* to cause the observed differences in temperature and luminosity.

Iben's elaborate models may very well be a good representation of how stars "burn" hydrogen until it is used up. No doubt the details of hydrogen fusion have been well worked out at the Lawrence Radiation Laboratory in Berkeley, California, and also at Los Alamos, New Mexico. Any discussion of how stars "burn" helium when the temperature reaches 80 million degrees Kelvin is however theoretical, for this type of helium fusion has never been accomplished at either laboratory.

There is no necessity, however, for the claim that a *given* star passes through all these stages: (a) from the main sequence where hydrogen at the star's center is "burned up," (b) on up the red giant branch where the shell of hydrogen is burned dumping helium into the core, (c) to the phase where helium fusion is kindled, and (d) to the final white dwarf phase, where the only source of energy is the heat stored in carbon and oxygen nuclei.

Schramm *assumed* that the universe began with only the lightest elements, hydrogen, helium, and possibly some lithium. All the other elements presumably were synthesized later in the stars. When the most massive stars (eight solar masses) exploded, the elements from carbon to iron supposedly were formed. Then, in the envelope of red giants, elements up to lead and bismuth are formed by the slow s process of adding nuclei one at a time. The r or fast process occurs only in supernovas where neutrons can be absorbed by nuclei in rapid succession. The regions of great nuclear instability are thus bridged. All the elements heavier than bismuth are believed to have been formed in this way.

Then Schramm claimed that one needs to know only the *ratio* in which suitable pairs of elements occur to calculate their age. He then makes an admission that creationists who have studied radioactive decay have long maintained. Terrestrial rocks, although fundamentally of the same material as the rest of the solar system "*do not provide suitable samples*" for age determination. The "rocks on the earth have (been) formed and reformed too many times."

He referred to a 4.6 billion years since the formation of the solar system according to his evolutionary frame of reference. Creationists refer to catastrophies altering the rocks in spans of thousands of years. He claimed that meteor samples and those from the moon give accurate results. Yet meteors surely are the result of catastrophe and the surface of the moon shows abundant evidence of having suffered violence of many sorts.

Schramm claimed that the production ratios of radioactive elements can be calculated simply by adding up the numbers of their progenitors.

U-238 has progenitors of mass 238, 242, and 246 plus 10% of the decay products of mass 250 (the rest spontaneously fissions). The total is then 3.1.

Thorium 232 is produced by nuclei of mass 232, 236, and 240 as well as all the progenitors that contribute to Pu-244 (2.9) and so totals 5.9.

The production ratio then of Thorium 232 to U-238 is $5.9 \div 3.1$ or 1.9. (Pu-244 has as its progenitors all of the atomic mass 244, 92% of 248, 89% of 252, and 7% of 256 totalling 2.9.)

Now the abundance ratio of Th-232 to U-238 is 4. Since the calculated production ratio is 1.9, one can determine from the half life of the substances that the time required for such a change in ratio is seven billion years. This **idealized scheme** is based on the idea that all the elements originated during one event.

But Schramm argued that this cannot be so since several nucleo-chronometer pairs give *different dates* for the same event. Indeed chronometers with relatively short half-lives would no longer exist if the only production event occurred billions of years ago. (Creationists would heartily agree for different reasons.)

Schramm therefore suggested that more complicated models are needed involving a number of supernova explosions. Thus the presence of iodine 129 and plutonium 244 is not consistent with a single event concept. Plutonium has a half life of 82 million years. Researchers at Los Alamos Scientific laboratory have detected traces of Pu-244 in nature.

From the creationist viewpoint the present distribution of radioactive elements and their ratios to one another is the result of their method of creation. Creationists could accept the idea that U-238 was created by the r process as Schramm suggested, involving the absorption of neutrons by nuclei in rapid succession.

And, as Icko Iben proposed, matter originally may have existed only as protons, neutrons, and electrons. Then these may have been converted to helium and the heavier elements.

In fact it may well be that all were at first crammed together at extremely high densities and temperatures in excess of 10 billion degrees. Then most of the energy in the universe would have been in the form of electro-magnetic radiation (Photons) corresponding to the first step in creation when God said, "Let there be light."

Creation oriented physicists will find much in this article by Schramm, and the article by Iben, helpful in building up a creation model of how this earth and the universe were formed. Creationists would be inclined to believe that the build up left varying amounts of the radioactive element progenitors "lying along the way" so to speak.

These are now mistakenly *assumed* to be decay products formed since the origin of the universe and particularly the earth. From the creationist point of view it would be impossible to tell how much of each "decay product" was actually due to decay rather than a necessary product involved in the creation of U-238, for example.

Why must one assume that the r process resulted in total conversion to U-238 leaving no uranium II, ionium, radium, or lead 206?

Creation oriented physicists are invited to give these concepts consideration and necessary correction in order to arrive at a reasonable creation model of how the elements were formed.

