# Creation Research Society Quarterly

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

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# CREATION RESEARCH SOCIETY



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## ARTICLES



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### *Cover Photograph*

Anna Ruby Falls, Georgia-note the massive blocks of rock that have been transported below the falls. Likely in the past during a wetter post-Flood climate, there was considerably more water available for erosion and transport. Caption and Photograph by Carl R. Froede, Jr.

**Instructions to authors can be found in June Quarterly.**





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## Editor's Comments

After five years, it is time to pass the CRSQ editorship on to Dr. Eugene Chaffin and his associate Dr. George Howe. I have enjoyed corresponding with many readers. Your ideas and interest in creation studies are always appreciated.

It is popular today to use the word "evolve." Ideas, plans, and careers are all said to evolve with time. Well, the *CRSQ* certainly does *not* evolve. This word means more than simple change; evolution implies disorder, mutation, and degeneration. I suggest that the unfortunate word "evolve" is a poor choice *unless* referring to a downward trend! The Quarterly, meanwhile, continues to strengthen. Please support the new editors in our continued effort to promote creation science.

Don DeYoung



### Quote

Man does not project himself, or make himself; he is created by God and reflects the logos by his own reflection on and doing of "these things."

Reist, Jr., J. S. 1986. The existential challenge to Christian values: sheer freedom or shaped faith? In Burke, T. J. (editor). The Christian vision: man and morality. Hillsdale College Press. Hillsdale, MI. p. 71.

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# CREATION RESEARCH SOCIETY

**History** The Creation Research Society was 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 creation, with a current membership of over 600 voting members (with graduate degrees in science) and over 1100 non-voting members. The Creation Research Society Quarterly has been gradually enlarged and improved and now is recognized as 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. The Society operates two Experiment Stations, the Grand Canyon Experiment Station in Chino Valley, Arizona and the Grasslands Study Site in Weatherford, Oklahoma.

**Membership** Voting membership is limited to scientists having at least an earned graduate degree in a natural or applied science. Dues are $20.00 ($24.00 foreign) per year and may be sent to Glen W. Wolfrom, Membership Secretary, P.O. Box 28473, Kansas City, MO 64118. 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 $20.00 ($24.00 foreign) per year and includes a subscription to the Quarterlies. All others interested in receiving copies of all these publications may do so at the rate of the subscription price for all issues for one year: $23.00 ($27.00 foreign).

**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. 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 humans, 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 a historical event worldwide in its extent and effect.

4. We are an organization of Christian men and women 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 Savior for all people. Therefore, salvation can come only through accepting Jesus Christ as our Savior.

# LETTERS TO THE EDITOR

## Creation Conference

The Creation Science Fellowship, Inc. (CSF), is sponsoring the Third International Conference on Creationism (ICC), to be held in Pittsburgh, PA, July 18-23, 1994, on the campus of Duquesne University (Duquesne is not affiliated with the CSF or ICC). The response for the third ICC has been overwhelming. This ICC, like the Flood, is global in scope! With the exceptions of South America and Antarctica, every continent will be represented by prospective authors.

Over 100 papers have been submitted into the review process, geared to high level, "state-of-the-art" creationism, following the stringent standards set in previous ICCs. The theme of the Technical Symposium is *Developing and Systematizing the Creation Model of Origins.* The Technical Symposium runs the entire conference, Monday through Saturday, inclusive.

The Basic Creation Track has been specifically designed to present the currently understood creation model of origins to the "man on the street." To meet this intended goal, only invited papers have been selected, in order to provide the ideal introduction to the creation model. Presentations are targeted for either an entry or intermediate level, with the intended audience being home schoolers, private and public educators, pastors, and others interested in learning more about this important and exciting topic. The Basic Creation Track runs from Thursday through Saturday, inclusive.

For more information, write to International Conference on Creationism, P.O. Box 99303, Pittsburgh, PA 15233-4303, or call (412) 341-4908.

Robert E. Walsh
ICC Coordinator

## Creation Vacations

Alpha Omega Institute's affordable, family vacations feature an illustrated creation seminar with Dave and Mary Jo Nutting, special children's programs, and Colorado recreational activities. Contact Alpha Omega, Box 4343, Grand Junction, CO 81502, (303) 245-5906.

Dave and Mary Jo Nutting

## Relativity

A free monograph containing a theory that not only predicts all of the verified consequences of the special and general theories of relativity but also eliminates all of the creation-science criticisms of Einstein's theories is available. In particular, it is shown that one basic physical process influences all natural entities and produces all such relativistic effects. This process is a type of damping of the oscillatory behavior of a special type of space medium. The monograph is written for individuals that have the equivalent of an advance degree in physics or mathematics. The supply is limited. Simply request the "monograph on relativity" from me.

Robert A. Herrmann, Ph.D.
P.O. Box 3268
Annapolis, MD 21403-0268

## Hydrothermal Vents

Some have questioned what the force could be that pushes seawater out of deep-sea hydrothermal vents against the pressure of the overlying ocean (Lee, 1992). According to Tunnicliffe (1992), the basalt of the mid-ocean rifts is leaky—that is, cold, dense seawater percolates through the pores of the rock beneath the ocean floor. When it percolates far enough downward, it contacts the hot rock beneath the mid-ocean ridge. This heating causes a buoyant force which pushes the seawater upward and out onto the seafloor, causing hydrothermal venting. Sleep and Wolery (1978) concluded from theoretical considerations that the temperature of the vent waters implied venting upwards through planar and/or tubular crack zones. Thus, the faulted rift valleys of the mid-ocean ridge would provide the conduits for the exiting of the heated vent waters.

Perhaps a new theory about the geology of the ocean floor may be necessary. Personal correspondence with Jim Honeyman and E. Peterson has caused me to question my assumptions about continental drift. Honeyman basically contends that the mid-ocean rifts were opened and pushed upwards by displaced mass, rather than by convection currents in the oceanic crust. The reasons I think his views deserve deep consideration are twofold:

1) the "casual attitude toward moving chunks of granite around on the surface of the earth," as Honeyman describes it, which is the theory of continental drift. I realized that my belief in drift theory is a residual from my evolutionary days, and thus should be reviewed and examined thoroughly;

2) the geometry of the mid-ocean rifts themselves. Precise mapping by up-to-date sonar technology has revealed that many mid-ocean ridges are actually series of propagating rifts—that the ridges are made up of segments of cracks which overlap each other at the tips, for which they are termed overlapping spreading centers (Macdonald and Fox, 1983). As an evolutionist studying the ridges, I was given a paper about the formation and interpretation of dilatant echelon cracks (Pollard et al., 1982), such as crevasses in glacial ice or cracks in soil 'within active fault zones. These are linear series of overlapping, curved-tip cracks found in many places and on many scales in nature, which form in response to the rotation of remote principal stresses about an axis parallel to the crack propagation direction. I was struck by the similarity of this type of crack formation to the geometry of the mid-ocean ridges, but since I still had in my mind that the rifts were caused by subsurface magma convection, I could not make a logical connection between the two.

Honeyman theorizes that global ice caps caused pressure on the earth's crust, which ruptured in the weakest areas-the ocean crust. To quote him: "The continents average 30-33 km and the ocean floors 4-6 km. The thinnest section would therefore fracture and material would be extruded. After rupture, the great mass of ice would force parts of the continents downward and elevate the ocean floor on both sides of the rift. As the ocean floors elevated, there would be two

effects: the crust on both sides of the rift, as the circumference increased, would stretch and fracture perpendicular to the rift. As the ocean floor pushed upward, water would be displaced onto the continents. The elevation and fractures are still evident."

In fact, the precision mapping of the seafloor reveals that in the northeastern Pacific, at least, the mid-ocean ridges look like nothing more than huge tension cracks with the main stress perpendicular to the ridges. The fact that the ridges are gigantic dilatant echelon cracks may indicate that the stress that was ripping them apart was shifting even as the rifting was occurring. What is even more exciting, not only does the mapping show overlapping spreading centers, but the magnetic anomalies parallel to the ridges, which have been used to "prove" continental drift, mimic the overlap—in other words, as the rift was cracking, lava was spreading out from the cracks over the seafloor, and the earth's poles were undergoing reversals, so that the bands of reverse and normal polarity that parallel the ridges are like a motion picture of the separation of the ridge into two overlapping cracks. Evolutionary geologists assume that this flowing of lava and reversed and normal banding occurred over millions of years, but to me, it shows a tremendous crack which originated at some point and split across the ocean floor like a zipper opening.

There is much material for study here, which could be very fruitful in the area of the relationships between oceanic and continental crust. For example, currently it is held that the Pacific and North American plates are moving relative to each other, and that is what causes earth quakes along the California fault zones. If what Honeyman says is true, however, it could be that the melting of the ice caps is the cause of the quakes: the ice melted much faster than the earth's ability to rebound, so perhaps it is the slow yet steady rising of the North American crust, seeking equilibrium with the dense ocean plates surrounding it, that causes faulting and quaking. This would also explain why strong earthquakes do not only occur in California. Under the drift theory, strong earthquakes should mainly occur at plate boundaries, yet there were very strong earthquakes in South Carolina and the Mississippi Valley in the nineteenth century.

I believe that the origin of the mid-ocean ridges as fractures resulting from massive loading of glacial ice onto of the continents is a model that deserves consideration, and would encourage more study on the subject.

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Jackie Lee
218 Walden St.
West Hartford, CT 06107

## Fossil Wood of Big Bend National Park

### Introduction

I will address two different issues raised in the Big Bend papers (Williams and Howe, 1993): (1) the association of bentonite clay and petrified wood deposits, and (2) regional marker bed dating and correlation.

### Bentonite and Petrified Wood

In response to the first issue, the author supports the premise that there is evidence of an association between the occurrence of volcanic ash deposits, i.e., bentonite and montmorillonite, and petrified wood. The author is aware of petrified trees and wood associated with the Forest Hill Formation (Oligocene) located northwest of the city of Jackson, Mississippi. Although this formation is not known to contain any volcanic clays, the Yazoo Clay Formation (Eocene), which lies unconformably below the Forest Hill Formation, is a fossiliferous montmorillonitic clay with stringers of bentonite (Kolb et al., 1976, p. 3).

It has been shown that montmorillonite and bentonite weather to kaolinite, releasing silica (Altschuler et al., 1963). With enough precipitation and a groundwater table higher than the buried woody tissue, replacement of the plant tissue by silica released from the underlying formation could, and in fact has, occurred.

### Javelina and Aguja Correlations

Secondly, the issue was raised in Appendix II of the above referenced article, regarding the age and correlation of the Javelina and Aguja volcanic formations to other volcanic formations found in Wyoming, Montana, New Mexico, Louisiana and other sections of Texas. While many geologists support the idea of regional correlation of "related" strata via "marker beds," great caution must be used when extrapolating those marker beds regionally and/or globally. In order to correlate these two volcanic formations with other volcanic formations found several hundred or even thousands of miles away time equivalency must be established between them. Volcanic ash beds have a long history of use as stratigraphic event markers, and they may have local, regional or even global significance (Miall, 1990, p. 96). The correct dating of ash deposits requires correlation with "date markers," such as fossils, woody material, etc., found in, above and/or below the deposits in order to determine their age (Law of Faunal Succession and Law of Faunal Assemblages). The Big Bend area is complex geologically, with volcanic features punctuating much of the exposed geologic column and there would be a tendency to correlate these volcanic ash deposits to other geographically separate ash deposits, especially if they contained the same fossil assemblage.

The above referenced article stated that with permission from the National Park Service, Williams and Howe collected specimens of fossil and charcoalized wood to determine if radiohalos were present, to conduct C-14 age studies and to ascertain the silica content of the petrified wood. This author can predict with confidence that even with date determination made from these samples no new age outside of what has

already been determined will likely be accepted, due to the presence of dinosaur bone in these formations.

A common prejudice in geology is to use dating methods to reinforce existing age dates of formations. The Gulfian Series, which is comprised of the Javelina and Aguja Formations, was originally dated as late Cretaceous by Robert Thomas Hill in 1887. It has not changed since that time (Adkins, 1932, p. 400). The question is why have these formation remained with the same age as was originally proposed in 1887—was R. T. Hill so good at dating material that it just cannot be changed? How do we know that he was right?

The answer to solving these questions lies in understanding the differences between the lithostratigraphic unit, biostratigraphic unit and chronostratigraphic unit (North American Commission on Stratigraphic Nomenclature, 1983; emphasis mine):

> A lithostratigraphic unit is a defined body of sedimentary, extrusive igneous, metasedimentary, or metavolcanic strata which is distinguished and delimited on the basis of *lithic characteristics and stratigraphic position*. A lithostratigraphic unit generally conforms to the Law of Superposition (youngest on top) and commonly is stratified and tabular in form.
>
> A formation is the fundamental unit in lithostratigraphic classification and is defined as a body of rock identified by *lithic characteristics and stratigraphic position;* it is prevailing but not necessarily tabular and is mappable at the Earth's surface or traceable in the subsurface.
>
> A biostratigraphic unit is a body of rock defined and characterized by its fossil content.
>
> A chronostratigraphic unit is a body of rock established to serve as the material reference for all rocks *formed during the same span of time.* Chronostratigraphy provides a means of organizing strata into units based on their age relations. A chronostratigraphic body also serves as the basis for defining the specific interval of geologic time, or geochronologic unit, represented by the referent.
>
> A Series is defined as a chronostratigraphic unit, based on the time span of a *biostratigraphic unit*, a lithic unit, a magnetopolarity unit (deposits all having the same magnetic field direction), or any other feature of the rock that has a time range.

With these definitions we can approach the questions raised about correlation of the Javelina and Aguja Formations with other formations and their possible age.

The Javelina and Aguja Formations have different lithic characteristics. They lie one below the other (superposition) and cover a geologically mappable area. They both comprise the Gulfian Series, a chronostritigraphic unit, and were deposited during a specific timeframe (As the reader will notice the formations moved from lithic units to chronostratigraphic units). The deposition of a formation requires time. However, several geologists have noted that the time it takes to deposit a formation can vary drastically (Ager, 1993, p. 80; Miall, 1990, p. 169).

How are the Aguja and Javelina formations dated? The Aguja Formation (lower unit) was originally dated by the dinosaur bones found in it, and therefore its age was determined from the evolutionary geologic timescale. A further refinement to the dating of the formation would involve determination of the dinosaur's first and last appearance as has been determined by specialists working in the field of vertebrate paleontology.

The dating of the Javelina Formation (upper unit) is more complex owing to the fact that mammal fossils were found with dinosaur bones (i.e., *Alamosaurus*). To date the formation to the Paleocene would require the dinosaur bones to have been eroded and redeposited with mammal bones. It also might be shown that the mammal bones were deposited in an entrenched feature at the Javelina-Black Peaks Formation contact, which would serve to move the Javelina back in time from the Paleocene to the Cretaceous. Current dating of this formation appears to weight the dinosaur bones as most reliable for dating purposes, however it does appear that this could change in the future.

In comparing these two formations to formations found in Wyoming, Montana, New Mexico, Louisiana and other sections of Texas, two issues must be addressed: (1) are the formations chronostratigraphic? and (2) how is this determined?

In addressing the questions stated above, the first tool used should be biostratigraphy. If sufficient paleontologic information is found in the formation then an age could be postulated. Superposition would serve to better locate its appropriate chronostratigraphic position.

If biostratigraphy were insufficient to determine the chronostratigraphic position then formations above and below would be examined, paleontologically, to determine if they provide the necessary information. If they failed, then some comparison with surrounding formations would be attempted (this is where geologic mapping is used in determining lateral correlation between formations—shown in Tables II and III, Williams and Howe, 1993). It is generally accepted that lateral correlation and stratigraphic position can provide the formation in question with an age range which could be further defined by additional dating methods (i.e., C-14, Ar/Ar, U/Th, etc.).

With *Alamosaurus* being identified at this locale and in the Hell Creek Formation in Montana, from an evolutionary point of view, these formations would be viewed as chronostratigraphic. However from a creationist's position all that could be assumed would be that the same dinosaur is found at two different locations. Additional research would be needed to determine if transport occurred before the dinosaur was buried, or if the creature was buried in place. If this could be determined then the next step would be to postulate as to when (i.e., antediluvian, Flood, receding waters, etc.) the dinosaur was buried. Much research remains in determining chronostratigraphic units from a creationist point of view.

Lateral continuity even with facies changes (e.g. a sandstone grades into a siltstone which eventually grades into a carbonate rock) is accepted as chronostratigraphic. However, in the last several years a

number of geologists have started to challenge this assumption (Ager, 1993, p. 87; Miall, 1990, p. 85). A closer examination of the lateral facies is required for specific correlation and in some cases the formations might be considered diachronous (deposited at different times) even though they adjoin one another. This factor can throw into question the correlation of chronostratigraphic units. However, considering the "geologic" timeframes in question, what is the difference between 10 to 20 million years?

From the photographs and description given in the original article (Williams and Howe, 1993) it would appear that both formations of interest were allochthonous as evidenced by the clay balls and broken pieces of dinosaur bone. Additionally, pre-petrified wood deposits probably were transported as well. This author would need a closer examination of the site before any further determinations could be made. It would be fair to venture that material at this Big Bend site might have been moved some distance from where it was originally deposited.

In conclusion the Aguja and Javelina formations are dated by the fossils which they contain (biostratigraphy) and the Law of Superposition. To correlate these formations laterally requires that age determination be established with other formations. The formations to which these two are compared contain similar fossil assemblages and are accepted as time equivalent (chronostratigraphic).

### Suggested Research

The author recommends the researchers investigate and relate the following: 1) What plants can be identified from the petrified wood samples obtained? It might serve to better identify climatic conditions. 2) What are the positions of bone pieces to the clay balls it could infer transport together and could better focus hunting for bone in "channels"? 3) Are the dinosaur bones still together (articulated) or do they appear to be broken and in pieces (disarticulated)? 4) Do any bones (or wood) show evidence of pre depositional weathering (rub marks, scratches, broken ends, etc.)? 5) Is there any evidence of trace fossils found in these formations? 6) Are there any sedimentary structures exhibited by the Aguja and/or Javelina formations?

As creationists we are not bound to the mold of evolutionary thought and as such we can seek answers to the earth's geology through comparison of God's word with the stratigraphic record. While geologists may never fully understand everything which has occurred in earth's past, creation geologists accept that there was a world-wide Flood which has left its mark on the earth's surface. Similar formations warrant further inspection to determine if they are indeed time equivalent or deposited in similar lithology. This is then followed by determining their position within the framework of a young earth, catastrophic Flood and ensuing ice age.

### Acknowledgements

The author expresses thanks to Dr. Emmett L. Williams for suggesting comment on the original article and to Jack H. Cowart for the extensive editing he did on this letter.

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Carl R. Froede, Jr.
2895 Emerson Lake Drive
Snellville, GA 30278-6644

## Oxymoron

I must point out one important fallacy in Hoffman's argument (1993). Gödel's incompleteness theorem does *not* state that any (useful) logical system must be "inconsistent or contradictory." His theorem states that any sufficiently complex logical system must be *incomplete* or contradictory (i.e. there *must* be truths or falsehoods which the logic system cannot judge, or any logical statement can be proven true *and* false within that system). Obviously, we choose systems that are incomplete over the systems that are inconsistent. Another point of contention is Hoffman's denigration of tautologies. I do not feel that logical constructions from postulates are useless. If that were the case, who would use the quadratic, cubic and quartic equation solutions found in math handbooks?

### Reference

Hoffman, E. J. 1993. Evolutionism: an oxymoron. *CRSQ* 30:12-16.

Dan Watts
2117 Francis St.
Huntsville, AL 35811-2011

## Author's Reply on Oxymoron

The point of contention is Gödel's incompleteness theorem. What this theorem is supposed to say, or not supposed to say, seems to me a case of the blind men and the elephant. Everyone has own interpretation of this theorem. Whatever the interpretation I will say this: The theorem is either tautological or else it is in error. That is, chased back to its initial premise or premises, whatever they may be, they must constitute a tautology, and all the subsequent steps must constitute tautologies, or else the results are in error. In other words, the results must be exactly the same as the premises, otherwise the results are in error. Not to mention whether the premises themselves are in error.

The element of tautologism occurs in Aristotle's tripart syllogism of major premise, minor premise, and conclusion. The conclusion is buried in the premise, "as logicians have pointed out from the days of Pyrrho to those of Stuart Mill" (Will Durant, 1961, p. 50). The premise by itself will also constitute a tautology, being a redundancy or circularity, where the subject is the predicate and defined within itself. Thus consider Euclid's axiom or postulate about parallel lines not intersecting, which, in whatever form it is stated, is but a tautology. In cold fact all the so-called fundamentals of mathematics are only tautologies. (If not, then they are not "fundamentals.") In a more confrontational way of speaking, they are non-statements, in that they cannot be declared as absolute truth.

This is why I note in the article: that absolute truth, or Truth, must be metaphysical. Furthermore, Truth cannot be expressed in wordy explanations, which must be tautological or else in error, and in last analysis must become a Person. This is as far as the analysis can be carried.

About the practicality of mathematics, I can do no better than to quote Warren Weaver (1961, pp. 426-427).

> [One] finds unresolvable disagreement among scientists concerning the relationship of scientific thought to reality and concerning the nature of reality itself. He finds that the explanations of science have utility, but they in sober fact do not explain. He finds the old external appearance of inevitability vanished, for he discovers a charming capriciousness in all the individual events. He finds that logic, so generally supposed to be infallible and unassailable, is in fact shaky and incomplete. He finds that the whole concept of objective truth is a will-o-the wisp.

This well-traveled passage appeared in the *American Scientist* back in 1961, having been reprinted from the *Proceedings of the American Philosophical Society*. I have previously used it myself on occasion, most recently in an article about energy appearing in the *OPEC Bulletin* (1993).

Concerning quadratic, cubic, and quartic equation solutions, they are useful, but they do not say any more than the original equation. The solutions are merely more convenient to use. It is like the concept of energy being a (sometimes) more convenient way to state the results of experimental observation.

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E. J. Hoffman
P.O. Box 1352
Laramie, WY 82070

## Oxymoron and Tautology

There are several critical flaws in Dr. Hoffman's article "Evolutionism: An Oxymoron" (Hoffman, 1993). While there are many statements in the first part of the article with which I can agree, when the author attempts to use ideas from the foundations of mathematics he makes many errors. First of all, Hoffman refers to Gödel's incompleteness theorem as follows:

> This inadequacy is embedded in what is known as Gödel's incompleteness theorem, or proof, or construction. In any system of logic diverse enough to be of interest, there will always occur inconsistencies or contradictions (p. 14).

False! The theorem more accurately states that in any system of logic diverse enough to be of interest, there will always occur propositions, the veracity of which cannot be ascertained. In particular, Gödel's theorem states, "Every consistent, recursively axiomatized extension of the Peano system has at least one undecidable i.e., neither provable nor refutable-sentence" (Skordev, 1987, p. 4; Hamilton, 1978). In truth, any system of logic of any interest must be 100 percent consistent and contradiction free. There are famous examples of mathematical propositions proven to be neither provable nor refutable. In addition, if every interesting system of logic contained contradictions, then the method of proof called *reductio ad absurdum* would have no value. To apply the method of *reductio ad absurdum* we assume the opposite of what we wish to prove and show that this faulty assumption leads to a contradiction. If contradictions occur anyway, we could never determine whether the absurdity we reach follows from the faulty assumption or the very nature of logic. However, *reductio ad absurdum* is in common use in mathematics.