—Reviewed by W. E. Lammerts

References

- ¹Tuning in to a target, *Nature*, 244 (5411):70.
- ²Bada, J. L., and R. Protsch. 1973. Racemization of aspartic acid and its use in dating fossil bones, *Proceedings of the National Academy of Sciences (U.S.A.)*, 70 (5):1331-1334.
- ³Clark, R. M., and C. Renfrew. 1973. Tree-ring calibration of radiocarbon dates and the chronology of ancient Egypt, *Nature*, 243 (5405):266-270.
- ⁴Deuser, W. G., E. T. Degens, and G. R. Harvey. 1973. Methane in Lake Kivu: new data bearing on its origin, *Science*, 181 (4094):51-54.
- ⁵Lieske, R., and E. Hofmann. 1929. Yeast formation under high gas pressure. *Biochem. Z.*, 210:448.
- ⁶Vsekhsvyatsky, S. A. 1973. Letter. *Sky and Telescope*, 46 (3):139.
- ⁷Clapham, P. B., and M. C. Hutley. 1973. Reduction of lens reflexion by the "moth eye" principle, *Nature*, 244 (5414):281-282.
- ⁸Libby, L. M., and H. R. Lukens. 1973. Production of

- radiocarbon in tree rings by lightning bolts, *Journal of Geophysical Research*, 78 (26):5902-5903.
- ⁹Benemann, J. R. 1973. Nitrogen fixation in termites, *Science*, 181 (4095):164-165.
- ¹⁰Buchner, P. 1965. Endosymbiosis of animals with plant microorganisms, *Interscience*, New York.
- ¹¹Hensley, W. K., and W. A. Bassett. 1973. Pressure dependence of the radioactive decay constant of beryllium 7, *Science*, 181 (4105):1164-1165.
- ¹²Anderson, J. L., and G. W. Spangler. 1971. Abstract. *Bulletin of the American Physical Society*, 16 (Series 2) (10):1180.
- ¹³Anderson and Spangler. 1972. *Journal of Physical Chemistry*, Vol. 76, p. 3603. These authors reported that something else along these lines was to appear, probably in the *Journal of Physical Chemistry*, in 1973.
- ¹⁴Nevins, S. E. 1974. Post-flood strata of the John Day country, northeastern Oregon, *Creation Research Society Quarterly*, 10(4):191-207. See also Northrup, B., for comments on this article in same issue, p. 228ff.
- ¹⁵Nevins, Stuart. 1974. Post-Flood Strata of the John Day Country, Northeastern Oregon, *Creation Research Society Quarterly*, 10(4):191-205.
- ¹⁶Lammerts, W. E. 1971. On the recent origin of the Pacific Southwest deserts, *Creation Research Society Quarterly*, 8(1):50-54. (See especially p. 53, right column.)
- ¹⁷Colgate, S. A., and T. Sigurgeirsson. 1973. Dynamic mixing of water and lava, *Nature*, 244 (5418):552-555.
- ¹⁸Magne, R., J. Berthelin, and Y. Dommergues. 1973. Solubilisation de l'uranium dans les roches, par des bacteria n'appartenant pas au genre *Thiobacillus*, *Comptes Rendus Academie des Science Paris*, 276 D (19):2625-2628.
- ¹⁹Shorski, R. 1972. Effect of magnetic field on reduction of haematite, *Nature Physical Science*, 240 (7):15-16.
- ²⁰Schramm, David N. 1974. The age of the elements, *Scientific American*, 230(1):69-77.
- ²¹Mulfinger, George. 1970. Critique of stellar evolution, *Creation Research Society Quarterly*, 7(1):7-24.

BOOK REVIEWS

"The Bankruptcy of Evolution." Bible Science Association of Canada, P. O. Box 34006, Vancouver 9, British Columbia, Canada. 1973. Pamphlet. Price, 5 cents.

Reviewed by Harold Armstrong.*

This work is really a tract, of a size that can readily be put into a pocket or a letter, and at a price such that it can be distributed widely.

Several aspects of scientific data, often mentioned as proofs of evolution are mentioned. By means of quotations from scientists who want to uphold evolution, the reader is shown that the alleged evidence does not prove the desired conclusion. Groups of data mentioned include embryology, vestigial organs, resistance to antibiotics or to insecticides, and fossils.

That the mechanisms usually proposed for evolution, mutations and natural selection, are not adequate is pointed out briefly.

*Harold Armstrong, M.Sc., teaches physics at Queen's University, Kingston, Ontario, Canada.

This work could be especially useful to anyone who has the opportunity to distribute small items of literature.

☆ ☆ ☆

Natural Theology: or, Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature by Wm. Paley. Originally published about 1800, reprinted by St. Thomas' Press, P. O. Box 35096, Houston, Texas 77035. 1972. 402 pages. Price, \$3.95.

Reviewed by H. L. Armstrong.*

In one sense, it may seem presumptuous to review a book so outstanding, and of such a long standing, as Paley's. But there may be those who, while they have heard of Paley, have never seen his book. Moreover, the fact that it has been reprinted should be widely known.

Paley's purpose in writing was, in part at least, to combat the atheism which was as militant in his day, as today, if not so common. Of the various forms of evidence of God's existence and nature, he chose one which still interests creationists: that from design in nature.

Paley began by proposing the question: supposing that one were to find a watch, would he not conclude that there was a watchmaker? Would he consider for a moment that it had always existed, or that it had come into being by chance somehow?

The examples of design are drawn from the whole field of nature. They involve plants and animals, men and moles, elephants and insects. Their nature as a whole, their anatomy, and the instincts which come into play in their daily life, are all shown to conduct to their existence.

Nor does the work consider organic nature only; there is some consideration of inorganic nature, and of astronomy.

In the last part of the book, Paley proceeds, from the evidence already adduced, to draw conclusions about God's nature. This is the work of natural theology, in the old sense; and while Paley never proposed that it would be a substitute for revelation, he did consider that it might serve to lead some people to investigate revelation seriously.

Remarkably, though the work is nearly two hundred years old and deals with nature, practically nothing has been superseded; if anything, more recent knowledge usually makes the arguments even stronger.

Also remarkable is the fact that here, in a work written about 50 years before Darwin, refutations of practically all of Darwin's concepts may be found. One wonders how Darwinism caught on. Of course, it may be that after 50 years Paley was not well known. Besides, people will believe what they want to believe.

In conclusion, this work is well worth while for anyone who wants to make a sincere attempt to learn what is implied by the world around us. St. Thomas' Press has done a real service in reprinting this volume.

☆ ☆ ☆

The God Who Cares (A Christian Interpretation of Time, Life, and Man) by Harold F. Roellig. The Branch Press, Box 229 Bayside, N. Y. 1971. 176 pp. Price: \$4.50.

Reviewed by Larry G. Butler.*

I eagerly bought this book shortly after it was published, chiefly because it was claimed that Dr. Roellig "has established a unified and holistic vision of the acts of God through time in the form of a narrative of God at work in the origin of the universe, at work in history, at work now."

On examining the book I regretted my rashness, for I found that Dr. Roellig does not accept the Biblical narrative as a valid record of the acts of God at His creative work.

*Larry G. Butler, Ph.D., is professor of biochemistry, Purdue University, West Lafayette, Indiana.

He begins by accepting all the claims of the evolutionary thinkers, from the origin of the universe (Big Bang, 12 billion years ago), through the origin of life (due to random occurrences of natural phenomena, but a highly predictable event), to the origin of man ("It should be plain how difficult it is to separate our species in any significant way from the animals out of which we evolved").

For this I bought the book? Conventional texts express the same views more convincingly.

When I came across Dr. Roellig's assertions that divine intervention of God in the evolution of life cannot be detected and should not be expected either in the record of life or in the history of the universe, I conceded my mistake in buying the book, and relegated it to a back shelf.

Then when I recently noted advertisements in *Scientific American* claiming in bold type that this book "renders obsolete the California creationist-evolutionist textbook controversy," I decided I must have missed something. I began reading it again, encountering such topics as the stages in human evolution (beginning with *Australopithecus*) and the dawning of religious consciousness (at least 50,000 years ago).

The first three chapters of Genesis are said to be parables with a very long oral tradition before they were written down; the Noachian flood is said to be a myth. Discouraged, but still hopeful of finding the key to the California textbook controversy, I pressed on.

Lengthy chapters rehearsing the history of the Israelites, the life of Christ (who is presented as a model of selfless love and service, rather than as the Saviour), the early church (The Way) and the present church (neglect of The Way) are presented from a theologically liberal viewpoint.

In his final chapter Dr. Roellig pleads that, despite the "historical fact" that *Homo sapiens* evolved to know guilt and anxiety, despite the "unsolved problem" (which is "not of critical importance") of whether man's mind "is or is not something more than an intricate series of electrical and chemical phenomena," despite this mechanical, deterministic, materialistic view of life, man's call from God is to love and serve others in all areas of his life.

According to Dr. Roellig, the only true peace comes from giving ourselves totally to the service of God and man.

I was disappointed to find no narrative of God at work, only the naturalistic process of evolution going about its implacable business; I still stubbornly prefer the Biblical narrative of supernatural God at His creative work.

Neither could I see how this book renders obsolete the creationist-evolutionist textbook con-

troverly unless it is by "selling" conventional evolutionary dogma to creationists in the guise of a "Christian Interpretation."

Actually, rather than distinctively Christian, the book is a humanistic, evolutionary interpretation in which the author ignores or contradicts the Biblical record. I am not "buying" this interpretation. Most creationists won't either.

☆ ☆ ☆

Earth's Most Challenging Mysteries by Reginald M. Daly. 1972. The Craig Press, Nutley, N. J. 403 pages. Price: \$3.95.

Reviewed by Erich A. von Fange.*

Daly draws on a wide range of scientific literature to support his thesis that many of earth's geological mysteries are best solved through acceptance of the Biblical Flood, followed closely in time with an Ice Age.

Despite the crushing dogmatism of science about the evolutionary development of the earth, scientists have many speculations but no key and no solution to the many problems and mysteries of the earth. Jargon, double-talk, and confusion reign mightily over the land.