A major error is the author's misuse of the word tautology. A tautology is a statement or proposition that is true by virtue of its logical form alone (Webster's New Collegiate Dictionary; Monk, 1977, p. 169; Cohn, 1982, p. 4). For instance, the statement "Either it is raining or it is not raining" is tautologous. In fact, any statement of the form, "Either _____ is true, or _____ is not true," is tautologous. It does not matter what phrase we fill the blank with; only that the phrase can only be true or false and not something in between. Another example of a tautology is the statement, "If it is raining, then it is raining. Again, "If _____, then _____," is always tautologous as long as _____ is a phrase that can only be true or false. An example of an implication that is not a tautology is the sentence, "If it is raining, then the streets are wet." This implication may be valid, but since it is not true by virtue of its logical form alone, it is not a tautology. The Pythagorean theorem is *not* a tautology as claimed by Hoffman (p. 13). It does require more than an inspection of the logical form of the statement of the theorem in order to prove it. Even the equation $a^2 + b^2 = c^2$ is not a tautology since it is not true for every selection of values for *a, b,* and *c.* At various points in the article, the author equates tautologies with axioms, and even with "if and only if" implications (characterizations).

Hoffman states, "If a statement does not constitute a tautology, then it must constitute error or approxima-

tion, and vice versa" (p. 14). The following is a well-known theorem in mathematics: A matrix is diagonalizable if and only if it has a basis of eigenvectors. One need not understand this theorem to see that it is *not* a tautology, since it is not true by virtue of its logical form alone. I ask, in what way does it constitute error or approximation? No error or approximation can be found.

Hoffman states, "As to the rest of mathematics, itself, the subject is in disarray" (p. 14). Being a mathematician studying and teaching at the University of California at Davis, I can attest that nothing could be further from the truth. Mathematics is a vibrant subject that will continue to grow as long as mankind has creativity, imagination and analytical ability. Ever since the turn of the century, mathematics has been on a firm axiomatic foundation. Mathematics is known as 'the only pure science' since every result must be proved rigorously.

Hoffman's paper contains other errors, but I will refrain from commenting further on it except to point out that one of his main assertions in the latter part of the paper is true, but not for the reasons he gives. Hoffman claims, "evolutionism is a creature of reason, whereby mankind attempts to explain himself and all other things—which is a logical impossibility" (p. 15). This much is true, though his reasoning is faulty.

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Jeffrey M. Groah
86 Lyle Way
Davis, CA 95616

## Author's Reply on Oxymoron and Tautology

It is amazing how Groah reinforces, directly or indirectly, everything I had to say in my article. It is engrossing how the English language permits us to say *almost* the same thing in so many ways, using different words and phrases. I distinguish this from the concept of the tautology, which I use to mean saying the same exact thing, whatever that is.

He emphatically discounts my use of ideas from the "foundations of mathematics," as if this is part of some exclusive club or domain for the duly-initiated. And conditioned, I might add; I am reminded of the story about "The Emperor's New Clothes" My defense is that these "foundations" can only be tautologies or else they are in error. In this, I reiterate the conclusions of von Mises and Wittgenstein about the theorems of pure mathematics being but tautologies or conventions, cited in the article. Though these conclusions have to be obvious, and are imbedded in the uses of language, the usual thinking is otherwise. I add that, as with legalese, the more precise the attempt at explanation is made, the less intelligible it becomes.

Groah takes offense to my interpretation of Gödel's incompleteness theorem. As near as I can translate, his definition is *almost the* same as mine (thus he writes that the theorem "more accurately states . . ."). I do not say *exactly* the same, because I nor anyone else can know exactly what this theorem or exercise means. It is all bound within the terminology used. Suffice to say, if we are not dealing in tautologies, then by exclusion we are dealing in error.

I do wish to remark about Groah's use of the term "logic." He says that any theorem of logic of interest must be 100 percent consistent. This statement is tautological in that a system of logic is, by definition, that which is consistent. If not, then enter another system of logic.

He further objects to my use of the word *tautology*. His interpretation of tautology is *exactly* the same as mine, however, only in different words. I merely state that a tautology is a redundancy, a circularity, a case where the subject is the predicate or vice versa. These are commonly-used "dictionary" expressions which say the same thing that Groah expresses more formally—but not any better.

Furthermore, I am careful to note that—as Groah also states, but in a different way—there is no confirmation that what the tautology represents is "true" in the first place. Nor can there be any such confirmation. In fact, we cannot even say what "true" means absolutely except in a metaphysical sense, whereby a Person is "absolute truth," or Truth.

I cannot refrain from again bringing up Plato's statement, that if we do not know the answer to a problem, then we do not know the problem, whereas if we do know the answer, then there is no problem. A tautological statement all the way.

Another characterization I emphasize is about the young student to whom the teacher asked, "What is two plus two?" When the student answered "four" the teacher replied, "That's pretty good." To which the young student responded, "Pretty good my eye, that's perfect!" Such it is with tautologies.

I reiterate that the Pythagorean theorem is but a tautology, contrary to Groah's objection. It merely represents a different arrangement of the parts of a square (That is, of the right triangles so formed). Or else we can speak of right triangles, and right angles, and squares, on account of the Pythagorean theorem.

Groah mentions that the equation $a^2 + b^2 = c^2$ is not a tautology since it is not true for every selection of a, b, and c. This is getting the cart before the horse, because, given any two, the other quantity is given by the tautology that is the equation. He says that I confuse tautologies with "axioms" What, pray tell, is an axiom if it is not a tautology? The axiom or postulate that "the shortest distance between two points is a straight line" is nothing more than a tautology.

If Groah wishes to mix or unmix words and meanings—whatever "meaning" is—I cannot stop him. Nor, I suppose, can he stop me. I agree with Wittgenstein, that meaning is given by context and usage—and Groah may choose any way to use a word that he sees fit—as can I. As to whatever is to be the exact meaning, this requires the concept of the tautology, and we are back

to the beginning, for no one can know what the tautology represents, absolutely.

As to my statement "As to the rest of mathematics itself, the subject is in disarray," I defer to Morris Kline's book, *Mathematics: The Loss of Certainty*.

My final remark, which was not discussed in the article: This is about trying to convince someone else that we are "right" or "correct'"—whatever that is. The devices that we use may be called "acting'"—part of the game called dialectics. Since we must deal either in tautologies or error, and cannot reason or rationalize absolutely, we must resort to other devices in order to convince. And whoever puts on the best act or show, whether on paper or out-loud, will be declared the "winner." It is a business at which the media perform superbly, as do many in Washington for that matter—ensuring that their opinions prevail. And at which Clarence Darrow excelled during the Scopes trial, to become the impetus for evolutionism and this ongoing round of intellectualism.

I have enjoyed making this rejoinder. Groah must be a lively professor who makes his classes interesting and wide-ranging—and who I trust can receive as well as he can give.

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E. J. Hoffman
P.O. Box 1352
Laramie WY 82070

## Logic

E. J. Hoffman's article, "Evolutionism, An Oxymoron" (1993), reminded me of the musings of another thinker out of the past, recorded in the book of Ecclesiastes. Like Solomon, Hoffman concluded that mind games are in the end a great weariness and the only real meaning comes from obeying God.

One point that Hoffman does not highlight, however, is that although true statements can indeed be defined as truisms, it should not be concluded that only false statements are interesting. This is because all things are not laid bare before us and truth may need to be uncovered. If I can lead a person to see a truth he previously had missed, this is novel to him and exciting for me.

Of course, we are not pure creatures of logic and often the greater the intelligence, the more clever the smokescreen. We should be under no delusion that logic changes lives. Transformation requires a miracle of the Holy Spirit. But the logic is all there, awaiting the unprejudiced view of a liberated mind.

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Ross S. Olson, MD
5512 14th Ave. So.
Minneapolis, MN 55417

## Theology vs. Science

There is an inviting assumption that theology and science are not in the same knowledge frame. However, this position can only be taken if the sciences (simply knowledge) are allowed to define knowledge as evolutionary based knowledge as if evolutionary knowledge is the only existent knowledge.

To do this it must be proved that chance is the sole possible knowledge base—that there is no causal base for the billions of phenomena in the universe. Since chance does not operate in the realm of the true and the false, chance cannot be proven a true base for evolutionary science. Chance events for example, cannot be repeated. If creation theology cannot operate in the field of science, it must be because of an assumption that the evolutionary rubric "time, natural law, and chance" can be shown to be true when subjected to the "repetition, falsification, observation test" of modern science.

I challenge modern science to prove its foundation in "time, natural law, and chance" with chance as the sole permissible ground of argument. There is not even a starting position for such an argument. No truth starting position for such an argument exists since evolutionary belief has no truth or falsehood. The evolutionary paradigm must have total knowledge of God to prove Gods nonexistence. Chance cannot make a start.

Lawrence McGhee
14019 SE Market St.
Portland, OR 97233

## Moondust Argument and Carving

I would like to draw attention to an important paper for creationists by Andrew Snelling and David Rush, concerning the commonly used moondust argument (1993). The conclusion of this detailed paper is that uniformitarian assumptions can no longer be used to argue for a young age for the moon based upon the amount of dust, since the best data indicate that the commonly used Pettersson estimate for the amount of dust influx is wrong by orders of magnitude.

Interestingly, their detailed research found that anti-creationist critics, in their haste to demolish the argument, had used figures which err greatly in the opposite direction. For example, the scathing critique by theistic evolutionists Van Till et al. in *Science Held Hostage* (1988) arrives at a figure for moondust influx which is only about a twentieth of that which should have been correctly concluded from the literature they consulted.*

On another matter, the CRSQ recently published a paper which mentioned a *National Geographic* article about an ice-age man apparently carved from mammoth ivory (Sennott, 1993). Although the article indicated that microscopic analysis showed that the carving was not a forgery, when I wrote to the scientist concerned, Alexander Marshack, he maintained that it definitely was a fake and he wants nothing to do with it.

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Carl Wieland, M.D.
Creation Science Foundation, P.O. Box 302
Sunnybank, Queensland 4109, Australia


*Readers may be interested in the following recent letters to the editor on the subject: Kuban, G. L. 1991. Moondust. *CRSQ* 28:74-75; Parks, W. S. 1991. Response to Kuban. *CRSQ* 28:75-76; Williams, E. L. 1991. Meteoritic activity, micrometeorites and age measurement. *CRSQ* 28:76-77; Quarterly astronomy bibliography. *CRSQ* 29:50-52; Micrometeoroids. *CRSQ* 29:54.

## Quote

. . . Certainly the biblical world view implies that since God is the creator of all that exists, He ultimately is the rightful owner of all that exists. Whatever possessions a human being may acquire, he holds them temporarily as a steward of God and is ultimately accountable to God for how he uses them. However omnipresent greed and avarice may be in the human race, they are clearly incompatible with the moral demands of the biblical world view.

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# CARBON DIOXIDE IN THE ANTEDILUVIAN ATMOSPHERE

BRUCE J. TAYLOR*

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### Abstract

*Data are presented which define the role of atmospheric carbon dioxide in plant growth. The amount of atmospheric carbon dioxide required to support a unit amount of carbon in the biosphere is determined from this data. This permits the determination of the minimum amount of atmospheric carbon dioxide required to support the antediluvian biosphere based on the amount of coal reserves and resources. The increased atmospheric carbon dioxide may also require an additional source of atmospheric water vapor to support the antediluvian biosphere. Furthermore, increased atmospheric carbon dioxide may have implications for the respiration and diet of mankind and the animals before the Flood. Carbon dating and the preferential growth of selected plant types in the pre-Flood world would probably be affected by increased atmospheric carbon dioxide as well.*


### Effect of $CO_2$ on Plant Growth

During the 1600s a classical experiment was performed in which a

> 5 pound willow tree was planted in a container with 200 pounds of oven-dried soil. Water was added as needed. After 5 years the tree had increased to 169 pounds, 3 ounces, but the soil itself still weighed 199 pounds and 14 ounces (Wittwer and Robb, 1964, p. 34).

This experiment demonstrated that more than 99 percent of the increase in weight of this plant was derived from ground water, atmospheric $CO_2$, and water vapor.

Numerous experiments have been performed that show that the amount of $CO_2$ in the present atmosphere is the limiting factor for plant growth.

> We have not in our experimentation, either under controlled conditions in plant growth chambers, or in greenhouses, reached the upper limit where above normal carbon dioxide concentrations in the atmosphere, no longer increased plant growth. Our objective has been to maintain greenhouse atmospheres of carbon dioxide at 1000-2000 p.p.m. [parts per million] during daylight hours. This is higher than that initially aimed for in Colorado for carnations and roses. At a moderate light intensity, cucumbers responded by increased growth to the highest level provided (8000 p.p.m.). There are other reports where crops have responded to levels of carbon dioxide ranging from 20,000 to 30,000 p.p.m. Lake has reported that no harmful effects on tomatoes were observed at 30,000 p.p.m. (Wittwer and Robb, 1964, p. 50).

Even though optimum light, temperature, water, and humidity are provided for plants along with adequate fertilizer, the growth rate and final size of the plants is limited by the amount of atmospheric $CO_2$ available to the plants. That increased $CO_2$ increases plant growth is a well known fact particularly in the nursery industry, where for many years nurserymen have routinely increased the available $CO_2$ in the greenhouse. It is also a requirement for growing plants in a greenhouse where $CO_2$ enrichment is not used, that a continual exchange of air be maintained with the outside. Otherwise the $CO_2$ within the greenhouse will be depleted and plant growth will be reduced or cease. In the green house the number of plants are limited so that increased $CO_2$ results in increased growth rate and plant size, whereas in the natural environment, total live plant material will continue to increase until some limiting factor is reached. For our purposes the important fact is that the atmospheric $CO_2$ is usually the limiting factor for total amount of live plant growth. The exceptions are the desert and polar regions where ground water in the former and temperature in the latter are the limiting factors. However, if the amount of atmospheric $CO_2$ is increased, the total live plant material will also increase until a balance is established or until some other limiting factor such as ground water, temperature, light, space, humidity, or soil fertility is attained.

*Bruce J. Taylor, B.S., 16700 Jupiter Farms Road, Jupiter, FL 33478.

### The Carbon Cycle

The carbon cycle provides the method whereby energy from the sun is made available for food, fiber, and shelter to the animal kingdom and mankind. Through photosynthesis, atmospheric $CO_2$ and water are synthesized within the plant into various hydrocarbons and the excess oxygen is released to the atmosphere. Most of the carbon thus derived from atmospheric $CO_2$ is not returned to the atmosphere but is stored within the plant as tubers, fruits, seeds, and as plant growth. When the plant remains are oxidized, the carbon is once again released into the atmosphere as $CO_2$.

Oxidation can occur in different forms, the most familiar of which is rapid oxidation through burning. Oxidation can also occur slowly without fire. This form of oxidation takes place more rapidly in the tropics (though it occurs in all climates) where plant remains are exposed to the heat of the sun and bacterial decay. This is one reason why tropical soils which are not covered with a plant canopy or water are extremely poor. That is, all the decayed plant material (humus) is rapidly oxidized, leaving the earth barren. Another form of oxidation is the digestion of plant material by people and animals to obtain energy. Various estimates have been made for the amount of unoxidized carbon contained in humus. The majority of these estimates are in the range of $1400 \times 10^{15}$ gC, [grams of carbon] (Trabalka, 1985, p. 181).

### $CO_2$ Equilibrium

The term *preagricultural* is used to indicate the period from post-glacial times until approximately 1800 AD. This period was chosen for the discussion and calculations that follow because the amount of atmospheric $CO_2$ was relatively constant over this period (Trabalka, 1985, pp. 34-35; Vardiman, 1990). A constant amount of atmospheric $CO_2$ would indicate that equilibrium had been established between the assimilation of $CO_2$ in live plant material from the atmosphere and the release of $CO_2$ into the atmosphere through oxidation. The ratio of preagricultural atmospheric $CO_2$ to the carbon in the preagricultural biomass is required in the following calculations.

It will also be assumed that equilibrium had been established in the pre-Flood biosphere between unoxidized humus and living plant material. Additionally, it will be assumed that the increase in the size of the biosphere is linear with the increase in atmospheric $CO_2$. In the plant growth experiments with increased $CO_2$, the number of plants used to determine the effect of increased $CO_2$ was limited and the increase in plant size was decidedly non-linear. As mentioned, however, in the natural environment the total number of plants will increase and this increase in total plant weight will probably be much closer to a linear increase. Also it will be shown below that the type of plant growth was probably different in the pre-Flood world from that of the post-Flood environment. Based on these assumptions, it will be possible to determine the *minimum* amount of pre-Flood atmospheric $CO_2$ required to support the pre-Flood biosphere. Although the assumption of a linear increase is probably not strictly correct, the values obtained for the amount of $CO_2$ in the pre-Flood atmosphere from these assumptions will be conservative.

### Preagricultural Atmospheric $CO_2$

There does not appear to be any reason to presume that the composition of the antediluvian atmosphere was different from the preagricultural atmosphere except for the amount of $CO_2$ and quite possibly the amount of water vapor. The preagricultural level of atmospheric $CO_2$ has been estimated through indirect measurements of carbon-containing marine sediments, the amount of $CO_2$ trapped in air bubbles in the polar ice sheets, and from tree ring data. Such estimates have indicated that the amount of $CO_2$ has remained reasonably constant at 260-290 ppm throughout the preagricultural period (Trabalka, 1985, pp. 34-35).

As was demonstrated, the size of the biosphere is limited by the amount of $CO_2$ in the atmosphere. Therefore, this period of relatively constant atmospheric $CO_2$ likewise would have been a period when the amount of live vegetation was reasonably constant.

### Preagricultural Biomass

The size of the preagricultural biosphere has been estimated to be $900 \times 10^{15}$ gC. Approximately $4 \times 10^{15}$ gC is represented by heterotrophic organisms: animals and nongreen plants (Trabalka, 1985, p. 181). The amount of carbon contained in the heterotrophic sources is probably less than the error in these values and, therefore, will not be included in the following calculations.

It is noted that the amount of carbon reported by Trabalka in the preagricultural biomass is considerably greater than the $300 \times 10^{15}$ gC quoted by Morton (1984) from Hunt (1972) for the present biomass. Although there certainly would have been some reduction in the biomass from preagricultural conditions to the present due to the removal of forest for farming, a three-fold reduction seems to be quite large. Also, the $1.45 \times 10^{18}$ gC derived by Morton (1984) for the antediluvian biosphere is only a 60 percent increase over the preagricultural biosphere as reported by Trabalka (1985). This small increase hardly seems to qualify for lush tropical plant growth that extended from pole to pole which is generally believed to have existed during the pre-Flood period.

If it is assumed that all the vegetation which formed the coal deposits was growing at the time of the Flood, the minimum amount of $CO_2$ required to support the antediluvian biosphere can be estimated by multiplying the ratio of preagricultural $CO_2$ to the carbon in the preagricultural biomass by the sum of the carbon in the preagricultural biomass and the coal beds. This ratio is 275 ppm / $900 \times 10^{15}$ gC or $0.3056 \times 10^{-15}$ ppm/gC.

### Coal Reserves and Resources

Trabalka defines three terms to describe the reserves and resources of coal which will be used here.

1. *Demonstrated reserves* - resources already discovered that can be produced with current technologies and under current economic conditions;
2. *Undiscovered recoverable resources* - resources that are thought to exist and that can be produced, given technological and economic conditions likely in the foreseeable future;

3. *Remaining total* resources - all remaining deposits such that some portion could be economically produced. (Trabalka 1985, p. 72)

As would be expected, there is considerable variation in the reported quantities of coal deposits due to the uncertainty of estimating in place coal beds.

> The World Energy Conference (WEC) has periodically provided estimates of proved reserves and energy resources. The data assembled by the WEC were compiled by an international advisory panel and published as the *Survey of Energy Resources* . . . Table 4.6 was constructed from WEC data, and estimates of recoverable resources were made by Parent. His estimates were generally made by taking 50% of the total resources reported in WEC, but they included some adjustments for the United States, the United Kingdom, and India (Trabalka pp. 72-73).

Four categories of calculations will be presented here, including three which were established by Trabalka and one from Morton. These categories are:

1. *Demonstrated Reserves* - the same as defined above.
2. *Recoverable Resources* - the same as defined above.
3. *Total in-place Resources* - the sum of categories 2 and 3 defined above.
4. The quantity reported by Morton (1984) quoted from Hunt (1972).

The quantities in the first three categories of Table I for the coal reserves and resources are excerpted from Table 4.6 in Trabalka (1985, p. 73), which were in tons of coal equivalent (tce). These values, when multiplied by $7 \times 10^5$ gC/tce, give values in grams of carbon. Similarly, when the sum of the coal plus the preagricultural biomass is multiplied by the ratio of the preagricultural $CO_2$ to carbon in the preagricultural biomass the minimum amount of $CO_2$ required to support the antediluvian biomass is obtained.

**Table I. Carbon in world coal deposits, plus the preagricultural biomass, and the CO2 required to sustain the total as live plants.**

| Category | Quantity of Coal tce ($10^9$) | Quantity of Coal gC ($10^{18}$) | Coal plus Biomass gC ($10^{18}$) | $CO_2$ ppm |
|---|---|---|---|---|
| 1. | 687.4 | .48 | 1.38 | 422 |
| 2. | 5137.5 | 3.6 | 4.50 | 1375 |
| 3. | 11066.2 | 7.7 | 8.60 | 2628 |
| 4. | | 15.0 | 15.90 | 4859 |

Estimates of the quantity of coal in 1. demonstrated reserves; 2. recoverable resources; 3. total in-place resources; and 4. the quantity reported by Morton (1964) are presented in tons of coal equivalent (tce) and grams of carbon (gC). The third column is the sum of these quantities of carbon and the carbon in the preagricultural biosphere. The final column is the atmospheric $CO_2$ in parts per million (ppm) required to sustain this amount of carbon as live plant material.

As was noted in the previous quote, Parent (1983) reduced the WES estimates by 50 percent. Therefore, if the values quoted by Trabalka (1985) are doubled there is essential agreement between the total in-place resources and the value quoted by Morton (1984).

It is also recognized that some of the unoxidized pre-Flood humus may have been incorporated in the present day coal beds. Nevertheless, this amount is probably small compared to the total carbon in the coal deposits and will be disregarded in the following calculations.