The most important object of veneration is the sacred geological column, locked into place in 1840, with which no devotee dares to tamper. It is the great tabu of science.

Some sources used by Daly will be familiar to readers of the *C. R. S. Quarterly*, e.g., C. E. P. Brooks, Sir William Dawson, Charles H. Hapgood, Sir Henry Howorth, Henry M. Morris, Byron C. Nelson, Donald W. Patten, George M. Price, Alfred M. Rehwinkel, Otto Stutzer, Immanuel Velikovsky, and John C. Whitcomb.

From about 175 sources noted in the bibliography, there are many really excellent quotations and references from many fields of science and from scientists which support the author's thesis. Perhaps the most illuminating quotations on the whole issue of creation vs. evolution are the following (p. 388):

We are determined to believe evolution, not because it is true nor that we believe there is any evidence for it, but because it has become the symbol of our liberalism. (a university student)

We all, even the youngest of us, profess to accept the doctrine of evolution, if only as a convenient weapon with which to meet the fundamentalists.

Such candor is rare in our time. These quotations show the psychological nature of the issue and the low estate of fact and evidence in a scientific age.

Among the topics effectively treated by Daly are the following: extinctions of mammoths and dinosaurs, rise and fall of floodwaters, origin of coal, the ice age, origin of oil, collapse of the vapor canopy, submarine canyons, age of rivers, origin of sedimentary mountains, ocean ridges and trenches, and origin of ranges, basins, and shoreline mountains.

In the opinion of this reviewer, it is not necessary nor is it tenable to "place all our eggs in one basket"—that there was only one geological event (the flood followed by the ice age) to explain all the geology of the earth from Cambrian to Recent. One can be faithful to the Scriptures and support a number of events occurring on a young earth. The book, nevertheless, is an interesting and useful resource and reference.

☆ ☆ ☆

Biological Transmutations by Louis Kervran. English version by Michal Abehsera. 1972. Swan House Publishing Co., Binghamton, New York. 163 + xix pp. Price: \$5.75. (Paper \$2.75.)

Reviewed by H. L. Armstrong.*

The thesis maintained here is that transmutations of elements, e.g., of potassium into calcium, can happen in living beings, both plants and animals. From the viewpoint of the usual chemistry and physics, such a claim is surprising, to say the least.

Yet it is perhaps no more surprising that the discovery, about the turn of the century, that there are circumstances under which transmutations occur. For instance, the "fixing" of atmospheric nitrogen, which, if done artificially requires rather extreme temperatures and pressures, is carried out easily under ordinary conditions in the bacteria on the roots of legumes.

The transmutations reported involve mostly the lighter elements. Some examples may be mentioned.

Human beings, according to the author, are able to transmute sodium into potassium, by combining an atom of oxygen with one of sodium. The combination is on the nuclear level; the result is not just an oxide of sodium.

The reaction is quite endothermic, and is thus useful by absorbing excess heat. Data are presented to show that men working in extreme heat used up sodium and excreted more potassium than could possibly have come from reserves in the body. At the same time, they definitely took in more heat than was used in evaporating perspiration.

*Erich A. von Fange, Ph.D., resides at 467 Pine Brae Drive, Ann Arbor, Michigan 48105.

*H. L. Armstrong, M.Sc., is with the Department of Physics, Queen's University, Kingston, Ontario, Canada.

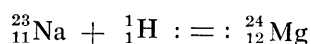
Studies are described in which chickens, living on a diet which provides little or no calcium, are nevertheless able to go on making egg shells. But they did have a source of potassium. That they were able to combine potassium with hydrogen to make calcium is proposed.

Especially by the action of certain bacteria, evidently iron and manganese are interchanged. The combination of hydrogen with manganese can give iron; or the reaction may go the other way.

Some experiments are described by which anyone with some ability at analytic chemistry should be able to investigate these processes. Many of them involve letting seeds germinate, and comparing an analysis of the sprouts with that of the seeds.

Some possible applications are suggested. In agriculture, the theories presented here could explain how plants are able to go on taking from the soil elements which are not commonly included in fertilizers. In medicine, the matters considered include the relation between, and effects of, the amounts of sodium and of potassium in the blood. The possibility of transmutation of silicon into calcium is appealed to in dealing with the growth and healing of bones.

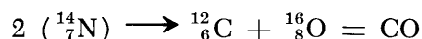
The various reactions which are proposed mostly involve either hydrogen or oxygen. They balance in the way in which the reactions in nuclear physics balance; the sum of atomic numbers, and that of mass numbers are the same on each side of the equation. For instance, the combination of hydrogen with sodium to form magnesium is written:



(The reader will recall that the lower numbers are the atomic numbers, interpreted as indicating the number of protons in the nucleus of the atom concerned. The upper are the mass numbers, interpreted as indicating the number of nucleons, i.e., protons and neutrons, in the nucleus. One should also recall that the mass numbers usually balance, in nuclear physics, only because they have been rounded off.

If they are entered exactly, there will usually be a discrepancy; and this is related to the energy of the transmutation by Einstein's relation. It seems to be doubtful, however, that the same relation holds in the biological transmutations.)

Little is said in this book about the mechanism proposed for such transmutations. One example, which has an application in industrial safety, is that of molecular nitrogen into carbon monoxide. This could be written:



Now the molecular nitrogen has two atoms combined. One might imagine a proton tunnelling from one atom into the other, according to the formulae of wave mechanics, to bring about the transmutation. After all, when an atom of radium disintegrates, giving off an alpha particle, i.e., an ion of helium, it can be said that the ion tunnelled its way out of the nucleus of radium. The only difficulty is to see whence the rather large energy, (according to conventional nuclear physics), would come from.

There are several reasons why it might be worth while for creationists at least to watch for further developments here. First of all, creationists can perform a minor service, by being sympathetic—up to a point—to unorthodox notions in science. Creationists are committed to a belief that “there are more things in heaven and earth than philosophy dreams of.” Also, creationists know what it is like to hold unpopular views.

In the second place, if it is true that plants, e.g., are able to transmute elements, creationists can see why. God arranged it thus, so that they could get around deficiencies in the place where they were growing to some extent. But it would be very hard to see how any such ability could have “evolved.”

In the third place, if there are transmutations in plants and animals, and if there may be some involving carbon, this would introduce another reason why ages determined by radioactive carbon might be erroneous.



How to Lie with Statistics by D. Huff. Originally 1954, now in the 25th printing. W. W. Norton and Co., Inc., New York. 142 pages. Price: \$1.95. (For paper back)

Reviewed by H. L. Armstrong.*

To review a fairly old book is certainly not the usual practice. But upon looking at this work, I thought how much the tricks mentioned in it resembled some of the tricks used in arguments for evolution. For that reason it might be worth while to think about this book.

There are two points to be considered: first, that statistics may be false or misleading; and secondly, that true figures may be presented in a misleading way.

One of the points considered is bias, sometimes under the heading: “the little figures that are not there.” This is seen especially in the selection of evidence favorable to a thesis, contrary evidence being ignored. Creationists know that that is done in support of evolution.

*H. L. Armstrong, M.Sc., is with the Department of Physics, Queen's University, Kingston, Ontario, Canada.

One instance is the way in which orders of strata that agree with the preconceived notions of what the "geological column" should be like are selected for presentation; while places in which the strata are in the "wrong" order, according to uniformitarianism, are ignored, or else attempts are made to explain them away as "overthrusts."

Another error, or trick, in the use of statistics, is that of giving e.g. averages to quite unwarranted precision. Sometimes it may not be noticed that the range of variation of something is so great that an average really means very little.

An example of this is found in the ages of things, quoted on the basis of results from e.g. radioactive carbon. Often if the uncertainty indicated by the comparison of different results were indicated, then the results would seem to prove little or nothing.

True data may be presented in misleading ways. One such is the use of a graph in which only a little bit of a scale is shown, so that say 1% change in something extends over the whole graph. The analogous trick to this in evolutionary writing is concentrating on some miserable bit of variation in something, e.g. fruit flies, and suggesting, without any evidence whatever, that such variation might go on indefinitely, to lead to new kinds of creature.

Other kinds of pictorial presentation may be misleading. For instance, figures may be represented by pictures, (e.g. men, money-bags, etc.), drawn usually with linear dimensions to scale. But one tends to interpret them in terms of areas, or even volumes, which go as the square or cube respectively of the linear dimensions. Thus the differences are exaggerated. The use of misleading drawings, e.g. those which compare embryos, and probably some "reconstructions" of primitive men, in support of evolution, is, of course notorious.

Sometimes the statistical figures are all right, but are used to support false conclusions. Such mis-uses have, of course, been considered under logic for a long time. They are fallacies or sophisms, according to the purpose and viewpoint. Two of these are especially common.

One of these fallacies is the "ignoratio elenchi": missing, or rather, perhaps, refusing to see, the point. This is found when the statistics do not support the desired conclusion, so they are used to support some other conclusion, which is considered to be related somehow, or to suggest the desired one.

For instance, all of the experiments on the "artificial creation of life" really have nothing to do with the beginning of life; they show that it is possible, at a considerable effort, to synthesize

some organic material (organic in the sense that it is similar to something that might be found in some organisms), in the laboratory. But this is reported in a manner, and it is intended to suggest that the "creation of life" is just around the corner.

The other fallacy is that of "post hoc ergo propter hoc"; i.e., of suggesting that because B followed A it must have been caused by A. For instance, the "fossil record" is supposed to show that the mammals followed the dinosaurs; it is then claimed that the mammals were caused by the dinosaurs, in the sense of descending from them.

But fossils can never "tell" anything about descent. It could have been, as some of the early geologists held, that there were catastrophes, followed by re-creations. The "fossil record" indicates such a series of happenings more nearly than it indicates a steady uniformitarian change.