The basis for suggesting that only a small amount of pre-Flood humus is contained in the coal deposits is that two likely situations exist for the location of the pre-Flood humus. The first is that the pre-Flood humus was evenly mixed throughout the sedimentary deposits including the coal deposits. For this case the percentage of coal deposits to total sedimentary deposits will be calculated. The largest estimate of the volume of coal ($V_c$) can be determined from the equation, $V_c = W/d$. Here the weight W, is $13{,}477.6 \times 10^9$ tons (Trabalka, 1985, 73) and the average density d, is 86.33 lbs/ft$^3$ (Baumeister, 1967, pp. 6-8). This gives a total volume of coal of 1061.2 cubic miles. The volume of sedimentary deposits have been estimated to be $9.3 \times 10^7$ cubic miles (Pettijohn, 1957, p. 3). Pettijohn's estimate was based on the work of American geochemist F. W. Clarke with some revisions for oxidation, carbonation, and hydration. In this situation there would only be approximately 0.001 percent of pre-Flood humus in the coal deposits. A second possibility is that the pre-Flood humus was sorted by the Flood waters. Sedimentary deposits formed through rapid settling are graded by particle size with the largest particles forming the lowest layers (Foster, 1971, p. 118). The lower layers of humus that have been subjected to insects and bacterial action are composed of very fine particles. Therefore, this humus would be deposited in the upper layers of the sedimentation. The actual situation was probably some combination of these two cases, however either would justify neglecting the amount of pre-Flood humus in the coal deposits.

$CO_2$ may or may not have been the limiting factor for plant growth in the antediluvian atmosphere. That is, other growth factors such as sunlight, temperature, water, and soil fertility may have been limiting factors for plant growth. Nonetheless, the values obtained from this analysis for the amount of $CO_2$ in the antediluvian atmosphere are the minimum amount required to sustain the antediluvian biosphere. It should also be noted that the coal reserves used in these calculations were reported as of 1980. Therefore the value obtained is understated by the amount of coal mined before 1980.

## Effect on Climate

A considerable number of atmospheric General Circulation Models (GCMs) have been run in an attempt to determine the effects of increased atmospheric $CO_2$ and other radiatively active (greenhouse) gases on specific climatic elements (surface air temperature, vertical air temperature profile, precipitation rates, and soil moisture) (MacCracken and Luther, 1985). Considerable controversy surrounds the results obtained from simulations by these GCMs which have generally been run with two to four times the present level of atmospheric $CO_2$ (Bartz, 1992). Nevertheless, the general indication is that increased $CO_2$ will increase atmospheric temperature (MacCracken and Luther, 1985, p. 271).

Likewise, increased atmospheric $CO_2$ is believed to be capable of altering the global precipitation patterns. In Africa south of the Sudano-Sahelian region and in Andean South America, desertification is accelerating. The trend toward desertification is greatest near the semi-arid interface with rain-fed cropping systems. Desertification is continuing in most other regions of the developing world, including China (Mabbutt, 1984). However, the extent of desertification is also controversial (Dregne, 1985).

If the results from the GCMs prove correct and the increasing desertification is the consequence of increasing atmospheric $CO_2$ the increased atmospheric $CO_2$ required to sustain the antdiluvian biosphere would require an additional source of water vapor. One possible source for increased atmospheric moisture would be a canopy of water surrounding the earth, such as that proposed by numerous creationists (Whitcomb and Morris, 1961, pp. 255-258; Peterson, 1981; Dillow, 1982; Johnson, 1986; Rush and Vardiman, 1992). In all of these proposals, the canopy is presumed to exist over and to be segregated from the atmosphere. This arrangement would not be beneficial to plant growth. Rather, the water vapor would need to be mixed throughout the atmosphere or at least be increased at the level where the plants were growing. Should a water vapor canopy be required to sustain the pre-Flood vegetation, this canopy would also increase the atmospheric pressure.

### Effect of Increased $CO_2$ on Animals and Mankind

As noted, $CO_2$ enrichment in greenhouses to enhance plant growth is a well known practice. Yet when enrichment is practiced, a warning system should be installed which sounds an alarm if the concentration of $CO_2$ goes above approximately 5000 ppm, the maximum recommended or a normal work day (Mastalerz, 1977, p. 304).

Smith (1981) has reported the effects of increased atmospheric pressure on animals and mankind, particulary as it relates to increased difficulty in breathing and damage to tissues within the body associated with increased oxygenation. It may be that difficulty in breathing with increased atmospheric $CO_2$ and increased oxygenation which results from increased atmospheric pressure are offsetting phenomena. If so, then increased atmospheric $CO_2$ could be the means which permitted human and animal life to survive with increased atmospheric pressure resulting from a water vapor canopy.

> Mortimer found in beans, sugar beets and barley that increasing the carbon dioxide level from 0.25 [2,500 ppm] to 2.0 [20,000 ppm] percent favored the conversion of the assimilated $C^{14}O_2$ into sucrose rather than into serine and glycine. Others have shown that with high levels of carbon dioxide the synthesis of sugars is increased and at low carbon dioxide partial pressures, organic acid synthesis predominates (Wittwer and Robb, 1964. p. 46).

Before the Flood, man was given fruit and seed bearing plants for food (Genesis 1:29). After the Flood, meat was added to the diet of mankind (Genesis 9:3). Although this field is outside the expertise of the present author, the difference in the assimilation of carbon at increased levels of $CO_2$ may account for the change in the diet of mankind following the Flood.

In addition the change in atmospheric $CO_2$ may be indicated through the longevity of the patriarchs. Prior to the Flood the age of the patriarchs was reasonably constant. After the Flood the age of the patriarchs continually decreased to that of the present average age.

Although some of the atmospheric $CO_2$ probably was dissolved in the rain that flooded the earth, the greater portion would have remained in the atmosphere. And in the initial months following the Flood, the pre-Flood humus that was exposed to the sun would have been oxidized, returning more $CO_2$ to the atmosphere. However, the regrowth of vegetation would have required a number of years to develop to that of the preagricultural period.

Notwithstanding the fact that God added meat to the diet of mankind (Genesis 9:3), none would have been available for food. Consider that for cattle the gestation period is nine months and it is highly unlikely the first calf would have been slaughtered immediately. It is much more probable they would have been retained for herd building so that a few years elapsed before meat was actually added to the diet. Nor would any of the sacrificial animals been available for food because they were sacrificed prior to the addition of meat to the diet (Genesis 8:20).

Therefore, the transitional period required for the reduction of the atmospheric $CO_2$ probably corresponded to the transition in the ages of the patriarchs and the diet of mankind and the carnivorous animals. Also without this transitional period, the carnivorous animals could have eliminated a number of species of animals and possibly even mankind.

### Effect on Plant Growth

The change in metabolic pathways for the assimilation of carbon during photosynthesis has been labeled the $C_3$ and $C_4$ pathways (Strain and Cure, 1985, p. 57).

> The effect of $CO_2$-doubling on biomass accumulation among $C_3$ grasses appears to be reasonably similar at about +28 percent, but the values for $C_3$ broadleaf species are sparse and erratic. If soybean may be taken to represent $C_3$ broadleaf crops, the effect of $CO_2$-doubling on biomass accumulation appears to be higher than for the $C_3$ grasses, which is in keeping with their carbon assimilation responses. Biomass response to $CO_2$-doubling was low for the $C_4$ species corn (+9 percent) and sorghum (+3 percent), which also agrees with the generally low response of carbon assimilation for these species (Strain and Cure, 1985, p. 112).

The change in the synthesis of plant material under increased $CO_2$ for different plant types may account for the giant ferns in the coal record. Similarly, the preferential growth rates of different plant types under pre- and post-Flood conditions may be the source of what is presumed to be evidence of evolution within the plant kingdom. Further, this may account for some extinct plant types which could not survive in the post-Flood environment.

### $C^{14}$ Dating

Increased atmospheric $CO_2$ would probably alter the amount of $C^{14}$ formed in the atmosphere and the change in metabolic pathways noted above may increase the assimilation of $C^{14}$ within plants. Both of these effects would distort the indicated age of pre-Flood biologic materials if the dating is based on present atmospheric conditions.

C. J. Yapp and H. Poths have arrived at a similar conclusion to that presented in this article based on an analysis of goethites from an ironstone in the Upper Ordovician Neda Formation. In their analysis the atmospheric $CO_2$ was determined to be approximately 16 times greater than the present (Yapp and Poths, 1992, p. 342). This value is in very close agreement with that derived under category 4.

### Conclusion

The minimum amount of atmospheric $CO_2$ required to sustain the antediluvian biosphere based on total in-place resources would have been at least 2628 ppm / 275 ppm or approximately 10 times greater than the amount in the preagricultural atmosphere. Furthermore, the minimum amount of $CO_2$ in the antediluvian atmosphere based on the report by Morton would require 4859 ppm / 275 ppm or in excess of 17 times that in the preagricultural biosphere.

This increase in atmospheric $CO_2$ could also create a need for an additional source of water vapor to sustain the antediluvian biosphere. Similarly, the increased $CO_2$ in the atmosphere is approaching the level that would interfere with breathing. However, this difficulty with breathing could be ameliorated through increased atmospheric pressure resulting from a water vapor canopy.

Additionally, increased $CO_2$ causes differences in the pathways through which carbon is assimilated within plants. This would produce different food values for plant material and could affect the diet of both people and animals. This phenomenon would result in differential plant growth rates that could be interpreted as part of the evolutionary process.

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# CHAOS: MAKING A NEW HERESY

STAN G. SMITH*

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### Abstract

*New and exciting mathematical strategies in science have been rapidly developing over the lust two decades. A field of study has emerged, collectively called "Chaos" or nonlinear dynamics. A brief summary of the history and findings are given, and various features of chaos theory are discussed regarding creation and evolutionary world views.*

### Introduction

Are fractals, solitons, and bifurcations attracting us toward a paradigm shift in science? Can you say "deterministic chaos" without wincing? Is there really something new under the sun? Authors James Gleick (1988, p. 7) and Ian Stewart (1989, pp. 2-3) in their respective reviews of chaos theory say so, and they are note alone. Others suggest that this "new" science will contribute to everything from understanding evolutionary mechanisms to ushering in a new age (Briggs and Peat, 1989, p. 166). The AAAS (Anon., 1989) appears to be advancing a little chaos in the educational advancement of evolution, and deterministic chaos is

*Stan G. Smith, M.S., 1710 Boston, Las Cruces, NM 88001.

rapidly becoming a standard part of the university curriculum. Chaos theory is even making its debut in popular fiction (Crichton, 1990, pp. 72-75), and at the cinema. However, are nonlinear dynamics, fractal geometry, or genetic algorithms really "chaos" theories by other names? Perhaps it is time to separate some of the facts from the fantasies and discover exactly what is new, if anything, under the "chaotic" sun.

### Historical Background

From a historical perspective the seeds of modern chaos began with the troubling realization that nonlinear systems of equations were not yielding the well packaged solutions that Newtonian investigators had come to know and love. Isaac Newton himself had investigated iterative techniques (Peitgen and Richter, 1988, p. 18), while he was dealing with differential calculus. Iteration involves a recycling of computed values in order to produce a string of successive computed values. Iteration appears to be key in chaos theory which will be discussed later. Perhaps Newton glimpsed aspects of chaos in his iteration method when his functions failed to have real roots. However, it is not clear how Newton may have understood variations in initial conditions in a "deterministic" solution process with respect to current perspectives within the modern science of chaos. After all, even Newton did not yet really live in a deterministic "Newtonian" world: he was helping to create it.

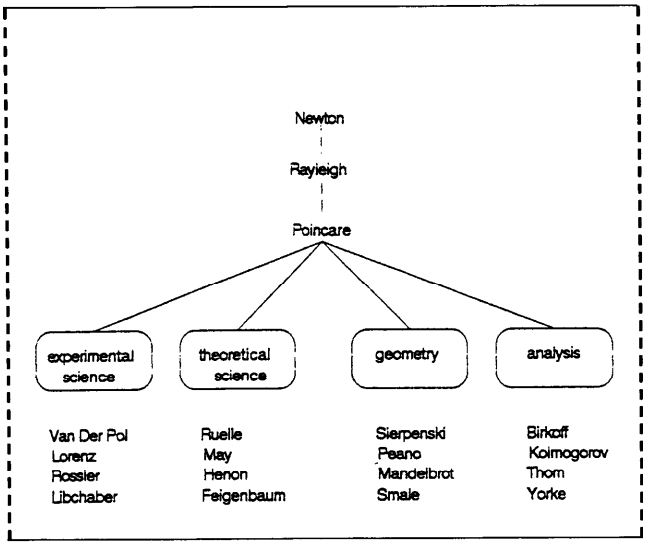
Newton operated from a geometrical perspective, as illustrated throughout his *Principia,* which led him in developing his analytical approach. He was untroubled by a strict analytical bias in opposition to geometry or intuition. He crossed intellectual boundaries and attacked everything to bring full disclosure. Furthermore, Newton is especially important in this regard, for it is unlikely that he would have been dissuaded in favor of modern fanciful interpretations in the mathematical sciences supporting evolutionary concepts developed from a Darwinian perspective.

Following Newton, Rayleigh apparently experienced the chaos of nonlinearity in his study of mechanical vibrations. Rayleigh took more of an experimental approach in analyzing nonlinear behavior by driving coupled mechanical systems in and out of resonance. However, all the modern investigators of chaos point to Henri Poincare as the first who clearly understood the implications of nonlinearity and the loss of analytically integrable solutions with respect to Newtonian determinism.

After this, investigators randomly appeared in different disciplines and remained isolated until scientists and mathematicians recently began to realize a general connection in their work over the last two decades (Gleick, 1988, pp. 3-4).

Little could be done to improve on Gleick's historical background of chaos, except a possible connection between chaos theory and the "catastrophe" theory of Rene Thorn and E. C. Zeeman. Table I is a brief list of some historic contributors in the area of nonlinear dynamics. Although highly abbreviated, this list is useful in investigating other notable scientists, mathematicians, and work in chaos. A comprehensive list of investigators in the field today would fill pages. Although difficult to strictly separate geometry from analysis or even physics, the work of some investigators may carry more weight under specific headings depending on the nature of their backgrounds or their publications.

**Table I. Representative scientists in non linear dynamics.**




A few of the individuals listed deserve special attention, as their names have been used to describe chaotic phenomena. Edward Lorenz, an M.I.T. research meteorologist, was one of the twentieth century scientists who showed the reality of chaos from his vacuum tube computer in the early 60's (Stewart, 1989, p. 138). In his numerical investigation of atmospheric fluid flow, he discovered a range of variables for a set of differential equations which produced his "Strange attractor," specifically the Lorenz attractor in honor of its discoverer. This so-called strange attractor is a finite manifold in phase space, possessing an infinite thread of values woven throughout its finite volume never repeating previous values within its orbit. At this stage, Lorenz discovered what is referred to as sensitive dependence, a situation where the slightest change in initial conditions alters the path or pattern of values generated from his set of equations. He further understood that it implied doom for long-range weather forecasting, since the slightest change in an initial value dramatically changed the pattern of the outcome.

Benoit Mandelbrot is a mathematician who came to chaos from the geometrical side of life. Mandelbrot's contribution helped to integrate the previous work of mathematicians such as Cantor, Julia, and Fatou, resulting in a richer understanding of what are called fractals (spacial forms of fractional dimension). His famous Mandelbrot set is a bizarre portrait in the complex plane which reproduces many Julia sets upon expansion of various regions of the master set. From a study of such expansions or magnifications, complete replicas of the entire Mandelbrot set are found nested in its microscopic fabric demonstrating the phenomenon known as self-similarity.

Mitchell Feigenbaum is a Los Alamos scientist who carefully studied the "logistic map" which will be examined later. Feigenbaum's contribution provided a basis for recognizing the underlying universality of nonlinear forms (Gleick, 1988, p. 175). He discovered what are apparently universal constants named in his honor, Feigenbaum numbers. The observed sequence of period doubling, called bifurcations, associated with transitions from stable states to chaos in certain phenomena were more mathematically accessible after Feigenbaum. This universal quality was a valuable leap forward in the ability for workers to really understand some of the nuts and bolts of nonlinear representations. Several investigators, before and after these men, have made significant contributions. However, the ones mentioned were foundational and significantly influenced the direction of development in modern chaos theory.

## Non-Fiction

*Basic Terms*

I begin by limiting the discussion to a brief examination of some specific features and observed consequences associated with chaos theory previously mentioned.

| *Features* | *Observations* |
|---|---|
| Nonlinearity | Sensitive dependence |
| Iteration | Self similarity |
| Driven systems | Bifurcations |

These lists represent major elements and discoveries in the study of chaos. Indeed, the first feature listed has been used to describe this field of study: nonlinear dynamics. Nonlinearity implies just that—functions containing terms which are something other than simple proportions or linear combinations. Transcendental functions or higher power terms introduce nonlinearity into a system. Alone, such functions may be appropriately understood and describe well-behaved phenomena. However, when these nonlinear functions are iterated, one obtains surprising results.

Iteration, or iterative feedback, constitutes a process in which parameter values are fed back through one or more equations producing new values to be repeatedly fed back through the same equation(s) to generate new values. From Newton to numerical techniques, iteration is not something really new (Peitgen and Richter, 1986, p. 5). However, the chaotic mindset about iteration is different. The mapping or processing itself has become a different order of solution. Prior to our modern computer, of course, it would have been difficult to think this way.

For example, consider a function, $y = f(x)$. Start with a "seed" value for x and determine y. Now let y become the next x and determine a new y, which becomes a new x, and so forth. In terms of x we may write the following sequence:

$$x$$
$$f(x)$$
$$f(f(x))$$
$$f(f(f(x)))\ldots$$

We may represent this continuous series more simply as,

$$x_{n+1} = f(x_n) \qquad (1)$$

These values, or their map, represent the dynamics of a system. Equations are not "solved" so to speak, but are used as processing algorithms to generate values often used to produce a map, picture, or "portrait" giving an intuitive sense of the dynamics involved. Illustrations given in Figures 1-3, will be discussed.

The term "driven systems" is used to mean any dynamical system driven by some "engine" or energy source doing work on a system. Dynamical systems come as two types: conservative and dissipative. Conservative systems (those in which energy is presumed conserved) will not be discussed here, except to state that their energy conservation is demonstrated topologically in a phase portrait that preserves its area, or volume, under transformation (Schuster, 1988, pp. 105-108). A dissipative system is one in which the natural motion or activity of that system is depreciated due to some retarding influence, i.e. friction, etc. The area of such a system's phase portrait contracts under transformation and is not preserved. It is this dissipative type which needs a "driver" in order to sustain the activity of the system. This aspect will be important when entropy is discussed later.

A swinging pendulum which eventually comes to rest is a standard example of a dissipative system. Dissipative systems, therefore, must be "driven" in order to sustain the dynamics of the particular system. The interesting behavior occurs by driving elements of a system against the natural frequencies of those elements. If a pendulum is "driven," that is, in some way coupled to the shaft of a motor, the interaction due to the pendulum's natural period and the period of the motor's oscillation may make for very interesting and unusual motion as the rotational velocity of the motor increases. The motor's output could be adjusted systematically to generate an individual or global phase portrait to study the change in dynamical behavior. In many laboratory experiments, various "drivers" or energy sources for particular systems are controlled in systematic fashion, permitting a study of strange and complicated variations in periodic and chaotic motion.

Next, we consider observations or discoveries which are consequences resulting from the investigations of such nonlinear behavior. These have now been demonstrated in all sorts of systems in the areas of meteorology, economics, geometry, electronics, chemistry, ecology, and such everyday phenomena as dripping faucets.

During the chain of events which led to the modern synthesis of chaos theory, dynamical behavior was found to be profoundly sensitive to initial conditions. Lorenz saw this from his differential equations; geometers also saw it occurring from their topological transformations. In other words, the sequence of values generated from one or more nonlinear equations is extremely dependent on the initial value(s) used at the beginning of an iteration process. The meteorological study of Lorenz is the classic example of sensitive dependence and its consequences in weather forecasting (Stewart, 1989, 141).

Another consequence of nonlinear studies was the phenomena of self-similarity, sometimes referred to as

scaling. This is conveniently visualized in the study of fractals, but it appears to be a universal feature of chaotic systems. Regardless of scale, similar patterns within a fractal or other kinds of chaotic maps are continually manifested within these pictures or the mathematical ratios representing respective regions in a map. This theoretically continues on an infinitely large or small scale.

Finally, bifurcation or period doubling is a system characteristic where the transition from a periodic condition to a chaotic regime experiences a pattern in the doubling of states or values. This feature illustrates one of the so-called "routes" to chaos and is evident in both theory and experiment.

The above items do not exhaust the field of study with respect to chaos, but they represent some very important fundamental features within this "new" science. Now we will take a look at a mathematical structure known as the logistic map, which demonstrates many of these characteristics just discussed.

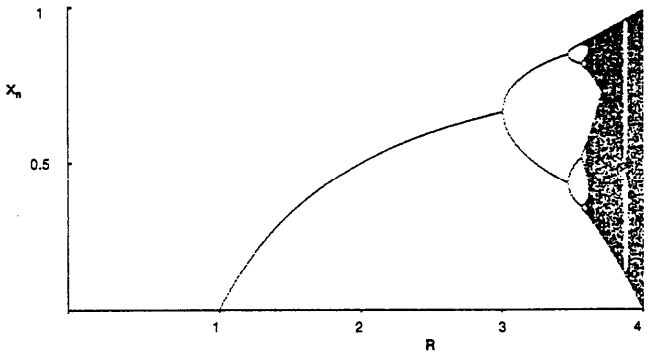



**Figure 1. Logistic map for 0 < R < 4.**

*The Logistic Map*

The logistic map is a picture developed from a simple one dimensional nonlinear equation, generally referred to as the logistic equation. This is written as,

$$x_{n+1} = Rx_n(1 - x_n) \qquad (2)$$

This equation and its corresponding map has been extensively studied and documented and finds a fundamental place in college texts on chaos theory. The variable $x_n$ begins the process with an initial "seed" value $x_1$, as discussed previously. This equation contains $x_n^2$ and is therefore nonlinear. The term, $x_{n+1}$, represents subsequent values generated by the equation which in turn become the next $x_n$ to be fed back through the equation to generate new values. The R factor is the "driving" parameter and is varied from 0 to 4 in Figure 1. In Figure 2, R varies from 2.8 to 4 since much of what is of interest is where 3 < R < 4. In Figure 3, an initial seed value was carefully selected for each R to demonstrate a feature of sensitive dependence in a rather odd way. These diagrams are the results of multiple iterations of this nonlinear equation while varying the driving parameter R.

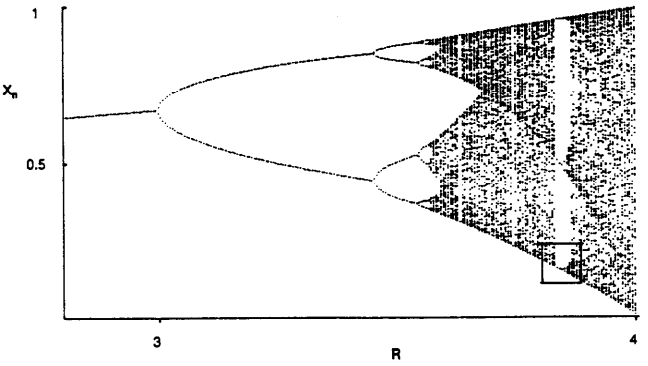



**Figure 2. Expansion for Logistic map for 2.8 < R < 4.**

Within these diagrams one can glimpse the observed discoveries which I have listed. The bifurcation phenomena is prominent in Figures 1-3. The doubling is clearly visible in the sequence 1,2,4,8, until the resolution of the computer printout fails us. Beyond about R = 3.6 is the reality of chaotic behavior and the pattern of any kind of periodicity or quasi-periodicity ceases, except in those strange areas where some would suggest that "chaos gives rise to order."

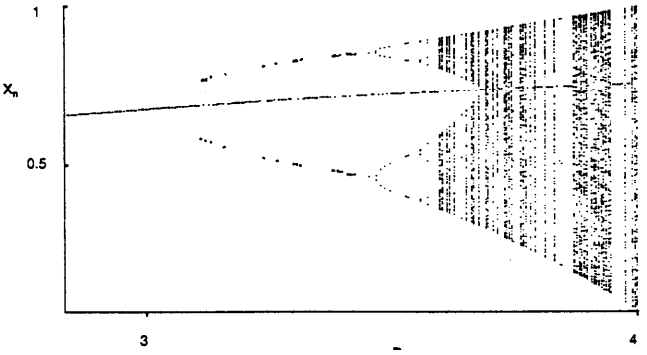



**Figure 3. Sensitive dependence of initial conditions illustrated by computer value approximation.**

The trail left by this iterative process can be studied with the help of the mapping in Figures 4-6. These show the path of generated values for a specific R leading to single and double-valued states in Figures 4 and 5, respectively. In Figure 6, the iterated values meander chaotically over the region. Such maps are useful in studying just how order presumably arises out of chaos.

To illustrate sensitive dependence in Figure 3, I allowed the truncation of computer values to tell the story. If you examine the logistic equation and set $x_{n+1} = x_n$, you will find that $x_n = (R - 1)/R$. In other words, if your initial condition for $x_n$ were exactly equal to this function of R then you should have a single valued solution for x for the entire range of R. Since $(R - 1)/R$ is rational this should be no problem. However, the computer in use must truncate any nonzero digit when the storage space terminates. In comparing diagrams 2 and 3 one can see the computer's

effort at maintaining the single value through the variation of R. However, even when the effect of truncation is sensitive to less than even 1 in $10^{15}$ when using double precision, the value quickly zooms away after multiple iterations and resumes its place in the bifurcation zone or wanders around in the chaotic trash. Much of Figure 3 therefore resumes the shape of that in Figure 2, particularly in the chaotic region, when $x_n$ is not *exactly* equal to the ratio (R - 1)/R. This is a crude representation and different than how one might see sensitive dependence illustrated from other sources (i.e. Lorenz), but it serves to show that the slightest difference in value between two points will be magnified by an iterative process.

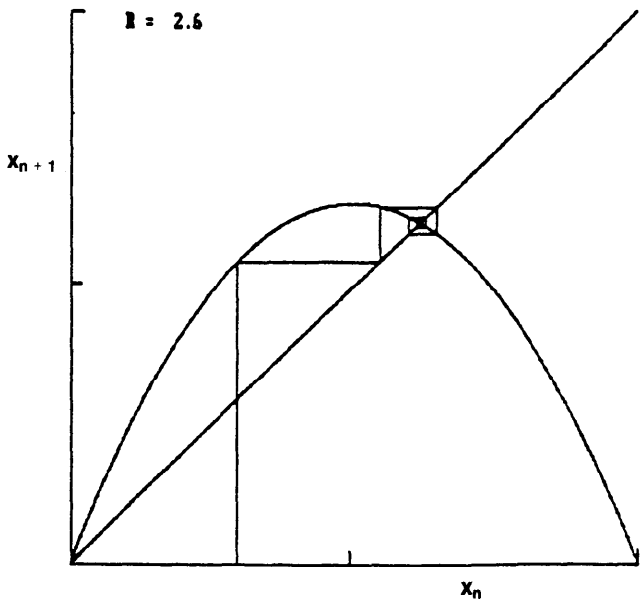



**Figure 4. A single-valued state.**

Finally, although not illustrated in this paper, an enhanced area of the block shown in Figure 2 would reveal a picture of the entire diagram. On the surface, this might remind one of something like a hologram where a small piece of the whole contains a perspective of the entire object in the picture. Successive enhancements of the logistic diagram would reveal the same pattern over and over again at increasingly smaller scales.

This concludes the discussion of some significant concepts in the field of deterministic chaos. As previously mentioned, many of these ideas are experimentally supported and therefore acceptable as part of the general body of scientific knowledge. However, spurious notions arising to attend this new theory about chaos sound very much like not-so-new heresies of the past.

## Fiction

As in every area of legitimate science, the pseudoscience of evolutionary speculation is close behind. Each of the above chaos principles has been used for every purpose from generating new evolutionary scenarios to virtual "proof" of evolutionary mechanisms. Like the attempt of evolutionary metaphysicists to boost support from quantum physics, evolution is being made to ride the coattails of legitimate scientific investigation in nonlinear dynamics.

Nonlinearity, like time, is becoming the new hero which opens unusual yet unlikely scenarios for evolutionary processes. Iteration represents biological feedback, and dissipative biochemical systems are driven in nonlinear fashion in a nonequilibrium state. Some might consider sensitive dependence to be an appropriate basis for an evolutionary "quick change" providing for a macromutation. Could bifurcations be used to represent branching of evolutionary forms bypassing any assumed missing links? Will observed outcomes of universal self-similarity replace outworn arguments from homology and embryology regarding similar features as proof of evolution? Are these just wild, crazy speculations of popular fiction or the mumbo-jumbo of new scientific buzz words? Let us look at what is really being said, written and promoted.

For some time Ilya Prigogine has been particularly important in this area. His work in nonlinear, far-from-equilibrium systems* has been interpreted as lending support for an abiogenetic mechanism. Chanu even suggests that Prigogine's use of mathematical operators leads to a new understanding of time from that previously understood in a typical thermodynamic sense (Chanu, 1991, pp. 212-213). Our previous sense of time must give way to a "proper" understanding of mathematical operators in dynamical systems. This begins to sound similar to the doubtful philosophies of physical reality vs. mathematical concepts illegitimately withdrawn from quantum theory. From such a philosophic viewpoint one need only modify de Sade's axiom of whatever is, is right. Today, whatever "mathematically" is, is right.

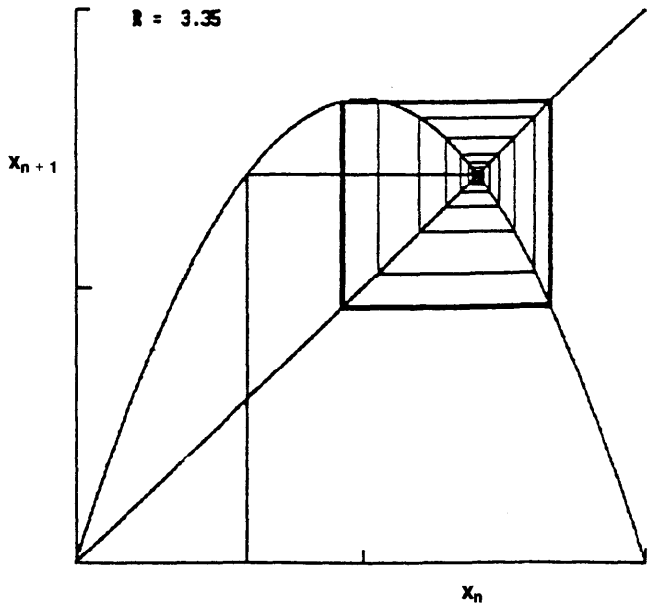



**Figure 5. A double-valued state.**

*Editor's Note: For a creationist review of this work see Williams, E. L. 1981. Fluctuations as a mechanism of ordering in Williams, E. L. (editor). Thermodynamics and the development of order. Creation Research Society Books. Kansas City, MO. pp. 55-66.

Nonlinear studies have led to a better understanding of so called chemical oscillators, such as the Belousov-Zhabotinsky reaction (Schuster, 1988, 11). However, can Prigogine, Eigen or others use these reactions as evidence for their philosophical extrapolations? Admittedly, an example of such a chemical oscillator personally witnessed at a lecture given by David Campbell of Los Alamos National Laboratories (Campbell, 1989) appeared to have a life of its own—but does it? Can chaos really explain and bridge the gap between nonlife and life? Can this be connected to Prigogine's view of biochemistry? Creationists have good reasons for doubt.

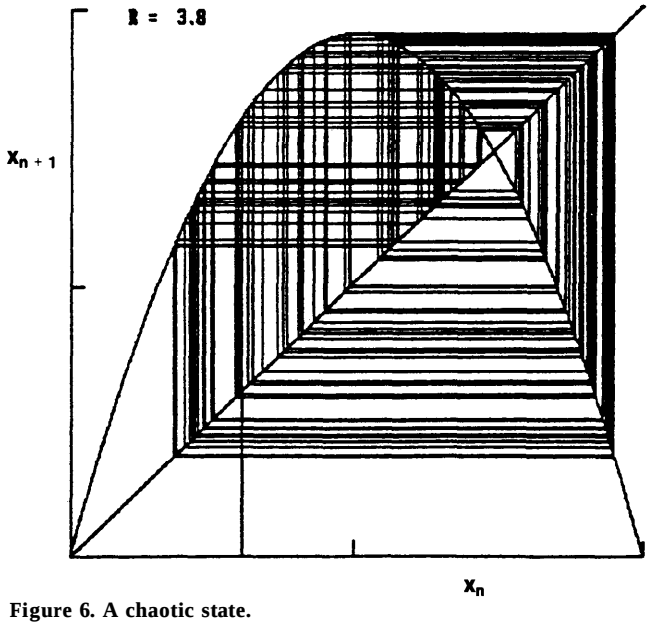



**Figure 6. A chaotic state.**

Next, Lynn Margulis has proposed a symbiotic evolutionary theory, which might be called "symbiotic feedback," where simple microbial cells ultimately interact and produce more complex nucleated cells (Margulis, 1982, p. 5). This procedure is no longer one of struggle and competition, but of cooperation. Presumed anaerobic ancestors had to come together to produce aerobic cells in response to the oxygen "waste" first generated by cyanobacteria. Margulis admits that the transition to an oxygen rich atmosphere is unpredicted by the "normal" laws in the physical sciences (Margulis, p. 6), but her solution lies in the biological realm. However, other advocates might be tempted to postulate that a "bifurcation point" in the development of earth's early atmosphere could be theoretically explained by some new "nonlinear" laws of chemistry and physics.

James Lovelock has noted the potential of chaos in his Gaian hypothesis. There is little doubt that Lovelock would be willing to accept chaos as the missing miracle which guarantees the generation of life. In his book, *The Ages of Gaia*, Lovelock (1988, p. 216) states:

> An ecologist colleague of mine, C. S. Holling, has observed that the stability of large-scale ecosystems depends on the existence of chaotic instabilities. These pockets of chaos in the larger, stable Gaian system serve to probe the boundaries set by the physical constraints to life. By this means the opportunism of life is insured, and no new niche remains undiscovered.

One of the more fanciful and speculative works in the area of chaos is *Turbulent Mirror* by Briggs and Peat. These authors integrate the diverse scientific work and findings of Prigogine, Lovelock, Margulis, McClintock, etc. to support a new picture of evolution. In a summary statement, the authors evaluate a viewpoint (with which they obviously share) expressed by Erich Jantsch (Briggs and Peat, 1989, p. 164):

> Jantsch's notion is unusual in that it runs directly counter to the old scientific belief that nature evolves from the small to the large, from the simple to complex. Coevolution of micro and macro scales is a fractal idea where both large and small scales emerge as aspects of one totally interconnected system.

This is a fairly good philosophic summary of what is happening in the evolutionary world. If the evolutionist imagines he is not constrained by a "linear" organization process from simple to complex, he will assume his difficulties with the previous thermodynamic arrow of time have been bypassed. If evolution is really fractal having self-similar characteristics at every scale, an evolutionist might be tempted to reorganize his phylogenetic concepts to support the notions of punctuated stability (order out of chaos) through variations in biological feedback. If this were the case, a uniformitarian framework for history might not be as relevant for the evolutionist as before. As creationists know, catastrophism has already received philosophic acceptance in much of the evolutionary camp.

Unlike the prior use of God to explain problem spots in evolution for the theistic evolutionists, a newer materialism might invoke "bifurcations" to punctuate geological history in order to achieve or circumvent previous problems which persuaded others to consider the supernatural. Magnetic field reversals could be the result of "chaos in the system" (Gleick, 1988, p. 29; Marek and Schreiber, 1991, pp. 151-152). A chaotic rupture in symmetry may kick-off gravitational collapse in stellar evolution (Doroshkevich, 1984, pp. 187-189). Nonlinear behavior could be used to suggest causes for presumed ice ages (Gilmore, 1981, pp. 429-433).

For another example, in a recent *Scientific American* article (Holland, 1992), John Holland discusses work in "genetic algorithms" referring to their applications in various areas of science. Most of the features I have listed (nonlinearity, iteration, etc.) are discussed in his article although no direct use of the term "chaos theory" as such is made. However, the purpose of his paper clearly sets forth mating and gene string recombinations as "driving" components in the evolutionary process. Genetic outcomes possess a sensitive dependence upon early random choices in Holland's classifier algorithm. Guided by such rules or conditions, stable states are achieved which become "successful organisms." Holland's references to successful uses of genetic algorithms in areas such as detection of pipeline leaks and turbine design, are of the same type as Gleick's

and Stewart's discussion of chaos. Yet, do these scientific successes justify evolutionary pseudo-science?

Finally, this new science and, unfortunately, its alien philosophies are significantly enhanced by the marvelous and fantastic displays which come from modern computers. The images of Peitgen and Richter in *The Beauty of Fractals* are as beautifully electrifying as they are scientific. The picture-painting power of the modern computer sketches complex maps in a matter of moments disclosing extremely useful information for experiments and strategies in handling nonlinearity. However, do computer printouts always represent physical truth? Can chaotic behavior of dynamical systems become the new replacement for both mechanism and miracle? I doubt it, and so should everyone else. Mathematical theories are useful, but theories require empirical confirmation.

### A Creationist Response

Nonlinearity, iterative techniques, or driven periodic systems are not new. However, sensitive dependence, self-similarity, and bifurcation (along with intermittency and strange attractors) are new in the way that they are presently understood. Chaos theory does present an alternative analytical strategy in attacking problems. Furthermore, it virtually renders certain nonlinear problems "solvable" which were essentially incomprehensible in any generation prior to computers. If solvable is too strong a word for some, at least rich new insights have been gleaned which did not exist before 1950. However, alternative strategies, expansion of classical concepts, or new information does not necessarily demand overhauling the framework of science. A paradigm shift does not necessarily equal an epistemological shift.

Three fundamental areas merit discussion: entropy, morphology, and philosophy. Evolutionists of every stripe have found the concept of entropy a problem.* Some have sought a redefinition in hopes of giving ground to some evolutionary mechanism. The problem of morphology has always been finding the particular mechanism(s) which give rise to the various organic or cosmological forms. Is chaos really a new mechanism to solve the evolutionists' problem? Finally, is there even a valid hope that chaos theory provides substantial ground for explaining the unobserved evolutionary scenarios for the whole of reality? Should we accept the proposition that "there is chaos in the system" as the philosophic excuse in the absence of scientific evidence?

Entropy has been defined in several contexts in the developing body of chaos theory. Two of these might be called metric (informational) entropy and topological entropy. One of the major measurements for entropy in chaotic systems is referred to as the Kolmogorov or K entropy. This measure is closely associated with other important measurements such as Lyapunov exponents and fractal dimensions. However, entropy was essentially developed from Claude Shannon's information theory. Much of the problem arises from what is meant by the term information, particularly when we hear about chaos creating information. As mentioned earlier, individuals like Prigogine or Eigen extend the idea of information outside of what might be considered a legitimate interpretation. Furthermore, the general public may become confused by the use of what is conventionally understood by the term information. In a recent ICR impact article by A. E. Wilder-Smith (1992, p. ii), this very point was addressed:

> Conceptual information of the type necessary to 'finance' life's codes, languages and concepts must be carefully distinguished from Claude Shannon's type of information, which consists of mere surprise effects without any conceptual content . . . 'information' in the Shannon sense can certainly arise from concept-free inorganic matter, but it is nonconceptual in nature and has never been shown to be in a position to resolve any molecular forms. . . . Confusion in assessing the importance of information' in origins theories is due to the fact that the term 'information' has been reduced by Shannon to non-conceptual surprise effects, without most non-experts in the area of knowledge having noticed the fundamental change in meaning.

With respect to the work of Prigogine and others, Thaxton, Bradley, and Olsen have challenged their arguments. These authors have clearly distinguished between thermal and configurational entropy, indicating that a decrease in thermal entropy would not give rise to new information or higher configurational order. In *The Mystery of Life's Origin* (Thaxton, Bradley, and Olsen, 1984, p. 152) they state:

> There is no apparent connection between the kind of spontaneous ordering that occurs from energy flow through such systems and the work required to build aperiodic information-intensive macromolecules like DNA and protein. Prigogine et al. suggest that the energy flow through the system decreases the system entropy, leading potentially to the highly organized structure of DNA and protein. Yet they offer no suggestion as to how the decrease in thermal entropy from energy flow through the system could be coupled to do the configurational entropy work required.

In addition to this argument, their consideration of what is referred to as the "concerto effect" reinforces doubt regarding the possibility of sustained biochemical products in the natural environment. Interference from investigators directing processes in a laboratory environment effectively depreciates credibility that all such processes would be collectively directed by nature "in concert" (Thaxton, Bradley, and Olsen, p. 104).

Evolutionist Robert Shapiro seems to echo some of the same sentiment creationists share. In his discussions on abiogenesis experiments, Shapiro refers to investigations where chemical chaos is the hope for providing the necessary link from non-life to basic life (Shapiro, 1986, pp. 206-207). However, although some degree of self organization occurs, he concedes that no structure capable of self replication is being generated (Shapiro,

*Editor's Note: Refer to the technical monograph, *Thermodynamics and the Development of Order.* Creation Research Society Books to examine this problem.

p. 212). Sophisticated nonlinear reactions are still not enough to produce the most foundational requirement for life: a self-sustained replicator. Even prominent chaoiogist David Ruelle admits that Prigogine's dissension with the general view of irreversibility associated with entropy is a philosophic bias rather than one based on evidence (Ruelle, 1991).

In dissipative systems, phase diagrams representing real systems do not preserve the areas of their map. Although information, of the non-conceptual type of Wilder-Smith, within a system may be suggested to increase, the contraction of area is equivalent to an overall loss of information. Ultimately, despite a fascinating dynamic display, we see that entropy will increase and "dissipative" systems are therefore appropriately named.

The question of morphology centers around some new mechanism of iterative feedback, with mutation and natural selection, to ultimately produce phylogenetic diversity. We may in fact discover that conservative mechanisms within organisms do indeed proceed by processes which were previously unknown. However, processes, individually or in combination, have not been found to experimentally produce an organism which the majority would agree is different in kind, phylum or even order.

I believe this problem of experimental repeatability is most acute for the evolutionist in the area of biological transition of kinds. If the evolutionist places his faith in mechanisms which could generate abrupt changes in organisms to produce new kinds, the question as to why we do not see this new type of evolution occurring now is sharper than before. Appeals to more time were swept away due to lack of transitional forms. Yet now, any process that would make biological transitions more dramatic (and chaos is dramatic) yields a greater possibility that such a catastrophic event might be observed. If the new evolutionist becomes too chaotic, he may not be left with an excuse as to why he cannot theoretically develop some new species every week once he finds the critical control points in his biological chaos network.

The new improved chaos scenarios for evolution sound great in the telling, but unique organisms (meaning different, stable, reproducing orders or phyla) have not been observed to have arisen from another kind of organism. Even under the guidance of laboratory investigators who influence genetic or other biological processes, the origin of new phyla have not been achieved and confirmed.

Finally, various routes to chaos, bifurcations or strange attractors characterize the general context for universal events. Overall, I accept these consequences as higher ground for the entire scientific community. Both catastrophes and relatively uniform periods characterize cosmological history. Chaos theory could be helpful in understanding when conditions prevail to produce a steady state solution or chaotic catastrophe. This research field is "hot" because it has opened the possibility to predict new and previously unknown behavior. However, a philosophic shift in using an amalgamation of order and chaos to invoke the invisible, uncharted links in evolutionary schemes is unjustified. Such missing "philosophic" links are little different than their biological counterparts.

**Summary**

Chaos theory has opened the door to valuable and useful insights in nonlinear dynamics. Evolution, like an illegitimate step-sister, grasps for an undeserved share of the inheritance due true science.

Theories for evolution are again seen to reside in the hearts and minds of advocates rather than empirical evidence. Evolutionary explanations may apparently move from simple to complex; still the universe, under a linear or nonlinear scheme, apparently does not. Biological feedback may explain or be used to demonstrate amazing genetic flexibility previously unknown; yet previously unknown classes of organisms have not yet been iterated into existence. Finally, though evolution remains strangely attractive to many, it is not yet demonstrated to be the result of a strange attractor.

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*Readers interested in this topic are urged to consult the various thermodynamic arguments offered concerning origin of life and living systems in *Thermodynamics and the Development of Order.*

## Quote

The evolution of our ancestral Forest Apes took place in widely separated areas.

Andrews, R. C. 1956. Meet your ancestors. Viking Press. New York. p. 17.

# CREATION AND CREATION MYTHS

JERRY BERGMAN*

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**Abstract**

*A survey of creation and flood myths throughout the world was completed, finding that most contain a basic set of themes that indicate they all had their origin in a set of actual historical events. It was also concluded that we have more knowledge and understanding of the Hebrew creation account in Genesis than any other and it stands in stark contrast to all others. Because the source of most creation myths was oral transmission, many were likely corrupted yet maintained the basic elements which lends credence to the position that most all creation myths are based on a set of historical events which occurred early in the history of humankind and which were embellished and modified as they were passed from generation to generation.*

## Introduction

A common concern about teaching creationism in the public schools relates to the perception that numerous "creation myths" exist, and if the Judeo-Christian version is taught, the Babylonian, Syrian, American Indian and myriads of other creation myths should also be required. None of these myths, it is often argued, are based on "scientific" evidence and they are all scientifically inaccurate. Others conclude that they should be taught, but only in appropriate classes, such as social studies. Even here, they should be presented only as ancient stories void of factual content. Clark's (1981, p. 8) statement is typical of this position:

> If creationists merely desire to have both positions, religious and scientific, presented, they must in order to avoid hypocrisy insist that American Indian, Hindu, Buddhist, and all other religious concepts regarding the origin of life are presented as well. They do not. They believe their concept constitutes divine truth. Evolution is a theory, nothing more. Its adherents do not claim the mantle of divine truth. This is the crux of the matter.

This conclusion is extremely superficial. Although almost every culture has a creation myth, most all are basically variations of the core theme of the creation story found in Genesis. In Freund's (1965, p. 6) words all of the "origin myths, though from scattered regions, have haunting similarities." Several researchers have concluded that the source of all creation myths, or what Sproul calls *primal myths,* reflect a common human experience or some actual historical event (Van Over, 1980; Sproul, 1979; Colum, 1930). If their origin were from a single early source, oral transmission, time and local cultural circumstances would have embellished or modified them. We would therefore expect that the details in the creation myths would vary, but that the basic outline would be similar or, at the least, almost all of the stories would have common elements. Conversely, the Genesis account, partly due to what Hasel (1974) calls its "antimythical polemic," stands in stark contrast to most every one of the others (Guerber, 1986). Even evolution, what Fahs and Spoerl (1960, p. 53) call "the newest of all the stories of the beginnings of life" is classified as a "creation myth" by those who study the field of primal myths. It is, though, in contrast to most all of the others, in that it is a story that does not involve outside intelligence.