The book author remarks that it is possible that some of these mis-uses of statistics arise from carelessness, or, in the cases of pictorial representations, from sloppy drawing. But, he goes on to say, that it is strange that nearly always the error is in the favor of the person issuing the statistics. Likewise, it might be said, some of the fallacious arguments for evolution might be just mistakes, but it is strange that they are always in the desired direction; viz.: in favor of evolution.



"Evolution, Science Falsely So-called." Ninth edition. International Christian Crusade, 205 Young Street, Room 31, Toronto, Ontario, Canada. 1974. 95 pages. Price: 30 cents, plus postage.

Reviewed by H. L. Armstrong.*

This work, occupying a position between those of a fullsize book of apologetics and of a tract, might well be called a classic, about 200,000 copies having been printed in the various editions. The booklet contains, in a condensed form of course, most of the arguments for creation and against evolution.

First of all, the reader learns that the alleged evidence for evolution becomes such evidence only by being misinterpreted; and that the evidence is in fact against evolution. Several of the alleged items of evidence, such as features of embryos, alleged vestigial organs, and fossils are shown to fit in with the stability of kinds rather than with evolution.

*H. L. Armstrong, M.Sc., is at Queen's University, Kingston, Ontario, Canada.

The means usually proposed for evolution, mutations and natural selection, are examined and shown to be unequal to the task which evolutionists wish for them.

The unique, and hence un-evolved, nature of mankind is discussed. There is also consideration of the bad effects which evolution, accepted as a doctrine, can have on mankind.

A number of miscellaneous pieces of evidence for a young earth, and hence against evolution, are mentioned. They include growth of the human population, first traces of civilization, and

reasons why some of the methods applied to finding ages are likely to give inflated results.

The work concludes with a list of 192 references. Many of these, as is pointed out, are by evolutionists, admitting difficulties in evolutionary thinking. Hence they are especially valuable evidence for the other side.

The size of the booklet, which will fit into a pocket or a letter, is very convenient. In general, it may be said that here is the creationist position, stated "in a nutshell."

LETTERS TO THE EDITOR

(Note to Contributors: Letters should be submitted in the form the author expects to actually appear in the *Quarterly*. Letters should be typed double-spaced on separate paper.)

Christian Concern about Government Schools

In regards to Dr. John W. Robbins' letter on "Christian vs. Government Schools" in the December issue: regardless of how one feels about tax-supported public schools, they do exist. Even if all Christians remove their children from them and enroll them in Christian schools (assuming they can afford it and good fundamental Christian schools are available to them), the majority of the children in our country will still be in public schools.

What about the non-Christian children—don't they deserve to know about God's creation, too? Shouldn't they have the fallacies of evolutionary thinking pointed out to them? We feel that we should reach such children with as much of the truth as possible.

By teaching creation in the public schools, we simply mean the presentation in textbooks and in the classroom of some of the evidences from the various branches of science which support the concept that all things are the result of intelligent, purposeful design, coupled with the presentation of some of the negative evidence and theoretical difficulties with respect to the evolutionary hypothesis.

This is the only way creation can be taught in science classes. Even apart from the constitutional rights of tax-paying citizens, this constitutes good education as well as good science.

We feel that the scientific facts will expose the fallacies of evolutionary theory while supporting the creation model, thus leading the students to the truth about God's creation as recorded in the Bible.

But if the students are not allowed to examine the hypothesis of evolution, they will not be able to cope with it when they confront it later. They

must know what the evolutionists believe and the facts of science to be able to refute evolutionary ideas.

We expect the church and the parents of Christian children to supplement the teaching regarding creation which they receive in school.

Sincerely,
Carole Barklow, Research Assistant
Creation-Science Research Center
4250 Pacific Highway, Suite 117,
San Diego, CA 92110

☆ ☆ ☆

More on Fossil Thorns

The article by Dr. John Howitt [*C. R. S. Quarterly*, 9 (1):51-53] contains a small but important error which apparently bothered M. R. Carse [Letter, *C. R. S. Quarterly*, 10 (1):77] besides others, and needs to be corrected.

The statement Howitt quoted from H. MacMillan (1871), *The Ministry of Nature*, MacMillan and Co. London, 347 pp.) that "not one indisputable thorn or thistle has been found in the older rocks" (p. 109) is certainly no longer true.

The 1882 date given by Howitt is merely a reprinting date for the 1871 copyrighted edition. Thus, considering the date of the original statement, its accuracy should automatically have been considered suspect.

In 1871 paleobotany was an infant science and perhaps it is understandable that no one had yet discovered fossil thorns or thistles. However, since that time, "indisputable" thorns of numerous woody plants have been reported in pre-Pleistocene strata. Some of the very lowest plants found in the geologic record were armored with thorns and spines.

See for instance Dorf (1934. Lower Devonian flora from Beartooth Butte, Wyoming, *Bulletin of the Geological Society of America*, 45:425-439) and Hoeg (1942. The Downtonian and Devonian flora of Spitsbergen, *Norges Svalbard-og Ishavundersokelser*. Skrifter, Nr. 83, 228 pp.)