*Jerry Bergman, Ph.D., Northwest College, Route 1, Archbold, OH 43502.

## The Problem of Similarity

Van Over, a leading "creation myth" researcher who refers to this type of narrative as "sun songs," concludes, "The surprising and perplexing fact is that the *basic* themes for [creation] myths in widely different geographical areas are strikingly similar" (1980, p. 10). Furthermore, these basic themes are all contained in the outline found in the second chapter of Genesis. This similarity has intrigued scholars or years (Leach, 1956). Typical is an analysis of 300 North American Indian creation myths which found them all "remarkably similar" (Rooth, 1957). Variations existed according to culture and other factors, but a few basic themes were commonly found in virtually all of them. Another extensive analysis of ancient African creation myths by Mbiti concluded that:

> Over the whole of Africa *creation* is the most widely acknowledged work of God. This concept is expressed . . . [in the teaching] that God created all things, through giving Him the name of Creator (or Molder, or Maker), and through addressing Him in prayer and invocations as the Creator. We have abundant examples of what African peoples say concerning the creative activity of God, and a few of these will suffice here.
>
> The Akan title, *Borebore,* given to God means "Excavator, Hewer, Carver, Creator, Originator, Inventor, Architect," and the people hold firmly that it was God alone Who created the world. The universe is described as having its architectural origin and form from God, Who is there pictured as its Artist-in-Chief. Of the four most known Akamba names for God two mean "Creator" or "Maker" and "Cleaver" The second of these *(Mwatuangi),* is taken from the human act of slicing meat with a knife or splitting wood with an axe. So God first creates, originates, molds and makes; then He gives shape, supplies details and adds distinctiveness and character (1970, p. 50).

Pospisil, in his study of the Kapauku populations of New Guinea, found that they believe that:

> beyond the. . . sky exists another world that may be similar to ours, the abode of Ugatame, the Creator . . . Ugatame is omniscient, omnipotent, and omnipresent, credited with the creation of all things and with having determined all events. Strangely enough, however, he is believed not to exist himself [in the way we do] . . . "But how can

> he not exist when he created all existence?" Obviously Ugatame is beyond existence, because to the Kapauku all that exists must be of phenomenal nature; one must be able to either see, hear, smell, taste, or feel it. But Creator is beyond this phenomenal dimension, because of the simple reason that he created it. Because he is, so to speak, in the fifth dimension and is not of phenomenal nature, he is able to be omnipresent (1963, pp. 82-85).

As Van Over (1980, p. 11) queries, "Why such similarity of mythic ideas and images throughout these distant cultures?" The renowned Claude Levi-Strauss is among the many scholars who have puzzled over this phenomenon. After years of studying these myths, he concluded that there exists an "astounding similarity between myths collected in widely different regions [of the world]" (1963, p. 208). In Kluckhohn's words, creation myths throughout the world "resemble one another to an extraordinary degree" (1962, p. 53; see also Levi-Strauss, 1965, p. 83 and Kluckhohn, 1958). That the creation myths are remarkably similar is not debated; why they are so alike is the concern: "The scholarly argument [of why this similarity exists] has raged for decades and it continues to this day. No definite answer seems yet to have developed, but theories abound" (Van Over, 1980, p. 11).

One theory is that the source of all of the creation myths is from an original one which developed by various gratuitous factors in a very ancient culture (the first humans?). Another position is that, the origin of these myths is from actual historical events. Whether the myths were originally created by different groups in various places of the world and their similarity was because they were influenced by common psychological human needs or had their origin from an actual set of events, time would embellish, modify, romanticize, and tailor the original story to local needs, customs and traditions. Periodic influences from outside of the culture also likely occurred. For example, in China:

> Most, if not all, mythologies include an account of the creation of the world and its inhabitants, both human and animal . . . what we have is rudimentary and gives every appearance of being the product of scholarly compilers who were, generally, concerned to recount cosmogonies as parables. . . . The most extensive account of the creation, involving a giant called Phan-ku, has survived only in texts from the third to sixth centuries A.D. . . . There are, on the other hand, accounts of . . . creation which . . . are older than the Phan-ku myth and seem to belong to an original Chinese tradition (Christie, 1968, pp. 46-47).

The tendency for time and culture to embellish or modify affects most other historical accounts, and even themes and concepts, indicating that their source is from actual historical events or common human needs. One example, the *serpent myth* (see Gen. 3:1-15), was researched by Mundkur who concluded:

> The serpent commands an extraordinary degree of attention as a religious symbol in practically every society throughout history. Serpents impel . . . loathing. . . because of primordial sensitivities rooted in the [past]. . . . Unlike almost all other animals, the serpent provokes certain patterns of intuitive, irrational responses latent in human and non-human primates alike (1982, p. 1).

The serpent, as pictured in Genesis 3:1-4, 14-15, part of which says:

> Now the serpent was more subtle than any beast of the field which the Lord God had made. And he said unto the woman, Yea, hath God said, Ye shall not eat of every tree of the garden? And the woman said unto the serpent, "We may eat of the fruit of the trees of the garden: But of the fruit of the tree which is in the midst of the garden, God hath said, Ye shall not eat of it, neither shall ye touch it, lest ye die." And the serpent said unto the woman, "Ye shall not surely die." And the Lord God said unto the serpent, "Because thou hast done this, thou art cursed . . . upon thy belly shalt thou go, and dust shalt thou eat all the days of thy life, and I will put enmity between thee and the woman, and between thy seed and her seed; it shall bruise thy head, and thou shalt bruise his heel."

A study of serpent myths throughout the world lends support to the view that the events described in Genesis could have been their source. A major parallel was found in Rooth's study of 300 North American creation myths: "there is one type of creation that is found all over North America which emphatically asserts that there are two creators, or rather one creator and a companion" (1957, p. 507). These two creators are pictured as father-son or two gods, uncle and nephew for example. The Christian teaching is that God originated the creation and His son is the actual creator (John 1:1, 16). Further, the Hebrew writer in Genesis 1 refers to the creator in the plural form: "let us make man in *our* image." These striking similarities could hardly occur by chance.

**The Problem of Meaning and Ancient Creation Myths**

Of the major difficulties in understanding creation myths is answering the question "to what degree did the ancients understand them as literal?" If archeologists 10,000 years from now unearthed certain contemporary American civilization remains, they could easily assume, based only on this evidence, that Americans believed in a literal creature called Santa Claus or, flying reindeer, tooth fairies, and odd white men who wore the label, "Mr. Clean." Few persons today believe that the earth has four corners, the sun rises or sets, automobiles are "self movers," *(auto* = self, *mobile* = move), motion-pictures as pictures that move, or cameras "take" a picture (after the picture is "taken," it is obviously still there). No one, except possibly young children, interprets these common vivid figures of speech literally. We know that expressions as "I could die of embarrassment" or "I could just kill him for that" are not literal. Some future generation may have

a field day understanding a TV commercial which proclaims "My husband got grease on his pants, and I really could have killed him. But instead I used new Dynamo." Could some future anthropologist conclude that our "primitive values" equate life with grease stains?

These few examples illustrate the difficulty of understanding a culture from a few isolated artifacts, especially words (Woodcock, 1976). There likewise exists some evidence that many of the ancients did not literally believe that Zeus caused rain, the sun was a god, or any of the other myths that we enjoy today were literally true (Ellis, 1982; Sebeok, 1968). Our new understanding of the ancients has altered our picture of them drastically (Diamond, 1964). Steindl-Rast summarizes this new view as follows:

> As we study the world view of ancient peoples, going as far back as we can in history and prehistory, the picture of earliest religion thus revealed stands in sharp contrast to the . . . notions anthropologists had in the eighteenth and nineteenth centuries. They simply took it for granted that all religious notions and the human mind in general must have developed step by step in close parallel to physiological evolution from a "savage" stage to ever greater refinement. Within our century, however, a wealth of objective material has been accumulated which proves that the most ancient cultural stratum to which we can penetrate by anthropological methods is . . . by no means "savage" (1977, p. 7).

Of course, past generations believed much which we today recognize as wrong, but mankind has always loved stories, and most of the ancient myths are just this. And unless a compelling reason exists not to, myths should be viewed as stories to both entertain and, more importantly, to teach a lesson about life (Ohmann, 1962; Altizer, et al., 1962). Ellis concludes that:

> If one is acquainted with the nature of myth (even on an elementary level), one is aware that even the ancient peoples who constructed them did not subscribe to a "literal" interpretation of them. The truth content of myth was considered to be higher, in a moral or religious sense, than merely a description of physical reality. For anyone in the twentieth century to ascribe "literal" reality to these ancient myths is almost too comical in itself to need further ridicule (1982, p. 12).

Plato's writings, Aesop's fables and other literary works clearly demonstrate that the ancients had a tremendous amount of insight into life and living and, indeed, if the reader could understand Greek, he or she probably would feel at home in the company of the likes of Aesop, Plato, Aristotle and Socrates—and would no doubt learn much from them (Harrison, 1933). An English teacher was fired because he insisted that his students read and discuss the works of Plato and Aristotle, illustrating this. His 20 years of experience and high recommendation from his students not withstanding, the school board insisted that his high school students simply could not understand the profound wisdom elucidated by these ancient Greek philosophers—and the courts agreed (Bloom, 1987). Did these philosophers accept beliefs or ideas that historians today claim were in vogue at the time, such as the assumption that stones fall to the ground because they're "returning home" or water floats up into the heavens when it becomes steam because it is also returning home (the natural home of water is the heaven, of stones, the earth)? We do not know exactly how they understood these possibly poetic explanations, but they, as we clearly do today, used much metaphor and symbolism (Sproul, 1979). Most historians conclude that modern humans have no monopoly on wisdom, and that the greatest of the ancient scientists were "considering the handicaps under which they worked, fully the equals of any in our own time" (Jones, 1972, p. 53: Kramer, 1961). To assimilate into our world, the ancients would have to adapt to our technology, but not necessarily to our "worldly wisdom." In the words of Levi-Strauss viewing myths as only naive attempts to explain reality is incorrect:

> Some claim that human societies merely express, through their mythology, fundamental feelings common to the whole of mankind, such as love, hate, or revenge or that they try to provide some kind of explanations for phenomena which they cannot otherwise understand—astronomical, meteorological, and the like. But why should these societies do it in such elaborate and devious ways, when all of them are also acquainted with empirical explanations? (1963, p. 207)

Given evolutionary assumptions, one would assume that the farther back in time one travels, the more "primitive," less sophisticated and more foolish human beliefs about the natural world become. Where this is true, it is only because the accumulation of knowledge gives each generation a clear advantage over previous ones. And an ancient Greek or Roman would feel fully at home in our culture—if he or she were raised in it. No evidence exists of *brain* or *human intelligence* evolution since Catal Huyuk (Chiera, 1938). The benefits of accumulated knowledge of past generations, an advantage that has been especially true during the past several centuries in the west, tends to distort our evaluation of the ancients. The ancients had a tremendous amount of insight and knowledge, and we are selling them short in viewing their creation myths as the product of "ignorance" (Steindl-Rast, 1977). Chiera (1938, p. 110) notes that the Babylonian and Assyrian "Creation stories [were] ancient cosmogonies [with] sophisticated philosophical substratum." As Levi-Strauss (1963, p. 230) summarizes:

> Prevalent attempts to explain alleged differences between the so-called primitive mind and scientific thought have resorted to qualitative differences between the working processes of the mind in both cases, while assuming that the entities which they were studying remained very much the same . . . the kind of logic in mythological thought are as rigorous as that of modern science, . . . the

difference lies, not in the quality of the intellectual process, but in the nature of things to which it is applied. This is well in agreement with the situation known to prevail in the field of technology: What makes a steel axe superior to a stone axe is not that the first one is better-made . . . but steel is quite different from stone. In the same way . . . man has always been thinking equally well; the improvement lies, not in an alleged progress of man's mind, but in the discovery of new areas to which it may apply its unchanged and unchanging powers.

This increase in knowledge notwithstanding, many things exist about which we remain vastly ignorant. And there are many areas of knowledge which we are no closer to solving today than were the ancients. Speculations relative to the origin and establishment of the universe abound, and a study of many of the time-tested truths of the ancients helps us to realize that we have been meandering around the truth, and in some ways they were closer to it (Glotz, 1967; Carcopino, 1940). The solutions to major problems are sometimes quite simple, and seem to elude those who mysticize and complicate them (Bergman, 1992). Sometimes a child holds the answer to problems that adults insist on believing are manifoldly complex. A father asked his daughter why she loved him, and she replied, "Because you loved me first," an answer that conveyed more insight into human behavior and motivation than it may at first appear.

Life has not changed in many important ways since humans have been on this planet. Eating, sleeping, working, loving and hurting, aside from the influence of cultural variations, have all been much the same since recorded history. The ancient cities, we are now beginning to realize, were far more complex than we had assumed only a few years ago (Steind-Rast, 1977). Except for lacking modern gadgetry, they were in many ways identical to modern cities Hamblin, 1973).

The problem of understanding symbolism likewise exists in interpreting the Hebrew creation account found in the first few chapters of Genesis. We have a significant advantage in understanding the ancient Hebrew and Greek words because compared to the mythology of dead cultures the former is still a living culture (Graves and Patai, 1983). Further, thousands of ancient extant writings exist which discuss the various nuances and meaning of words that can be used to aid in understanding the biblical manuscripts. This is not true for many of the other myths. Many are far removed from Western civilization and culture, and in many cases their meaning was long ago lost in history. The Babylonian and many other cultures are dead and no wealth of information is available to help us understand them to the extent that exists for the Hebrew and early Christian culture and beliefs.

With Genesis, we also have the advantage that the extant manuscripts are far more complete and, as the record is an historical outline, it can be used to direct research. It has also been more extensively studied than any other ancient manuscript, enabling us to draw conclusions about the meaning of the Genesis account with far more assurance than the creation myths from other cultures. Genesis was not intended to be primarily a didactic story, but a matter-of-fact brief summary of the creation of the heavens and earth. Asimov (1981, p. 3) concluded that:

> The biblical writers . . . labored to produce something that was as reasonable and as useful as possible. In doing so, they succeeded wonderfully. There is no version of primeval history, preceding the discoveries of modern science, that is as rational and as inspiring as that of the first eleven chapters of the book of Genesis.

Further, the creation account was both validated and explained by Christ, the Apostles and the early church, and they did not live in a "primitive" civilization but in cities much like our own. Nonetheless, as is true of all creation myths, Genesis does use figures of speech and allegories. Its reference to the earth's four corners obviously does not refer to a physical, four-comer structure. The writer utilized an expression that was common at the time, and is still so today. The only problem is to determine which statements are literal and which are symbolic (Morris, 1976). Unfortunately, in order to reduce the credibility of the biblical record many critics try to literalize portions which are obviously not meant to be such, even assuming that certain allusions refer to ancient myths, such as claiming that the Genesis "firmament" is the metal dome that some ancients believed encircled the earth (Asimov, 1981).

### The Epic of Gilgamesh

The most famous of all non-biblical creation myths, the *Epic of Gilgamesh* was not written to explain the story of creation but to convey the tragedy of life (Christie, 1968). Yet, its account of the Flood is roughly parallel to the biblical story of Noah and the Ark and many details are remarkably similar (Hoberman, 1983; Heidel, 1963). Sandars (1978, p. 7) summarized the story as follows:

> Gilgamesh is . . . the first tragic [non-biblical] hero of whom anything is known and [is about] . . . man in his search for . . . understanding, and of this search the conclusion must be tragic. It is perhaps surprising that anything so old as a story of the third millennium B.C. should still have power to move, and still attract readers in the twentieth century A.D., and yet it does. The narrative is incomplete and may remain so; nevertheless, it is today the first surviving epic poem from any period until the appearance of Homer's Iliad: and it is immeasurably older.

The Gilgamesh epic, although basically a tragic love story, is today most famous for its flood account (Gordon, 1965). The modern re-discovery of this account by George Smith stirred international attention. Smith, of the Society of Biblical Archeology, reported in 1872 that he located an "unknown" account of the flood among the Assyrian tablets in the British Museum (Hasel 1974). He soon published the *Chaldean Account of the Deluge* based on tablets that were very incomplete, encouraging a search for more tablets (Heidel, 1951). Smith later found many of the missing lines of the flood description which was then, and still is today, "the most complete and best preserved part of the whole Epic" (Sandars, 1978, p. 10).

Although it is often claimed that the biblical account of the deluge was derived from this Babylonian source,

it is more reasonable to conclude that both accounts came from an older source, possibly one of those that Moses used to write Genesis (Gordon, 1965 p. 50, see also Hasel, 1974; Morris, 1976, pp. 25-26). The Gilgamesh flood narrative is only a small part of the whole story, and is at best a background event of the story. Its inclusion in the Epic was primarily to help elucidate its theme: the struggle to find meaning and purpose in life. Even a cursory reading concludes that it was not meant to be an historical account, although its source was obviously history which was passed down from the survivors of "the great flood." Thus Sandars (1978, p. 40) notes:

> Although the gods play a great part in the epic. . . Gilgamesh appears to have been . . . a secular poem. . . there is no suggestion that it was recited as part of a religious ritual as was the great Babylonian poem of creation, *The Enuma Elish,* though it contained quasi-religious material in the laments over the dead, and in the set pieces of "wisdom." It is a separate narrative, divided into loosely connected episodes covering the most important events in the life of the hero.

In a study of flood legends from all over the world, Strickling concluded "nearly all of them are variations of the theme in the biblical account . . . however, a statistical analysis indicates the purity of the biblical account and reveals evidence of subsequent upheavals having corrupted in varying degrees all other accounts" (1972, p. 152). Among the similarities that Strickling found are in 32 of the flood accounts a favored family was saved, and in 21 survival was due to a boat. He concluded that a correlation exists between the favored family account with the following teachings: 1) survival by boat, 2) a forewarning, 3) one flood only, and 4) preservation of other types of life. The same correspondence with the biblical account is also found in world wide creation accounts.

### The Purpose of Creation Myths

Many ancient "creation accounts" are, like the Gilgamesh epic, obviously didactic stories written not primarily to inform the reader of the means of physical creation, but to teach some moral principle via obvious folk hero stories or to instruct about some tradition (Hasel, 1974). In contrast to Genesis, many of the creation myths are written by "philosophers and teachers" and only incidentally refer to creation (Freund, 1965). Their primary purpose is clearly not to discuss origins, and often they only indirectly refer to it as a past event. Many, like *The Epic of Gilgamesh,* are concerned primarily with problems of living and life (Doria, 1976). There is, nonetheless, a strong similarity between most creation myths and Genesis.

Among the aspects of the early history of the world found in Genesis and the flood which also appear in many or most creation stories, are the confusion of tongues at Babel. Syrian, Sumerian, Greek, Babylonian, Chinese, Hindu, Persian and even the Estonian, Irish, American Indian, Toltecs' and Cholulans' creation stories all include this topic. In the Indian tradition the flood causes "Universal destruction" because the world grew "extremely sinful" (Mackenzie, 1987). As regards the great flood, Warshofsky (1977, p. 129) notes:

> With variations, that biblical account of a great, universal flood is part of the mythology and legend of almost every culture on earth. Even people living far from the sea—the Hopi Indians in the American Southwest, the Incas high in the Peruvian Andes-have legends of a great flood . . . covering the tops of the mountains and wiping out virtually all life on earth.

### The Five Basic Classes of Creation Myths

Long (1963) has successfully classified creation stories into five basic types, and many individual myths contain elements of two or more of these themes. His grouping is evidence that most creation myths had their origin, although altered in time, from an actual set of events or records.

**1. Creation From Nothing.** The creator "called forth into being" the creation, and it came into existence totally as a result of His will. Christianity has traditionally taught that creation was from "nothing" or *ex-nihilo* and several Scripture verses support this view. Genesis states six times "and God said . . . and so it was" indicating creation *ex-nihilo* for at least part of the creation or, at some point in time, all physical reality. Steindl-Rast (1977, p. 7) notes:

> Sometimes the way in which this Supreme Being made the world is described in elaborate myths; sometimes only the fact of creation is stated, as when the Baining of New Britain say: "He brought all things into being by inexplicable ways." Frequently the Supreme Being is described as making the world by thinking it [into existence], by a word of command, by singing or by merely wishing it to be. The Wijot in northern California, for example, say: "The Old Man Above did not use earth and sticks to make men. He simply thought, and there they were."

**2. Emergence Myths.** Usually God creates the material *ex-nihilo,* then He forms or shapes it into useful forms. Humans and other parts of creation thus *emerge* from some other substances or preexisting material. Good examples include the formation of man from the dust of the earth, and of woman from a rib taken from Adam. God, as related in Genesis 1:11-12, also formed all plants from the existing earth (all quotes, unless noted, are from the Goodspeed version);

> Then God said, "Let the earth produce vegetation, seedbearing plants and the various kinds of fruit-trees that bear fruit containing their seed!" And so . . . the earth brought forth vegetation, the various kinds of seedbearing plants and the various kinds of trees that bear fruit containing their seed. And God saw that it was good.

The Scripture often calls God a *potter,* molding an existing substance into something else (Jeremiah 18:1-9). Creation myths commonly describe man's creation in this way. Mbiti (1970, p. 51) concludes that in ancient African creation myths:

> The metaphor of the potter is commonly used to describe God's creative activity. . . . The people hold that "there was nothing before God created

> the world." . . . God created out of nothing, in the original act of creation, though now He may use existing materials to continue His creative activities. This concept of creation *ex nihilo* is also reported among the Nuer, Banyarwanda and Shona, and undoubtedly a careful search . . . is likely to show that there are other peoples that also incorporated it into their cosmologies. . . . The Ila have three names for God by means of which they describe His creative work. They speak of Him as Creator, Molder, and Constructor. The Tiv, who are famed for their woodwork, think of God as the Carpenter Who "carves" the world giving it different forms and shapes. When the Lunda speak of God as "the Father Creator," they place Him on a parental level: He fathered all things, and exercises His fatherly care over them.

Parrinder adds that to the Africans the view of God is:

> As Molder of all, he shaped things, like a woman fashioning pots that she makes out of clay. He put things together and constructed them, like a builder making a house. . . . Some of the names given to God in African ritual, proverbs and myths, show what men think of his character and attributes. He is first of all Creator, Molder, Giver of Breath and Souls, God of Destiny . . . the work of making men was entrusted to Great God and he made human beings from the earth and molded their physical features. But the task of bringing these dummies to life was reserved for the Creator alone (1967, p. 19).

Another element that many myths have in common is that they imply or teach "creation through word or logos" (Doria et al., 1976: xxiii, see also John 1:1, 16) or a situation in which the God or Gods create through *sounds* such as verbal commands, or even coughs, crackles, or hisses. Genesis states that creation came about because God verbally ordered it to occur: "God *stated*, "Let there be, and there was!"

**3. Parent Myths and World Separation Myths.** In many myths, "mother-father" or "father-son" divisions or a separation of "parents" or something else occurs. Hasel (1974 p. 87) found that "the idea of the creation of heaven and earth by division is common to all ancient Near East cosmogonies" and in myths the world over. A Polynesian myth reads: "Darkness then rested upon the heaven an upon the earth and . . . [light and darkness] still both clung together, for they had not been made apart [yet]." Genesis contains several examples of separation, such as the division of the waters, and of night and day, but they all are, in Hasel's words "antimythical polemics," a simple description of events void of pagan embellishments (1974, p. 88). This is found among other places in Genesis such as 1:3-10, 14-19 which reads:

> Then God said, "Let there be light!" And there was light; and God saw that the light was good. God then separated the light from the darkness. God called the light day and the darkness night. . . .
>
> Then God said, "Let there be a firmament in the middle of the water to divide the waters in two!" And so it was. God made the firmament, dividing the waters that were below the firmament from those that were above it; and God called the firmament sky. . . .
>
> Then God said, "Let the waters below the sky be gathered into one place so that the dry land may appear!" And so it was. God called the dry land earth, and the gathered waters seas. God saw that it was good. . . .
>
> Then God said, "Let there be luminaries in the firmament of the sky to separate day from night; let them serve for signs for fixed times, and for days and years; and let them serve as luminaries in the firmament of the sky to shed light on the earth!"

**4. Creation From Chaos or from the Cosmic Egg Myths.** These are actually two separate categories which Long (1963) combined. The first is the occurrence of creation from chaos, or producing structure from an undifferentiated material existence. Creation from chaos myths generally stress that creation is the process of forming the earth and living things from an existing chaos or mass of undefined, unstructured elements. From the beginning chaos, order was caused to occur as a result of some activity, force, or process. This is, of course, the theme of Genesis 1:1-2 which teaches that the earth was undifferentiated in the beginning or, as Gen. 1:1 says: "And the earth was without form and void," or in the words of the *Soncino Press Version* "unformed and void [empty]" a term Goodspeed translates "desolate waste." Christie (1968, p. 47) notes, "for the Chinese . . . creation was the act of reducing chaos to order, a theme which persists throughout Chinese thought."

Some of the myths also include the concept of a *Cosmic Egg* (or a raw material such as water or clay) which God created or which already existed, and from which He caused mankind, animals, plants, the earth or some other part of the universe to come. This *Cosmic Egg* concept is similar to that described in Genesis 1:11-13 when it states that God created "seeds," which in turn produced fruit. The production of "Seeds" is obvious in much of the creation account. Genesis 1:20-25 says:

> Then God said, "Let the waters teem with [or produce] . . . living creatures and let birds fly over the earth across the firmament of the sky!" And so it was. God created the great sea-monsters and all the various kinds of living, gliding creatures with which the waters teem, and all the various kinds of winged birds. God saw that it was good, and God blessed them . . .
>
> Then God said, "Let the earth bring forth [or produce] the various kinds of living creatures, the various kinds of domestic animals, reptiles, and wild beasts of the earth!" And so it was. God made the various kinds of wild beasts of the earth, the various kinds of domestic animals, and all the various kinds of land reptiles; and God saw that it was good.

Interestingly, the cosmological view currently in usage, the big bang hypothesis (called the "standard model" because of its wide acceptance) postulates a "cosmic egg" from which the entire universe sprang (Lerner, 1991; Silk, 1989; Weinberg, 1977). Christie notes the Chinese myth:

> . . . of the third century A.D. [taught] Chaos was like a hen's egg. At this time neither Earth nor Heaven existed. From this egg, Phan-ku was born. The parts of the egg separated, the heavy elements forming the Earth, and the light, pure ones the sky. These were *yin* and *yang.* The concept of the world egg is not confined to China, nor to that of the primordial being from whom all else is derived. In classical Indian cosmogonies, a world egg occurs which opens to form the heavens from its upper part, earth from its lower [by] Brahma, the creator . . . these parallels . . . the result of direct influences between India and China or represent traditions deriving from a common source (1968, p. 49, 53-54).

5. The last group that Long identifies is the **Earth-Divider Myths** or where a divine being divides the water by bringing the land from the sea, permanently separating the two. Genesis 1:10 says God divided the land and water as follows:

> Let the dry ground appear [out from the sea] and it will sow; and God called the dry ground earth, and the basin of waters he called seas. (Byington Version).

The above outline of myth types illustrates that the essential categories of all creation myths are directly taught, or at least clearly reflected, in Genesis. Further, these concepts appear to have had their origin in a set of events which actually occurred, or from some ancient common source which was transmitted to later generations by the first humans. Adam and Eve, who gave their immediate descendants information which became part of later historical records, parts of which are found today in Genesis. As the descendants of Adam scattered, they would have carried what they remembered (the essential elements) of the history found in Genesis. This history, as it was oral in most cultures for years, would be altered, embellished and changed as society developed. The essential elements, though, have often remained the same. The currently available evidence as reviewed here is consistent with this view (Long, 1963). All of the creation myths appear to be basically derived from the events upon which Genesis is based, and in only a few cases do small remnants of the original story remain. This, though, is not the case with many of the accounts. Genesis contains none of the embellishments common to the others but only the bare outline of historical events (Guerber, 1986). For this reason, it stands in contrast to all of the other creation accounts.

Van Over (1980, pp. 15-16) also notes that, "an enormous number of creation myths . . . involve the sun," and that the "life-giving, regenerative properties of light . . . is almost universally identified with primarily creative forces. Everywhere the sun plays an important, if not a central role . . . [guiding] the dark cosmic chaos that existed before creation." Of course, the Scriptures also often use the word sun and light in this sense, even stating that "God is light" (1 John 1:5 see also Isaiah 2:4, Micah 7:8; John 1:7-9; 3:19; 8:12; 9:5; 12:36; Acts 13:47; 26:18; 26:23 and other verses). The term often refers not only to physical light but also to knowledge and insight. The first act of God after the creation of the heavens and earth noted in Genesis was, "Let there be light" (this was just after it was mentioned "there was darkness over the surface of the deep"). The importance of light (knowledge and wisdom) is likewise reflected in virtually all non-biblical creation stories. This view was expressed by Van Over as follows, "My personal view after studying [creation] myths for many years is that creation myths seem to rise from the depths of the human psyche [or experience]" and this explains their similarity. Van Over adds that:

> They clearly carry an intense human desire to shape and structure a confusing and troublesome reality to give meaning and insight where before only shadows reigned. This seems . . . [to be one] impulse that guided the . . . myths, and thus they became a necessary human function, for they give shape and meaning to our lives. They also serve the needs of our age and our personal spirits (1980, p. 11).

The need to understand our origins is manifestly basic to humans, and seeking an answer does not fully explain the similarity of the creation accounts or even the source of this common need and why it is universal.

**Summary**

A major problem in understanding the non-Hebrew creation myths is that many of them are nonsensical and difficult to understand today. This does not mean that the non-Hebrew creation myths were not understandable at one time, only that the difficulties in translation and understanding the meaning of the phraseology and symbols used by various ancient cultures must be studied for them to be understood today.

For this reason, specific interpretation of the various non-Genesis creation stories is often fraught with difficulties. Thus, the conclusions of some, such that it is "plain from the evidence of the *Epic* of *Gilgamesh* that the Babylonians were social evolutionists," is unwarranted (Sandars, 1978, p. 31). While similar themes and the basic skeletons make up all creation myths, the Hebrew account stands apart from all others in many other ways (see Doria, 1976). As Hasel summarizes:

> This investigation of . . . the creation account of Gen. 1 in conjunction with a comparison of respective ancient Near Eastern analogues has repeatedly pointed into one direction. . . . With a great many safeguards Gen. 1 implies certain terms and motifs, . . . partly chosen in deliberate contrast to comparable ancient Near Eastern concepts, and uses them with a meaning and emphasis not only consonant with but expressive of the purpose, world-view and understanding of reality as expressed in this Hebrew account of creation . . . the Genesis cosmology represents not only a "complete break" with the ancient Near Eastern mythological cosmologies but represents a parting of the spiritual ways brought about by a conscious and deliberate antimythical polemic which meant an undermining of the prevailing mythological cosmologies (1974, p. 1).

As the Hebrew creation account is only one of many ancient myths, and if one teaches the Judeo-Christian story of creationism, it is argued that the myths of

other cultures should also be taught. It is apparent from our review that a comparative study of creation myths can be—and has shown to be—a beneficial part of the school curriculum (Fahs and Spoerl, 1957, 1960). Research of ancient cultures finds that stories which attempt to explain the existence of humans, animals, plants, the world and the universe "are found in almost every culture in the world, both in the religions of archaic peoples and in the greatest civilization religions" (Long, 1963, p. 19). The universality of creation myths points to a basic psychological need for a *causal* explanation of our world and public schools have an obligation to deal with this need.

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## Quote

To say "God is," affirms, in the first place, that man is not a cosmic accident. Life is not a mere fluke, an offshoot of matter. Life, as a matter of fact, is primordial energy, using matter for its own ends, shaping and reshaping it purposefully. Life is a dynamic transformer of the raw materials of this planet. Theism gives life a primary role, especially life in its human manifestation.

The human person occupies a unique place among living forms. He shares some features in common with the other primates, but no other organism can match his capacity for abstract thought. We have the ability to generalize and classify; we are uniquely able to know and understand. And the universe we live in is infinitely intriguing, exciting our curiosity, inviting us to learn and feel the sheer pleasure of knowledge for its own sake.

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# PANORAMA NOTES

## Underwater "Mudcracks"

Have you ever wondered why there were so many shallow seas in the past? There are hundreds of meters of flat-lying sediments covering hundreds of square kilometers, all deposited in a shallow sea. This is based on environmental indicators, using the uniformitarian principle. For instance, if you find a clam fossil, the rock represents a shallow sea, probably close to the beach. If you find a dinosaur fossil, the rock represents a terrestrial environment. If both a clam and dinosaur fossil are found in close proximity, the dinosaur "obviously" lived at the beach. Environmental analysis is not only deduced from the fossils, but also from the characteristics of the rock. In a Flood model, many of these environmental indicators are meaningless. A dinosaur, as well as terrestrial plants, can just as well be buried in the deep sea.

Mudcracks are a common environmental indicator for subaerial exposure. When they are associated with marine or "lake" sediments, they indicate shallow water and only a brief exposure of the sediments to air. Numerous subaerial shrinkage cracks do not fit into the Flood model. Are there any other mechanisms that form "mudcracks" underwater? Yes, there are at least two mechanisms, one just discovered, which will be discussed later.

Underwater cracking has been shown to be possible from experiments, and many shrinkage cracks in the rocks have been attributed to this mechanism, called synaeresis (Burst, 1965; Plummer and Gostin, 1981). Underwater shrinkage cracks can form by a volumetric decrease in mud caused by either variations in salinity of the depositing medium, sediment compaction, and/or temperature changes. Plummer and Gostin (1981) believe most synaeresis cracks occurred within the sediment and not at the sediment-water interface. Geologists have attempted to apply diagnostic criteria to differentiate between subaerial and underwater shrinkage cracks. Although their warning has been little heeded, Plummer and Gostin (1981, p. 1153) assert that this differentiation is difficult:

> However, because of the many possible combinations of interplay between the factors influencing crack morphology under conditions of both desiccation and synaeresis, an overlap in crack morphology occurs between the two groups.

Astin and Rogers (1991), on the other hand, claim that no cracks in the rocks of the earth can be shown positively to have been formed underwater. They criticize experiments for using conditions not reproducible in nature. The cracks formed experimentally have been thin with only rare polygons. Underwater shrinkage cracks claimed from the rock record are mostly linear and thin with rare polygons. They come from environments where large salinity fluctuations are possible, for instance on a tidal flat. For their example, Astin and Rogers (1991) analyze lake sediments (a uniformitarian environmental interpretation) from the Devonian Period in the uniformitarian time scale. These "lake sediments" are 1000 meters thick in a basin at least 550 kilometers long located in northern Scotland. Linear and polygonal shrinkage cracks are numerous on about 30 percent of the "lake sediments" beds. The linear cracks have been assumed to be underwater shrinkage cracks while the polygons have been assigned a subaerial desiccation origin by previous investigators. But, since the cross-sectional shape of both the linear and polygonal shrinkage cracks are similar, Astin and Rogers contend that even the linear shrinkage cracks are subaerial desiccation cracks. They claim cracks were preserved by periodic blowing sand over a dried lake bed.

Trewin (1992), although assuming that the polygons are subaerial shrinkage cracks, presents evidence that Astin and Rogers' mechanism for the linear cracks is unrealistic, calling for hundreds of large changes from deep water to a partially dried lake. He prefers a mechanism of salinity changes for the linear cracks. Deep water on the order of tens of meters is inferred from laminated fish beds, although Astin and Rogers (1992) find polygons associated with these fish beds. Trewin (1992) claims there is no evidence the mud dried; a cohesive mud layer was required since there are no soft sediment loading features. The uniform grain size, normal grading in 30 percent of the sand layers, and the composition of the sand supports a subaqueous mechanism for the sand above shrinkage cracks. This sand is the same as the sand in the fish beds of the ancient "lake." Many of the cracks in the fish beds also thin upward, indicating the cracks formed within the sediment. All this evidence indicates that both the linear and the polygonal shrinkage cracks may have formed underwater.

Now, a third mechanism for forming shrinkage cracks has been suggested, for at least various types of carbonate mud. The resulting cracks are called diastasis cracks, which are formed by differential mechanical behavior within inter-layered sediments of different cohesive strengths (Cowan and James, 1992). The cracks form a complete array of shrinkage cracks from linear forms to polygons that look like subaerial desiccation cracks. Several lines of evidence, illustrated from thin sections, indicate the cracks were formed at either the sediment-water interface or within the sediment. Some of this evidence is ripped up, cracked blocks of mud in the overlying sediment and the disruption of the over lying sediment above a crack. Cowan and James (1992, p. 1116) state the implications of their research: "There may be many fewer ancient peritidal carbonates than we think."

Cowan and James (1992, p. 1109) state that previous workers automatically interpreted the cracked sediments as a peritidal environment, even though the sediments contain none of the important peritidal features. In other words, the finding of shrinkage cracks, although their origins is controversial, automatically determines a peritidal environment. One would think investigators would look for further evidence of tidal features, but they apparently do not. Is it typical for geologists to rely on a few questionable features and to ignore evidence to the contrary when making environmental interpretations?

So there are now two mechanisms for forming shrinkage cracks: either at the sediment-water interface or within the sediments. Many geologists have been skeptical of synaeresis cracks because the experimentally produced cracks are poor analogs of cracks in the rocks. However, with time polygons do form from linear shrinkage cracks in these experiments. Although many geologists believe experiments are unrealistic, the Genesis Flood can provide a mechanism for numerous submarine shrinkage cracks. Rapid sedimentation and compaction would cause diastasis cracks. Synaeresis cracks could form by expulsion of porewater in mud and by rapid changes in salinity and temperature of the water. Presumed desiccation cracks in sediment cores taken from the Mediterranean Sea have been used to support the idea that the Mediterranean was once a desert. However, Dietz and Woodhouse (1988) claim that similar shrinkage cracks have been found by divers at the bottom of Lake Michigan. "Mudcracks" very likely are not subaerial: they can form rapidly underwater or within the sediments during the Flood.

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Michael J. Oard*

*3600 7th Ave. South, Great Falls, MT 59405.

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### Introduction

The *Creation Research Society Quarterly* has been published since 1964 (30 complete volumes). In an effort to make these volumes available, all of the missing issues have been reprinted. Brief synopses have been written on volumes 1-14 and have appeared in the previous 14 quarterlies. In each synopsis, major articles are reviewed to give a person interested in scientific creationism a general idea of the contents of that volume. Many of the articles are of continuing interest and value.

### Origin of Life

Duane Gish (1979, pp. 185-203) wrote an article entitled "A Comprehensive Christian-Scientific View of the Origin of Life." This field is the author's specialty and he has developed many telling arguments against the naturalistic model. He demonstrated that the spontaneous generation of life is opposed by (1.) the rate of destruction of simple organic compounds is much greater than the rate of formation, (2.) the presence of so-called traps would be fatal to the origin of life, (3.) compounds needed for the origin of life would have been removed under "primitive earth" conditions, (4.) large polymers such as DNA, RNA, etc. could not have formed, (5.) if they did, only randomly arranged DNA and RNA sequences could have formed which would have been useless for life, (6.) enzymes and life are impossible without each other, (7.) spontaneous organization of complex, coordinated systems would have been impossible, (8.) all living systems are unstable and can only be formed by reproduction of already-formed living systems and (9.) the degenerating processes as predicted by the second law of thermodynamics would not allow any *spontaneous* generation of life. Gish covered primitive earth models, production of amino acids, the Viking probe, Fox's thermal model, origin of stable, living systems, Oparin's coacervate theory and degeneration processes in this classic paper. In the same vein of thought, Trop (1979, pp. 205-209) showed that polyamino acids are the missing links in any chemical evolution scenario for the origin of life. Creationists have continually noted the defects in reasoning of evolutionists in this "scientific" field.

### Botany

Howe (1978, pp. 39-40) claimed that the Venus flytrap had to have a fully-formed trap with trigger hairs, digestive glands, etc. for the mechanism to be useful to the plant. Then he explained how this caused problems for the neo-Darwinian model of evolution and suggested that the plant was designed. Lammerts (1978b, pp. 131-132) briefly discussed vernal pools (shallow, temporary pools) and the unique plants found in them. He thought that God may have created the plants after the Flood to create beauty in the post-Flood world. The desert primrose *(Oenothera caespitosa)* was presented briefly from a design perspective by Keithley (1978b, p. 147).

### Zoology

"A (recently) living pleisosaur found?" was the intriguing title of a brief article by Swanson (1978, p. 8). The figure shown in this note possibly indicates the carcass of a reptile-like creature. Keithley (1978a, p. 46) humorously examined the male-female relationship of the phalarope bird *(Steganopus tricolor)* and made some applications as to the silliness of evolutionary reasoning.

### Genetics and Taxonomy

Siegler (1978, pp. 36-38, 11) offered a creationist taxonomy discussing species vs. kinds. The subject of variation and fixity among living things as a biological principle was discussed by an expert on the subject, Frank Marsh (1978, pp. 115-118). He explored Darwin's studies noting the mistakes of the latter. Also he covered the possible types of variation and hybridization. Marsh explained that the basic types are fixed and that variation is limited. For a more detailed discussion of Marsh's postulates, see Marsh, 1976. The assumptions of evolutionary genetics were examined by Tinkle (1978a, pp. 53-54). The author refuted naturalistic claims where necessary.

### Anthropology

A discussion of *Ramapithecus* was presented by Hummer (1978, pp. 92-94). He explained that:

> If *Ramapithecus* is not the first hominid then the already "sudden appearance" of *Homo* in the fossil record becomes overwhelming. It means that for more than 20 million years of supposed primate evolution there are no known ancestral forms for man (p. 94).

Later Hummer (1979, pp. 212-214, 204) examined *Homo habilis.* He believed that the fossil evidence did not warrant the creature being assigned a *Homo* status.

### Pre-Flood Vapor Canopy

One of the creationists who probably has done more technical work in defense of a pre-Flood vapor canopy about the earth, Dillow (1978a, pp. 27-34), offered a treatise on ancient longevity and gigantism. His discussion included the radiation flux at the earth's surface, the biological effects of electromagnetic radiation, the canopy and the theory of aging, gigantism in the fossil record, gigantism and oxygen, longevity and oxygen, dinosaur size and longevity, ozone and the canopy and carbon-14 and longevity. He concluded that:

> . . . the biosystems of pre-flood animals apparently produced an enzyme that cleaned out cross-linked molecules. Subsequent to the flood, either due to inbreeding, mutation, a radiation burst or some unknown cause, this enzyme was gradually eliminated and longevity declined (p. 32).

The same author (Dillow, 1978b, pp. 148-159) examined the mechanics and thermodynamics of a postulated vapor canopy. His conclusions were carefully phrased after he defended the concept. Cyr (1979, pp. 184, 211) speculated on global precipitation under a vapor canopy. He included evidence from ice-core oxygen-18 isotope ratios, the C-14 anomaly and cosmic spherules in Pacific mud.

### Carbon-14 Dating and Dendrochronology

Don DeYoung (1978, pp. 14-16) discussed radiocarbon dating in relation to some of the variables that affect the method and concluded that the ancient dates derived by irrational uses of the method are not reliable and that the method offered promise for young-earth creationists. Tyler (1978, pp. 16-23) examined the non-equilibrium method of C-14 dating and stated that the model is viable. This paper deserves serious study by young-earth creationists. Dendrochronology and radiocarbon dating were discussed by Gladwin (1978, pp. 24-26). He noted many problems in the correlation of C-14 and tree ring dating.

### Thermodynamics

Harold Armstrong (1978a, pp. 119-121; 1978b, pp. 167-168, 175) used the first law of thermodynamics in an unusual manner to illustrate that matter is conserved and entities (forms) are replicated but that matter and form cannot originate from nothing. Thus the evolutionary concept of the spontaneous generation of order from nothing or nonorder is impossible. Also see Armstrong, 1981. It was demonstrated that living systems could not have arisen by natural processes (Boylan, 1978, pp. 133-138). Only matter plus creative intelligence could have formed life. The first and second laws of thermodynamics were employed to reach this conclusion.

### Earth Science

Two articles noted rapid growth of stalactites in cement tunnels (Amer, 1978, pp. 8-9; Cannell, 1978, pp. 9-11) and applications were made within a young-earth model. Williams and Herdklotz (1978, pp. 88-91) continued their research program to outline the variables that could cause rapid stalactite and stalagmite formation. This particular report included the amount of water available, acidity of the water, $CO_2$ content of water, cave humidity, presence of ammonia in a cave and the crystalline form of deposited $CaCO_3$. Applications were made within a young-earth framework.

Strickling (1978a, pp. 12-14) discussed catastrophism and its effect on science. A detailed review of Davis A. Young's uniformitarian views was presented by Clough and Fredricks (1978, pp. 47-52) and answers were provided from a young-earth viewpoint. An extensive examination of the cephalopods in the creation and the Flood was conducted by Woodmorappe (1978, pp. 94-112). He developed a model to explain the physical evidence seen in the geologic record. He considered the antediluvian ecological zones of coexistence of cephalopods as well as ecological zonation and the Flood. Russell Humphreys (1978, pp. 141-147) initiated a series where he viewed the core of the earth as consisting of water. He considered the Scriptural evidence in this part.

Peleg's division mentioned in the Bible was postulated to be a rift valley in the Red Sea region by Strickling (1978b, pp. 159-160). A reprint of Whitney's article, "The Origin of Yosemite Valley" was presented (1978, pp. 164-166). The author considered the valley to have had a recent origin. Smith (1979, pp. 179-183) noted that likely the Flood waters were heterogeneous, not homogeneous. Thus creatures living in fresh water and salt water could have survived the catastrophe.

### Astronomy

In a carefully presented thesis, Hanson (1978, pp. 55-68) argued against the catastrophic postulations of Velikovsky to the effect that the earth's axis had been deflected in the past. Also he listed evidence for a recent creation of the earth. Harris (1978, pp. 112-115) suggested a solution to the quandary of seeing stars that were created only a few thousand years ago from the earth today.