Other fossil floras also have plants with well developed thorns (Becker, H. F. 1961. Oligocene plants from the Upper Ruby River Basin, Southwestern Montana, *Geological Society of America Memoir* 82, 127 pp.) Further literature search would undoubtedly provide additional samples.

Since thistles are herbaceous they would be less likely to be preserved as fossils and to my knowledge have not been found. Pollen grains of this group are not unique and cannot be distinguished from other members of the family Compositae. Thus, although thistle-like pollen is found at least from Oligocene rocks to the present, palynology cannot tell us when the first thistles appeared.

I have no argument with Howitt's statement that "thorns and thistles certainly appear immediately after the expulsion from Eden" [Letter, *C. R. S. Quarterly*, 10 (1):78]. No other reading of Genesis 3:17 and 18 seems possible. I do not agree with the thesis that thorns were present "before the Fall" as held by MacMillan (Op. cit., pp. 109 and 111).

What I would like to point out is that since thorns are found as fossils (and thistles may be represented as well), the fall of man must have been at least a pre-Devonian event. The presence of thorns and thistles in the fossil record does not support the position that the fall and subsequent flood occurred during the Pleistocene. Such a position does not appear either biblically or scientifically sound.

Respectfully,
Lanny H. Fisk,
Dept. of Biology,
Loma Linda University
Loma Linda, Ca 92354

☆ ☆ ☆

Mimicry

If creationists expect to be taken seriously as scientists, we will have to behave like scientists. An inappropriate statement appears in your column, "Comments on Scientific News and Views," where you say regarding an author's statement on protective camouflage, "Yet he does not show, just as it never has been shown and never will be, how such features could, in fact, have evolved." (Vol. 10 (2):118-- Second col., line 42)

Such dogmatism about current scientific knowledge and that of the future has no place in rational discourse. Even aside from its prophecy about the results of future research, this statement claims a total knowledge of current information.

An article which, I believe, makes a pretty good case for the microevolution of protective

coloration in butterflies is that of P. M. Sheppard in the *Cold Spring Harbor Symposium on Quantitative Biology*, 1959. *Papilio dardanus* mimics several different distasteful species, depending on which distasteful model is prevalent in a certain area.

Genetic studies have shown that the major part of the mimicry is controlled by one gene with at least ten alleles. Since the various forms are interfertile, they belong to the same original kind which could have possessed at most four alleles at this locus (male and female heterozygous for different alleles). The additional alleles have therefore arisen by mutation and so constitute a case of microevolution, as it is generally defined.

Sheppard's article presents much more evidence in greater detail, but perhaps the above sampling gives a general idea.

Sincerely,
Lane P. Lester, Ph.D.
Sunshine Canyon
Boulder, Co 80302

☆ ☆ ☆

Comments on Scientific Theology

Dr. Holroyd's article on scientific theology in the December issue is very interesting. Certainly, as he claims, it is folly to teach science without a theistic background.

However, some of Dr. Holroyd's suggested means of implementation are to be questioned. Should a Bible believer really sit at the feet of Hegel and A. N. Whitehead as he indicates?

Most important—Dr. Holroyd advocates relying on the dichotomy of mind and matter. But is this not the central doctrine of the ancient Gnostics, and also of whatever modern counterparts they may have?

If scientific discipline is to be oriented afresh to the Lord, I would suggest the following:

Modern electronic-oriented science beginning with Faraday and Maxwell is a radically new development. Under Faraday and Maxwell this development was handled with Christian prudence. Since then this new development has not, generally speaking, been handled with Christian prudence. In fact, an adequate semantic basis has not as yet been found for it.

I would count as a veritable Christian Manhattan Project a scientific discipline taking up where Maxwell left off and handling the new science with Christian prudence. Such an implementation of Dr. Holroyd's thought would be most welcome.

Very truly,
Samuel Wolfe
419 W. Alamar Ave.
Santa Barbara, Ca 93105

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 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.

Board of Directors *Biochemistry:* Larry Butler, Ph.D., Purdue University, Lafayette, IN 47907; Duane T. Gish, Ph.D., Institute for Creation Research, 2716 Madison Avenue, San Diego, CA 92116. *Biological Sciences:* Wayne Frair, Ph.D., **Secretary**, The King's College, Briarcliff Manor, NY 10510; George F. Howe, Ph.D., Los Angeles Baptist College, Newhall, CA 91321; Wilbert H. Busch, Sr., M.S., Sc.S., **Membership Secretary**, Acting President, Concordia Lutheran College, Ann Arbor, MI 48104. *Genetics:* John W. Klotz, Ph.D., Concordia Senior College, Fort Wayne, IN 46805; Walter E. Lammerts, Ph.D., Freedom, CA 95019; William J. Tinkle, Ph.D., Timbercrest Home, North Manchester, IN 46962. *Geology:* Clifford L. Burdick, M.S., 924 N. 6th Avenue, Tucson, AZ 85705; Harold Slusher, M.S., University of