### General

A unique article written by Walter Lammerts (1978a, pp. 3-7) noted that certain accurate scientific predictions can be made based on Biblical creation concepts. He discussed findings from the space program and documented the earth's spreading deserts. Bergman (1978, pp. 40-46) claimed that cause and effect is necessary in a real world in spite of the claims that evolution occurred without any sufficient reason. Cause and effect mirrors intelligent design. It was noted that often students are indoctrinated (brainwashed) into accepting Darwinism (Harper, 1978, pp. 83-87).

Tinkle (1978b, pp. 138-140) discussed social Darwinism and stated:

> The doctrine of social Darwinism is not popular nowadays. But it and Darwinism in nature should stand or fall together; those who reject the former and hold to the latter are being inconsistent (p. 138).

A discussion of the course and destination of Noah's ark was given by Schmich (1978, pp. 161-163). A humorous story of evolution in Biblical literary style was cleverly done by Agard and Howes (1979, pp. 203-204). Haigh (1979, pp. 210-211) presented some arguments against theistic evolution. This volume of the Quarterly also contained several other items (notes, book reviews, letters to the editor, etc.) of interest to creationists.

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_____ Emmett L. Williams*

*5093 Williamsport Drive, Norcross, GA 30092.


## COBE Instrumentation and its Engineering Limitations

### Introduction

In April 1992, newspapers across the country proclaimed with great fanfare that evidence had been obtained that the Big Bang occurred approximately 20 billion years ago. This news was based on data received by the Cosmic Background Explorer (COBE) Satellite. The Big Bang Theory originally predicted a uniform mass distribution throughout the universe but this prediction has since been proven false. Therefore the residual heat from that explosion must be non-uniform. The background radiation, shown by COBE to have a temperature differential of 10 μK (micro-Kelvin), has been constant at 2.74 degrees Kelvin which is in contradiction with the Theory. The temperature differential was obtained by using six Dicke differential radiometers on board the COBE satellite, with each observing different points in the universe, measuring the received radiation and comparing it with the other radiometric measurements. Russell Humphreys points out that these measurements could have been taken through a cosmic cloud or plasma field, resulting in the differentials obtained by the COBE team. In addition to the above mentioned astronomical problems, serious engineering difficulties exist in achieving these miniscule temperature differential measurements. Following are some of the many engineering problems:

1. Radiometric Sensitivity
2. Dynamic Range Sensitivity
3. Absolute Accuracy and Calibration Techniques
4. Losses and Mismatches in the Antenna
5. Satellite Stability (incident angles)
6. Error Analysis
7. Other Sources Contributing to Uncertainties

### Radiometric Sensitivity

In any electrical system, interference, called noise, is present. The radiometer sensitivity is set equal to the random noise in the electronics driving the radiometers and thus equal to the measureable temperature difference. The lowest noise can be achieved by averaging all the interferences many times to obtain no lower than 50 percent of the total noise level. The best temperature difference in terms of noise achieved so far is 0.1 Kelvin. The radiometric sensitivity (resolution) is the minimum change in the radiometric antenna temperature that can be detected in the radiometer output. This is defined as a change in the output equal to the standard deviation of the output. The input to a radi-

ometer is a gaussian random noise signal. An ideal total radiometer with no gain fluctuations would have a resolution given by the equation (Ulaby et al., 1981):

$$\text{Delta } T(\text{ideal}) = T(\text{sys}) / \text{SQRT}(Bt) \quad (1)$$

where T(sys) = T(a) + T(rec) SQRT = Square root
and T(a) = Radiometric antenna temperature
T(rec) = Receiver input noise temperature
T(sys) = Radiometer system noise
B = Predetection bandwidth
t = Predetection integration time

The integration time on the COBE satellite is two years!

### Dynamic Range Sensitivity

The dynamic range for calibration of the radiometers is set from 3 to 300 K with a required temperature stability of 0.05 K or better. The best stability achieved so far is 0.1 K which has been obtained only a few times. This indicates quite an inconsistent temperature stability between the various radiometers.

### Absolute Accuracy and Calibration Techniques

Accuracy depends greatly on the calibration techniques employed and is extremely vital to the validity of the data received by these instruments. Aerojet and Hughes Aircraft, which built these radiometers, calibrate to 1 K in a thermal-vat chamber and to 3 K in space. In a thermal-vat chamber, the radiometers are continuously calibrated for 6 to 8 months and at a minimum cost of $8 million per differential radiometer calibration. As noted above in dynamic range sensitivity, the inconsistent temperature stability in the system contributes greatly to errors in the actual measurements.

### Losses and Mismatches in the Antenna

The losses and mismatches in the antenna are the key to all the prescribed functional requirements. Great efforts are spent to solve this difficult problem. This paper will not elaborate on the numerous and extensive algorithms involved to compensate for the errors incurred by this problem.

### Satellite Stability

Satellites do not fly in a straight line but wobble about all three axes. This wobbling, of course must be continuously tracked. The tracking data (on the incident angles) is stored at such high rates that the COBE satellite must downlink this and other stored data to a ground station every 10 minutes. In addition, the temperature resolution equation (1) must be integrated before the enormous data flow is properly correlated and interpreted.

### Error Analysis

After examining the COBE error analysis it seems that an overly high confidence in the accuracy of the contributing effect of the many error sources was employed. Several potential error sources to the precision of the COBE data, referred to a future NASA paper, are not considered in this analysis. One very important neglected error source is foreground microwave sources which include thermal emissions of the COBE spacecraft itself and also from earth, sun, moon, and other solar system objects. Nonthermal radio frequency interference (RFI) is another neglected error source. Cosmic and galactic signals were also disregarded in the analysis because an assumption was made that galactic emissions were fixed in the sky under observation. For brevity the error sources listed in the COBE error analysis will not be mentioned (see Kogut et al., 1992). A confidence level (CL) was assigned to each error source by the COBE team. Nineteen error sources are weighted at a 95% CL, three error sources at a 68% CL, and one error source at a 13% CL. Simple statistics shows that the combined CL of this analysis by the COBE team is 11%. Furthermore, none of the error sources discussed here are included in the COBE error analysis.

### Other Sources Contributing to Uncertainties

Linearity
Antenna beam efficiency
Polarization purity
Incident angles
Antenna pattern corrections
Instrument Degradation
Microwave Losses
Receiver Gain
Transmission Lines Signal Losses
Receiver Excess Noise

How much these error sources contribute to the uncertainty of the measured temperature differentials is extremely difficult to determine. No analyses on these topics have been published, although various algorithms have been proposed.

### Conclusion

Faced with the overwhelming problems and uncertainties presented in this paper, the published temperature differentials remain highly questionable. Therefore more caution and humility on the part of the COBE team is in order. Unfortunately modern uniformitarian scientists are not in the habit of admitting their erroneous assertions. They also will not publicly correct errors in their own theories. With the introduction of the Plasma theory, it should be noted that the Big Bang theory is losing its popularity and those intent on salvaging it are desperately searching for reasons, however absurd, to rescue it.

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Alfred E. Von Theumer*

*52 Corwin Circle, Hampton, VA 23666.

# THE SCIENTIFIC EXISTENCE OF A HIGHER INTELLIGENCE

ROBERT A. HERRMANN*

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**Abstract**

*This article gives a general overview of recent results in mathematical logic that should have a profound effect not only upon the foundations of creation-science but the foundations of all religious experiences and thought that either assume or logically require the existence of a supernatural higher intelligence. In particular, it is shown that the concept of the existence of a higher intelligence exterior to the material universe can be modeled rationally by means of the science of mathematics. It is established that human religious experiences and scientific models associated with either an assumption or an implied requirement that a supernatural higher intelligence exists are not somehow irrational in character as it is claimed by many secular scientists and philosophers. Indeed, if such experiences or creation-science models directly correlate to certain customary Bible interpretations, then the assumption of irrationality is scientifically proved to be false.*

## Introduction

When concepts relative to the DNA molecule are modeled by means of information theory, one aspect of the obtained theoretical conclusions seems to defy human comprehension unless a very special postulate is assumed. As Wilder-Smith (1993) states:

> We are forced to come back to basics and assume that there must have been in the beginning—at the act of creation—an organ of the kind that makes the human brain tick (but infinitely more powerful, of course) to generate the concepts of biology on a much larger scale than the human brain can ever develop.

Under the further assumption that all life throughout the universe is associated with DNA type molecules and that such natural processes are amenable to human thought, then such a higher intelligence could not be assigned to biological entities within the universe itself. Using the term natural to refer to entities, processes, and the like that are within our universe, under these assumptions, information theory leads to the conclusion that the acceptance of a supernatural higher intelligence would be needed in order to properly comprehend the model. Unfortunately, the assumption that a supernatural higher intelligence exists has been rejected by secular scientists and atheistic philosophers as not being consistent with scientific logic. Indeed, one of the greatest onslaughts against such an assumption and all of the human (religious) experiences that are modeled by using such an assumption began in earnest with the introduction of the philosophy of "rationalism." This philosophy claims that explanations for religious experiences and perceived phenomena that include supernatural entities external to the natural world are irrational in character. The concept of irrational refers to what is considered to be contrary to certain established human thought patterns.

Rationalism implies that if you cannot rationally justify the existence of such a higher intelligence, especially as such an intelligence relates to experiences within the natural world, then it is necessary to replace hypotheses stated in specified supernatural terms with hypotheses stated in natural terms. Feuerbach (1967, p. 110) stated this claim as follows:

> . . . there is no way of explaining the thousands and thousands of contradictions, perplexities, difficulties, and inconsistencies in which religious belief involves us, unless we acknowledge that the original God was a being abstracted from nature. . . .

Feuerbach (1967, p. 248) also states: "Moreover, religious ideals have always involved all manner of irrational and even superstitious conceptions." He even attacks the rationalists as being incomplete rationalists.

> . . . the rationalists take great pains to point out the obvious fallacies of religion; but these are secondary, subordinate fallacies; as for the fundamental fallacies, which have all others as consequences, the same rationalists let them stand, for they are sacred and inviolable. Consequently, when a rationalist asks an atheist what atheism is, the proper answer is: Rationalism is a half-baked, incomplete atheism; atheism is a complete and thoroughgoing rationalism (Feuerbach, 1967, pp. 259-260).

From Feuerbach's viewpoint, the hypothesis of the nonexistence of a higher intelligence exterior to the natural world, of God, is the ultimately correct hypothesis from which to begin a complete rationalization for all religious experiences and perceived phenomena. Since Feuerbach's lectures, these ideas have been championed by numerous influential philosophers, scientists and social reformers. Marx (1960, p. 24), using logical terminology, states it by writing: "Christianity . . . , cannot agree with reason because "worldly" and "religious" reason contradict each other." Santayana (1905, p. 159), utilizing a destructive term taken from the language of logic, writes:

> . . . the grand contradiction is the idea that the same God who is the ideal of human aspiration is also the creator of the universe and the only primary substance.

In this age of scientism, influential humanists, scientists, journalists and the like continue to parrot these claims of Feuerbach with the added proviso that the assumption of the existence of a supernatural higher intelligence will contradict absolutely the logical procedures accepted by the scientific community. One quotation will suffice as an example of this worldview. H. J. Eysenck (1973, pp. 89-90) writes:

> Thus the first part of my definition of humanism would involve a stress on the use of reason in dealing with inanimate nature and with other human beings. . . . This inevitably involves the rejection of revealed religion. . . . All humanists

*Robert A. Herrman, Ph.D., Mathematics Department, U. S. Naval Academy, 572 Holloway Rd., Annapolis, MD 21402-5002.

> are agreed that religion is not based on reason. . . . To me, the word reason in this respect implies science. Science is the embodiment of the rational attempts to solve problems posed by nature or human beings. . . . Reason, to me, marks out the method to be used by all humanists.

Individuals who have either had personal religious experiences or argue for the scientific acceptance of such a higher intelligence certainly do not consider their contributions as irrational. As exemplified by the above quotations, many in the philosophic and scientific world do consider as irrational the assumption that such an higher intelligence needs to be supernatural in character and this has inspired their attempts at rationalizing religious experiences, or ignoring creation-science models and evidence for the acceptance of such models.

If it could be demonstrated scientifically that assuming the existence of a supernatural higher intelligence is rational in character, then this would destroy, utterly and completely, the philosophical foundations for the philosophy of rationalism as it is applied to religious experiences and thought. It would eliminate the basic philosophical argument against the existence of a supernatural deity. Atheism would have lost its most profound intellectual foundation. Further, the necessary conclusions of information theory applied to the DNA molecule would be upheld and, indeed, the basic foundation of creation-science could no longer be rejected on scientific grounds. But what would constitute a scientific demonstration that it is rational to postulate the existence of a supernatural higher intelligence?

Timothy Ferris (1970, p. 157) writes: "Scientific theories must be logical. They must be expressible in terms of mathematics, the most rigorous logical system known." Ferris overstates his conclusion when he writes that this "must" be the case. Actually, the modern scientific approach to theory is rather more vague on the subject of rationality. What can be said is that if a theory can be closely associated with a mathematical structure, then it would follow the most rigorous logical system known.

## Human Intelligence

No attempt will be made in this paper to give a nearly complete definition of human intelligence. But one of the crowning achievements of humanity has been the construction of a symbolic language as a substitute for oral expressions. Modern computer technology also allows for visual or audio impressions that are captured by mechanical devices to be translated into a symbolic language that can later reproduce, with great clarity, the original visual or audio content. Thus, for our purposes, human intelligence will include the ability to express thoughts and perceptions in a symbolic language comprehensible by others and, further, to present written arguments that follow patterns that correspond logically to procedures accepted by the majority of humanity.

Throughout this discussion, it will only be assumed that a symbolic language corresponds to a portion of human oral expression, human perception and mental impression. A symbolic language $L$ is constructed intuitively from two or more symbols by juxtaposition and yields geometric configurations called symbol strings (i.e. strings of symbols). For every natural number $n$, there theoretically exists more than $n$ distinct symbol strings by this process. Similar symbol strings are recognized by human perception to be equivalent.

In 1930, Tarski characterized and abstracted mathematically those general procedures that correspond to the most significant human mental processes that, for finite collections of such symbol strings, yield deductive conclusions. The mathematical operator so obtained is termed a *consequence operator*. In modern mathematical logic, there are two types of such logic operators. The most basic is the *finitary* consequence operator of Tarski (1930). However, there is a similar operator that is more general in character and is often termed simply as a consequence operator.

The small amount of set-theoretic symbolism that is employed in this paper is taken from a standard high-school algebra course and is only considered as an abbreviation. Indeed, each symbol is specifically defined. No actual mathematics appears in this paper. The formal mathematics can be found in Herrmann (1987, 1991). The symbol used to represent the finitary consequence operator is the symbol $Cn$. The more general consequence operator is often denoted simply by $C$. Informally, such operators take any subset $A$ of $L$ (i.e. $A \subset L$) and yield all those members of $L$ that can be deduced from A (i.e. $Cn(A)$). A basic requirement is that the assumed premises can always be deduced logically (i.e. $A \subset Cn(A)$). Once a human being has deduced all of the consequences, then no more consequences can be deduced from the same set of premises (i.e. $Cn(Cn(A)) = Cn(A)$). For $C$, if one set of premises $B$ is a subset of another such set $A$ (i.e $B \subset A \subset L$), then deductions from $B$ form a subset of those deductions from $A$ (i.e. $C(B) \subset C(A)$). For a finitary consequence operator, the human argument of using only finitely many symbol strings from a set of premises $A$ to obtain a deduction is modeled by the additional requirement that if $x$ is deduced from $A$ (i.e. $x \in Cn(A)$), then there is a finite set of premises $F \subset A$ such that $x$ can also be deduced from $F$. One can show that this last requirement also implies the last property listed for the general consequence operator $C$. Consequence operators that correspond to specific deductive processes such as those defined for propositional, predicate, and higher-order formal languages (i.e. those logical processes used in modern scientific discourse) can be further characterized so that each can be differentiated one from another.

What Tarski did was to take a concrete everyday experience and mathematically abstract its most basic properties. From this abstraction, mathematical arguments establish other properties. These other properties may then be interpreted with respect to the original linguistic terms that generate the Tarski abstraction. Thus new insight is gained into what constitutes human thought patterns. As will be discussed later, the same type of formal abstraction is possible for certain dialectic logics.

In 1978 (Herrmann, 1981), Tarski's consequence operator theory was investigated through application of the new mathematical discipline called *Nonstandard Analysis* for the specific purpose of finding a nonnumerical model for the concept of subliminal perception. Nonstandard does not mean that different mathematical procedures are employed. This is a technical

term relative to abstract model theory. After many years of refinement, the basic properties of nonstandard consequence operators appeared in mathematical journal form (Herrmann, 1987) and book form (Herrmann, 1991). Cosmological interpretations of these results have been reported upon numerously many times within other scientific and philosophic journals as well. However, also of significance is a linguistic interpretation of these fundamental results. Generating the mathematical structure is not extremely difficult. But interpreting it linguistically has been arduous.

### A Special Linguistic Interpretation

In order to interpret a formal mathematical structure relative to different disciplines, a correspondence is created between terms in one discipline and the abstract entities of the structure. This actually yields a many-to-one correspondence since numerous disciplines can be corresponded to the same mathematical structure. Each time this is done, a *mathematical model* is constructed. My interest in this paper is a specific correspondence between some terms relative to intelligence, linguistics, and similar human activities associated with a physical world and the mathematical structure. With respect to nonstandard structures, however, many new objects emerge that are not present within the standard structure. Although these new objects have all of the properties of the original entities and thus the same properties as the nonabstract objects from which they were originally abstracted, they also have many additional properties not shared by any of the original entities. What one does, in this case, is to create new terms that have a similar linguistic-like character as the original linguistic terms and assign these new terms to appropriate unassigned entities within the nonstandard structure. But can you assign a concrete dictionary meaning to these new terms?

A dictionary meaning to these new terms will not carry the appropriate content. One reasonable method to obtain an in-depth comprehension is to have a strong understanding of the workings of the mathematical structure and to reflect upon the relations between these new linguistic-like terms themselves, as well as between the new terms and the standard linguistic expressions. What this means is that you must study the written statements depicting these relationships. The model that this creates forms a portion of the *deductive world model* or, simply, the *D-world model.* There is, however, a new method that has been devised that renders these new concepts comprehensible without the necessity of an in-depth study. The method is termed *negative comparison.*

Negative comparison is a description as to how these new concepts negatively compare with the original standard concepts. Certain aspects of such linguistic type interpretations have been discussed elsewhere (Herrmann, 1991) but not as it directly relates to the concept of a higher intelligence. Further, this present interpretation uses a few special terms not previously introduced. The linguistic-like terms that correspond to new abstract entities that, at least, have similar properties as the original have the prefix "ultra-" attached. It is always to be understood that prior to each statement one should insert an expression such as "It is rational to assume that . . ." where the term "rational" means the logical processes science uses to develop its most cherished theories. To be as simplistic as possible within this section, only one of many distinct logical processes will be compared. What can be said about this one process will hold for all similar processes that can be characterized by the consequence operator. Note that logical processes are also termed *mental* processes.

The use of the "ultra-" prefix does not remove the term from being only a defined mathematical abstraction. Within a description, additional phrases that correlate such terms to a specific discipline are either inserted or, at least, understood by the reader. Relative to a supernatural higher intelligence, one basic correlating phrase is "entity within the universe." This signifies any corporeal entity of which the human mind can conceive and which makes its home within the material universe. The insertion of this phrase is the basic change in the interpretation fro those previously used. Other obvious correlating terms will appear when relationships between the ultra-objects and the concrete linguistic entities from which the model was generated are discussed.

There exists an ultra-language, denoted by $^*P$, that at least has all of the properties of the most simplistic of human languages, the propositional language $P$. The language $P$ is a subset of $^*P$. A simple informal propositional language $P$ can be constructed from but two primitive words such as "house" and "door" and the usual additional symbol strings such as "or" "and" "not" and "implication." In this case, all of the expressions in $P$ are meaningful in the sense that they impress on the human mind various images. Assume that all of the members of $P$ are meaningful in this sense. There are many members of the ultra-language $^*P$ that cannot be used for any purposes by, and have no specific meaning to, any entity within the universe. However, all members of $^*P$ are ultra-meaningful. The mathematical model would require "ultra-meaningful" to correspond to a statement such as "they ultra-impress on an ultra-mind various ultra-images." Remember that deep understanding of what these new terms might signify requires an investigation of *the relationships* between such terms as expressed by hundreds of such statements. Suppose $S$ denotes the consequence operator that characterizes the simple human mental process called propositional (sentential) deduction. Then $S$ is a finitary consequence operator and all of the consequences $S(B)$ that can be deduced from a set of premises $B \subset P$ are obtained by deduction from the finite subsets of $B$. Now there exists an ultra-logical process, denoted by $D$, defined on the subsets of the ultra-language $^*P$, where $D$ has, at least, the same properties as those of the logical process $S$ when $D$ operates on finite subsets of the humanly comprehensible language $P$ (Note 1).

What happens when the ultra-mental process $D$ is applied to any finite subset $F$ of the humanly comprehensible language $P$? The set of consequences $D(F)$ contains all of these consequences $S(F)$ comprehensible by entities within the universe (i.e. $S(F) \subset D(F)$) and many that are not comprehensible by entities within the universe. Using consequence operator terminology, when this occurs, the ultra-mental process being modeled by the consequence $D$ is said to be *stronger than*

the mental process modeled by *S*. It is this and other, yet to be described, properties that led to the selection of the term "ultra" as a prefix. Further, no entity within the universe can duplicate the ultra-mental process *D*, and this process also has numerous properties that are not comprehensible by any entity within the universe (Note 2).

There is a delicate analysis that can reveal the composition for some of the ultra-words in $^*P$, where *w* in the ultra-language $^*P$ is an ultra-world if it is not a member of *P*. What this analysis details is often quite startling. For example, there are ultra-hypotheses, a single one of which is denoted by *w*, that cannot be comprehended by entities within the universe and that, when the ultra-mental process *D* is applied to *w*, yields a consequence that *can be* comprehended by entities within the universe. These ultra-hypotheses exist in subsets of $^*P$ that, at least, have the same characterizing properties as sets that describe human behavior, natural laws and the like. For example, if a sentence *x* in *P* describes a certain human behavior trait, then, although there may not appear to be a hypothesis *h* in *P* from which *x* can be deduced by the human mind, there does exist in $^*P$ an ultra-hypothesis *w* such that the ultra-mind process *D* when applied to *w* yields the conclusion *x*.

There are other mental processes that seem to correspond to intelligence. One of these is choosing from a list of statements, that is potentially infinite, a specific finite set that is meaningful for a particular application. Embedding this finite choice process into the deductive-world model yields the same type of conclusions as those for the ultra-logic *D*. This ultra-mind process cannot be duplicated by any entity within the universe, it is stronger than all such mental processes and has properties that in all cases improve upon the mental process of finite choice (Herrmann, 1991).