Texas at El Paso, TX 79902. *Medicine:* Karl W. Linsenmann, M.D., Midland Medical Center, Midland, MI 48640. *Physical Sciences:* Harold Armstrong, M.S., **Publications Editor**, Queens University, Kingston, Ontario, Canada; Thomas C. Barnes, D.Sc., **President**, University of Texas at El Paso and Consultant to Globe Universal Sciences, Inc., El Paso, TX 79902; John J. Grebe, D.Sc., 11604-114th Drive, Youngstown, AZ 85363; Richard G. Korthals, M.S., **Treasurer**, Arcadia, MI 49613; Henry M. Morris, Ph.D., Institute for Creation Research, 2716 Madison Avenue, San Diego, CA 92116; Emmett L. Williams, Jr., Ph.D., **Vice-President**, Bob Jones University, Greenville, SC 29614. *Science Education:* John N. Moore, M.S., Ed.D., 136 Brody Hall, Michigan State University, East Lansing, MI 48824.

GUIDELINES FOR CONTRIBUTORS

Editors of Creation Research Society publications ask all contributors to use the following guidelines for preparing manuscripts submitted for publication. It is our goal to keep such restrictions to a minimum thereby insuring a freedom of expression not often found in scientific writing.

Manuscripts should be submitted to the Editor in *triplicate*—one original copy and two photocopied or carbon copies for use by reviewers. Manuscripts must be typed double-spaced with good black ribbon on one side of the page only. At least one inch should be used for all four margins so the Editor will have space for his instructions to the printer, or for queries to the author. All manuscripts should be in English. Pages should be numbered consecutively, including all inserted pages. Typing the contributor's last name before the number of each page is good insurance against loss of any pages in editorial handling.

An *abstract* of from 100 to 200 words should be included with the manuscript. The abstract should contain a summary of the entire article, briefly giving representative coverage to such possible areas as data presented, concepts discussed, conclusions established, etc. Letters, book reviews, or articles less than one journal page need not contain an abstract.

If *corrections* and *insertions* in the manuscript are very brief, type or print them legibly *above* the line involved. If corrections are lengthy, then re-type the page involved with carry-over on a new page with number consistent with entire manuscript.

Authors are encouraged to use *illustrations*, *drawings*, and/or *tables of data* to increase reader understanding of the subject discussed. Only black and white "glossy" prints of photographs should be submitted. These will be retained by the Editor unless specific request for return is received with the manuscript. To facilitate prompt review of the manuscript by two or more referees, send copies of illustrations for mailing to referees. Such copies may be rough but should convey the same information as the originals. Illustrations should be referred to as "Figure 1," and numbered consecutively in order of use in the manuscript. *Captions* for illustrations should be assembled on a separate page, not attached to the figures. All drawings should be completed in black ink to insure high quality reproduction. All tables should be submitted on separate pages at the end of the manuscript. Tables should be numbered consecutively in order of use in the manuscript. Indicate on the manuscript where figures, drawings and tables should be inserted in the text.

References used should be listed at the end of the paper in the order of use. Literature citations in the text should be designated by consecutive numbers only. Each number will refer to the appropriately numbered source in the reference list at the end of the paper. The first reference to any source should include **complete** bibliographic information in this order: author (or possibly editor); date; title of book or article (and title of symposium volume if such); volume, number, and pages (if an article); publisher; city.

Two or more consecutively numbered references in the body of the article to the same source can be handled in the reference list by use of *Ibid.*, with new pages given. Later references to that same work (not in direct sequence) should be designated by Author, *Op. cit.*, and new pages cited.

By this system bibliographic material is not injected into the text, but is localized in the reference list at the end. A complete citation for interested readers is also guaranteed. Several typical forms follow by way of example:

References

¹Smith, C. M. 1950. The fresh-water algae of the United States. Second Edition. McGraw-Hill Book Co., Inc., N. Y., p. 434.

²*Ibid.*, p. 436.

³*Ibid.*, p. 307.

⁴Ris, H., and R. N. Singh. 1961. Electron microscope studies on blue-green algae, *Journal of Biophysical and Biochemical Cytology*, 9:63-80.

⁵Smith, C. M. *Op. cit.*, p. 482.

⁶Corner, E. J. H. 1961. Evolution (in) Contemporary botanical thought. Edited by Anna M. MacLeod and L. S. Copley. Quadrangle Books, Chicago, Ill. p. 417.

⁷A "clone" of plants is a group of adult plants originally derived from one parent plant by means of vegetative reproduction.

⁸Ris, H., and R. N. Singh. *Op. cit.*, p. 69.

Galley proof will be sent to each author and should be corrected immediately on receipt and returned to the Managing Editor. Authors should provide a forwarding address including zip code designations if they move from the address sent with the manuscript.

Arrangements for *reprints* are not provided. The Editors assume that the author will utilize photocopying methods available to him as the most economical means to obtain copies of his article.

Manuscripts should be addressed to Editor Harold L. Armstrong, *Creation Research Society Quarterly*, 4 Couper Street, Kingston, Ontario, Canada.

See the current *CRSQ* for book offers