Another human reasoning process is the dialectic. Basic characterizing expressions can be listed for many such dialectics (Gagnon, 1980). Such dialectics can be applied to any language *E* constructed from two or more symbols. The basic ingredients are a set of theses *T*, a set of antitheses *A*, and an operator *Sy*, among others, which yields a synthesis *x* for any $t \in T$ an some $a \in$ A. For all the dialectics listed by Gagnon (1980), it is not difficult to show that there exist sets of symbol strings *T* and *A* and operators such as *Sy* that when embedded into the deductive-world model become sets of ultra-theses, ultra-antitheses and, an ultra-mental process, the ultra-synthesis operator $^*Sy$ (Herrmann, 1992). Once again, the same type of conclusions hold for these ultra-dialectics as hold for the ultra-logic *D*.

It appears that all forms of such mental-like processes are improved upon, to an extreme degree, by their corresponding ultra-mental processes. When the collection *UM* of ultra-mental processes is compared, as a whole, with the corresponding set *M* of mental processes that are displayed by humanity, then it appears reasonable to characterize the collection *UM* as representing a higher intelligence. The logical existence of *UM* is obtained by use of the most fundamental tool of modern science and establishes that the acceptance of the existence of a supernatural higher intelligence is scientifically rational and verifies the conclusions discussed in the introduction to this paper. Moreover, any properly stated model *MH* that either specifically utilizes such a postulate or logically implies the existence of a supernatural higher intelligence cannot be rejected as somehow or other not being scientific in character. Indeed, if such a model *MH* explains past natural events or human experiences, and predicts other events as they are observed today, then the scientific method explicitly states that such models are to be considered as good as or even better than other models.

Although this discussion could be concluded at this point, one interesting question is suggested. Has such a higher intelligence been previously described using terms and concepts that parallel those for the above ultra-mental processes?

## Significance of Results

Although a comparison with the doctrine of all of the major religious belief systems has not been made, there does exist a strong correlation between these results and statements that appear in the Jewish and Christian Bibles. The Bible, when literally interpreted, often describes God's attributes in terms of a linguistic or a mental model. This is especially the case when the mind of God is compared to the mind of man. In every single case, the "mind of God" Scriptural statements are modeled by the above special deductive-world interpretations. This is a startling fact since the deductive-world model was not created originally for application to theological concepts.

As examples, every time the Scriptures state that God "speaks" to a prophet, or a Jew or Christian then the above special interpretation is verified. Indeed, all statements that compare God's wisdom, intelligence and the like with that of humanity are satisfied by this special interpretation as are numerous statements relative to the supernatural means that God employs to communicate with an individual.

Here is a partial list of such statements: Genesis 1:26; Numbers 23:19; Deuteronomy 33:26; 1 Kings 8:23, 27; 2 Chronicles 2:5; Job 9:4, 10, 11:7, 8,12:13, 15:8, 28:12-13, 20-24, 32:8, 33:12, 14, 37:23, 38:33, 36; Psalm 35:10, 53:2, 77:13, 86:5, 93:5, 94:11, 119:27, 99, 100, 139:2, 6, 17-18, 147:5; Proverbs 2:6; Ecclesiastes 2:26, 3:11, 8:17; Isaiah 55:8-9; Jeremiah 10:10-13, 17:10, 31:10; Daniel 2:21-22, 46; Matthew 10:20; Mark 13:12, 13; Luke 6:8, 10:21, 22, 21:15, 24:45; John 8:47, 10:16, 27, 12:40, 14:26; Romans 11:33-34; 1 Corinthians 1:10, 19-20; 2:10, 13, 16; 2 Corinthians 10:4; Ephesians 1:17; Colossians 2:3, 4; 2 Timothy 2:7; James 1:5.

Even if not specifically related to doctrinal statements, the logical existence of a supernatural higher intelligence is obviously significant or any supernaturally related belief-system and modern creation-science. It is no longer advisable to categorize human religious experiences and scientific models that are associated with a supernatural higher intelligence as being somehow or other irrational in character. Indeed, if such experiences or creation-science models directly correlate to a literal Bible interpretation, then the assumption of irrationality can be scientifically proved to be false. Finally, since application of the basic tool used for modern scientific research has established that it is scientific to assume the existence of a supernatural higher intelligence, a properly constituted creation-

science model that relies upon this assumption is not "pseudoscience", as has been claimed. Note once again that if such a model increases our capacity to understand the workings of the natural realm, then the scientific method specifically states that such a model is the preferred model.

### End Notes

1. Mathematically the purely subtle consequence operator $C_1$ on all of the internal subsets of $^*P$ is $D$. See Herrmann (1987), Theorem 4.5.
2. This comes from the fact that the formalized first-order theory of the propositional calculus is an infinite set and as such when embedded into the D-world model this metatheory generates infinitely many incomprehensible statements that behave like logical rules for the ultra-logic $D$.

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## BOOK REVIEWS

*Bones of Contention—A Creationist Assessment of Human Fossils* by Marvin L. Lubenow. 1992. Baker Book House. Grand Rapids. 295 pages. $12.95.

Reviewed by Michael J. Oard*

It is a pleasure to review the fruits of 25 years of creationist research on fossil man. This book is well written and documents numerous examples of circular reasoning in the analysis of human fossils and dating methods. Marvin Lubenow shows that the human family of the past not only includes Neandertal Man but also *Homo erectus.*

Chapter 1 starts with an aura of worship—as scientists gathered around a once in a lifetime collection of our ancient "ancestors" in the summer of 1984. These fossils included many of the real specimens, not casts that most paleoanthropologists evaluate during their careers. In spite of the claimed accurate cast duplication, many experts departed realizing that casts lack many important details. Marvin Lubenow moves from the worship scene to document in Chapter 2 that the field of paleoanthropology, based on Carl Sagan's definition of science, lies outside the realm of science. Paleoanthropology is history based on many assumptions, including the philosophical belief of naturalism.

I was surprised to find that instead of enough fossils barely to it into a coffin, as one evolutionist once stated, there were over 4,000 hominid fossils as of 1976. Over 200 specimens have been classified as Neandertal and about one hundred as *Homo erectus.* More of these fossils have been found since 1976. This should be enough for creationists, as well as evolutionists, to either classify them as humans or apes.

Before embarking on the status of the fossils, the author lays further groundwork. He gives examples to show how scientists have allowed their biases to rule their research, how circular reasoning is endemic to this field, how faith in evolution and the old earth is pervasive, and how the self-correcting boast of science is shallow. The examples he uses to illustrate these claims are Marcellin Boule's flagrant misrepresentation of Neandertal Man; the famous Piltdown hoax, the authenticity of which inspired 500 Ph.D. theses; the young dating (within the evolutionary time frame) of the Taung skull, the first Australopithecine found in Africa; and the *"Australopithicus"* designation of the obviously human Kanapoi elbow joint, which evolutionists date at 4.5 million years old. The Laetoli tracks, analyzed as very human-like by virtually every investigator who has studied them, nevertheless are classified as produced by Australopithicus. The reason for this classification is simply that humans did not exist at that time. The Laetoli footprints and the Kanapoi elbow joint show how fossils are pigeonholed into time slots based on the "fact" of evolution.

This brings us to Chapter 6 and the Neandertal problem. Evolutionists do not know where Neandertal Man came from nor where he went; they know little of how he lived. More and more fossils are being found and the picture is now emerging of a race of humans possessing unique morphological features, particularly in the shape of their skull. Neandertal Man is especially found in caves all over Europe. They are also unearthed in western Asia and Africa. These latter fossils are not very Neandertal-looking. Of special interest is a Neandertal hyoid bone that indicates Neandertal Man could indeed talk, contrary to what some evolutionists earlier asserted.

Chapter 7 analyzes a large number of perplexing human fossils. They are lumped together as archaic *Homo sapiens* with designated age ranges from 5,000 to 700,000 years old. A well known example is Rhodesian Man. They are thrown into this category because they have a somewhat different skull morphology from Neandertal Man, they are "dated" older than Neandertal, or their cranial capacity is too large for *Homo erectus.*

*3600 7th Ave. South, Great Falls, MT 59405.

The next six chapters are dedicated to *Homo erectus* because these fossils are probably the most controversial within creationist circles. Lubenow's thesis is that *H. erectus* is a race of small-brained, short people. They are on the lower end of the large range in human cranial size, and they are a small version of the powerful and taller Neandertal man. Therefore, like the latter, *H. erectus* should be reclassified as *Homo sapiens*, an opinion shared by some paleoanthropologists. Lubenow's case for this designation is strong, and I have noticed a number of other creationists reaching to this same conclusion.

The creationist confusion over the status of *Homo erectus* is understandable. Lubenow devotes Chapters 8-11 to Java Man, the first *H. erectus*, originally designated as *Pithecanthropus erectus*, which translated means erect ape-man. The controversy surrounding Java Man and its founder Eugene Dubois is familiar to most creationists. The leg bone of Java man was indistinguishable from humans. A human tooth was also found. The rub came with the ape-like or Neanderthal-like skull cap found 50 feet away that Dubois associated with the human leg bone. Not only did Dubois personally not discover Java Man, he did not even describe the geology of the area in which it was found. Similar to what commonly occurs in paleoanthropology, Dubois made sensational claims about the missing ink status and the age of Java Man. He eventually became paranoid of criticism and hid Java Man from other scientists. When other scientists were being credited for finding the first Australian, Dubois unveiled the two human Wadjak skulls that he had hidden for 30 years. If he had revealed the Wadjak skulls at the same time as Java Man, no one would have believed Java Man was a missing link.

One of the interesting features of this book is its creative writing style. In Chapter 10 on the Wadjak skulls, Lubenow pretends he is an evolutionist who is assigned to date Wadjak Man, but faced with contradictory evidence. He has to explain his reasoning to a creationist. No matter how twisted this "evolutionist's" logic, evolution still wins in the end. This exercise gives us insight into the powerful force of circular reasoning within evolutionary circles.

An outstanding feature of the book is the data the author has managed to find in obscure sources. The report on the 1907-08 Trinil-Selenka expedition in Chapter 11 is one of these treats. An expedition of scientists booked passage to Java, purposely to verify Dubois' claims about Java Man. They came home with a different story and meticulously documented their results, only to have the report end in obscurity. The gist of the report is that Java Man was not that old, based on human artifacts, a human tooth, the fossil flora, gastropods, and recent geological activity in the area.

Since the discovery of Java Man, over 100 more fossils of *Homo erectus* have been unearthed. The fossils come from layers that are dated as young as 6,000 years and as old as two million years. For example 40 individuals have been found in Kow Swamp, Australia, and dated about 10,000 years old. Evolutionists wave the magic wand and try to classify them as *Homo sapiens* with *Homo erectus* features, again another example of circular reasoning. The "older" *H. erectus* fossils overlap in age with a group of fossils called *Homo habilis*. *Homo habilis* is another one of those pigeonholes where certain fossils of a certain presumed date are placed. Lubenow makes a good case for accepting three of them as human and the rest as three-feet tall Australopithecine apes. One of the three is the famous skull KNM-ER-1470, found by Richard Leakey in 1972. This is the one in which Leakey made the sensational claim in *National Geographic* that the world either throw out this skull or all theories on early man. A very interesting sequence of events unfolded after Leakey claimed skull 1470 was 2.9 million years old. I will discuss this situation at the end of the review.

Thus *H. erectus* (including Java Man) archaic *Homo sapiens*, and Neandertal Man are in the human family and often lived contemporaneous with *Homo sapiens*. Lubenow displays several diagrams in his book that show these overlapping fossils. Stone tools, once thought distinctive of one particular fossil group, are now associated with practically all the human fossil groups. Even *Homo sapiens* fossils overlap the ape *Australopithicus*. All these fossils, using evolutionary dates, falsify human evolution, as the gaps in the remainder of the fossil record falsify the rest of evolution.

Lubenow does not end his analysis with a critique of evolutionary theory, but tries to explain the fossil evidence within a creationist framework. It is easily understood that human families, possessing distinct tribal features, spread all over the world after the Tower of Babel. So we would expect different groups of human fossils to be more-or-less contemporary. But how are the features, especially the shape of the skull, of some of these humans to be explained? Possibly, they are genetic or caused by inbreeding. People spread from Babel during the Ice Age. For at least Neandertal Man, the Ice Age maybe was involved. Rudolf Virchow claimed that some Neandertals had rickets caused by a vitamin deficiency. This is plausible, especially for those Neandertals close to the northern European ice sheet. The Neandertal people likely were the first migrants into Europe. As a result their unusual morphological features could have been caused by a lack of sunshine, which would cause a vitamin D deficiency. The lack of sunshine was due to heavy cloudiness and volcanic effluents trapped in the stratosphere during the early Ice Age period. Neanderthal Man likely would have stayed in his cave for prolonged periods during frequent stormy weather. A high meat diet could also have contributed to vitamin deficiencies.

Marvin Lubenow finishes his book with chapters on subjects peripheral, but important, to the subject of human fossils. Chapter 17 delves into the importance of the issue and how the animal rights movement is one logical consequence of belief in human evolution. We are next treated to a lesson on the problems with the big bang hypothesis in Chapter 18. Circular reasoning, assuming evolution, is just as powerful in cosmology. There is always the question of who wrote Genesis, the starting point for the creation-flood model, including beliefs on fossil man. This is the subject of Chapter 19. A logical conclusion is that Moses was the editor of previously written records by key patriarchs. Chapter 20 finishes with the implication of fossil man to several

types of theistic evolution. Whether it is the old earth-old Adam or the old earth-recent Adam view, most theistic evolutionists are intimidated by what they believe is evidence that the earth is old. They seem to trust at face value ideas on geological and astronomical time. And they question clear statements of history from the book of Genesis—a book inspired by God Himself. I fail to see the logic in this reasoning. Why not question human ideas, based on many assumptions, and accept the clear readings of Scripture (I Thess. 5:21)?

A very enlightening appendix finishes the book. It shows that faith in the dating methods is like walking on quicksand. This is the best presentation of the bias and circular reasoning in dating schemes that I have read. For any Christian tempted to believe in evolution and the old earth, he should buy two copies of Lubenow's book. He should then cut out the appendix pages of the second book, place them side by side in order, surround them in a glass case, and hang the pages on the wall above his desk. There he can meditate on them whenever some evolutionist insults him for not believing a scheme in which many "independent" dating methods "agree."

I will briefly summarize this classic appendix, called The Dating Game. It documents from the published literature the 10 year effort to date the KBS Tuff above Richard Leakey's KNM-ER 1470 skull. The tuff was first dated in bulk by the K-Ar method at 212 to 230 million years old-"obviously" too old due to the associated fossils. The excuse was argon retention. Therefore, those doing the dating had to extract "undoubtedly young" ash grains. The date on the KBS Tuff ended at 2.6 million years old, supported by the K-Ar method, two $^{40}Ar$-$^{39}Ar$ determinations, paleomagnetism, the fission track method, and generally by pig and elephant fossil dating. Leakey considered the dating "accurate" and "secure." All these so-called independent dating methods, which arrived at the same date, is powerful stuff for making theistic evolutionists. Unfortunately, many have succumbed.

This is just the beginning of the story because paleoanthropologists would not accept the date because it implied that a modern looking fossil was almost three million years old. For 10 years debate over the age of the KBS Tuff raged in the literature. Finally a date of 1.9 million years was selected, supported mainly by fossil pigs, which was based on subjective pig lineages from other areas of Africa. The other dating methods also fell in line with the new date. It also was discovered that previous workers had found dates on their chosen tuff grains that ranged from 0.54 to 17.5 million years.

From my reading of historical science, I believe the manipulation of the many "independent" dating methods to arrive at a consistent result is common. I believe it includes the manipulation of rocks, fossils, and radiometric dates to bolster a consistent geological column. It is appropriate to end this review with a quote from the book (pp. 265, 266): "The radioactive dating methods are a classic example of self-deception and circular reasoning. . . . In the dating game, evolution always wins."

*The Origin and Evolution of Life on Earth, An Annotated Bibliography* by David W. Hollar. 1992. Salem Press. Pasadena, CA. 235 pages. $40.00.

Reviewed by Clifford L. Lillo*

As is usual for a bibliography on evolution, this book does not present a very sympathetic case for creation. The author provides commentaries on each of the listed books, praising those with a strong evolutionary message and deprecating books on creationism.

The bibliography is separated into 13 chapters. In Chapter 2: "Evidence Supporting Evolution," Hollar has listed 129 books in three categories:

Geology and Paleontology
Ecology
Comparative Anatomy and Physiology

In spite of Hollar's high opinion of the books, he does not show that they provide actual evidence for evolution; most of them merely parrot the standard evolutionist fiat that evolution is true. The section on ecology contains many books that describe relationships between organisms and their environments but such relationships are not dependent upon evolution so no evidence for evolution is presented. With respect to comparative anatomy, this again is not proof of evolution but is good evidence for structural design. Hollar summarizes *Life on Earth,* by E. O. Wilson, et al., in this way:

> The origin of life and the sequential development of new species over the four-billion-year history of life on earth are described in detail with supporting experimental data. The mechanisms of evolution are studied along with the genetic properties of species populations (p. 56).

These "mechanisms of evolution" (if by evolution we mean actual conversion from one basic kind to another basic kind) are lacking, since the authors primarily fall back on "the theory of natural selection" (Wilson, p. 638), which is no mechanism at all. They also claim that,

> Evolution can be broadly defined as a change in the heredity of a population . . . an even more precise definition: evolution is any change in gene frequency in a population. (Wilson, p. 637).

Creationists would call this "mini-evolution" or simply "variation" which can be observed and does not conflict with biblical teaching.

Hollar has included a chapter on "Evolutionary Controversies" (Chapter 3), which begins with "Lamarckism and Alternative Evolutionary Theories" and ends with "Creationism." In the former, one book dealing with the Lamarckian theory, *The* Age of *Lamarck: Evolutionary Theories in France,* 1790-1830, by Pietro Corsi, has a chapter entitled, "Developments and Problems in Lamarckian Doctrine," which, Hollar says, "describes the scientific evidence against the inheritance of acquired characteristics" (p. 57). What makes this book particularly appropriate is that Charles Darwin himself, in his *Autobiography,* said,

*Clifford L. Lillo, BEE, MA, 5519 Michelle Drive, Torrance, CA 90503.

> Nevertheless it is probable that the hearing rather early in life such views [i.e., those favoring the Lamarckian theory] maintained and praised [by a friend, Dr. Grant] may have favoured my upholding them under a different form in my *Origin of Species* (Jastrow, p. 7).

In Richard Leakey's Introduction to *the Illustrated Origin* of *Species,* he states, "Darwin wanted to account for his belief that some characteristics or habits acquired during a parent's lifetime could affect the corresponding attributes of its offspring" (Leakey, p. 17). Regardless of what Darwin wanted, he was clearly incorrect in favoring the views of Lamarck.

Hollar also lists books on punctuated equilibria, a theory which acknowledges the paucity of evidence for gradual evolution in the fossil record and tries to explain it by claiming that evolution goes by spurts. The listing for another book, *The* Ages *of Gaia: A Biography of Our Living Earth,* by James Lovelock, has this Hollar comment,

> Lovelock, a scientist and inventor . . . originally proposed with biochemist Lynn Margulis that all life on earth functions together as one superorganism, a single unit. . . . Lovelock . . . provides considerable evidence supporting the hypothesis (p. 60).

The "Creationism" section includes some books which actually favor the biblical viewpoint, but Hollar's annotations for each tend to indicate that they are only based on the Bible and have no scientific basis. A few examples will illustrate this:

a. In regard to Duane Gish's book, *Evolution? The Fossils Say No!* Hollar writes,

> Gish . . . relies upon biblical and philosophical quotations but does not present any objective data supporting a creationist model for life on earth (p. 66).

b. Hollar describes Henry Morris's book, *The Troubled Waters of Evolution* in this way:

> This work is a philosophical attack upon evolutionary theory . . . Morris concentrates upon a few problems with the available evolutionary evidence . . . (p. 68)

c. For A. E. Wilder-Smith's book, *The Natural Sciences Know Nothing* of *Evolution,* Hollar at first appears to be objective, even describing the author as "a noted creationist" but concludes his note with, "Wilder-Smiths book contains many semantic arguments with emphases upon biblical creation" (p. 70).

Christians will be amused, because Hollar, in commenting on Philip Kitcher's book, *Abusing Science: The Case Against Creationism,* says, 'He [Kitcher] stresses that in no way does Darwinian evolution threaten religious liberty or the existence of God" (p. 67). In reality, Kitcher's book is even more humorous. Kitcher, an associate professor of Philosophy at the University of Vermont, writes,

> Eminent scientists not withstanding, science is not a body of demonstrated truths. Virtually all of science is an exercise in believing where we cannot prove (Kitcher, p. 32).

Another book, *Deep Time,* by David Darling, Hollar describes in this way,

> This thought-provoking book is the story of a single proton's existence from the beginning of time (that is, the beginning of the universe) to the end of everything, from the theories of the big bang to the big crunch. . . . Darling very cleverly illustrates key points and concepts in physics and cosmology (p. 73).

However, a look inside the covers of *Deep Time* reveals these statements:

> And now these older tales [the story of the creation of the universe by God] are joined by fresh myths born not of faith, not of archaic wisdom unchallenged, but of science . . . Now nature alone is seen as potent enough, creative enough, to draw itself into existence. . . Remarkable. The universe born out of nothing, of its own accord . . . But who said the cosmos had to be logical (Darling, p. 16)?

Are these key points and concepts in physics and cosmology? Many evolutionists who believe in the Big Bang have confessed that the starting point had to be a "cosmic egg" but they cannot account for the cosmic chicken. Darling has solved that dilemma: "the universe was born out of nothing." Is this science?

Chapter 9 deals with "Debates Over Evolutionary Descent," which would seem to have been an appropriate subject for Chapter 3. Some of the books listed in Chapter 13, which covers the "Search for Extraterrestrial Intelligence," are not about creation or evolution and are not truly relevant to the bibliography. For example, Hollar says of Robert Pirsig's *Zen and the Art of Motorcycle Maintenance: An Inquiry into Values,* "While Pirsig's book does not deal with extraterrestrial life or evolution, it does address the human condition on earth" (p. 219). Other books listed in this chapter cover UFO's and extraterrestrials.

Totally missing from Hollar's bibliography is a biography of Louis Pasteur, who showed that life comes only from life, or the Robert Gentry book, *Creation's Tiny Mystery,* which shows that earth's basement rocks were formed suddenly. What Hollar has included are claims that all life is one superorganism, Lamarckian views, the concept that the universe can make itself out of nothing, science as an exercise in belief, alien religions and aliens from outer space. Such is the stuff of evolution and of Hollar's book.

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*The Social Context of Scientific Creationism* by Christopher Paul Tourney. Ph.D. Thesis. 1987 University of North Carolina at Chapel Hill. 517 pp. $35.00 for students and faculty members.

Reviewed by Jerry Bergman*

As of 1993, almost 100 Ph.D. and M.A. dissertations have been completed on creationism. One of these is by Tourney (DeYoung, 1993). Tourney's abstract says "instead of diagnosing creationism as an assault on science . . ." Tourney argues "presenting God's creation in a scientific image is a profound concession to" Western science and technology. His study did not "denounce the creationist's claims for having departed from some scientific norms," but explored "what their beliefs mean in the context of their lives" (p. 6). This anthropology dissertation involved extensive field work and interviews with some of those active in the North Carolina creation movement. The author concludes that science does not embody an "objective truth which stands apart from the objective textures of human life, or that the context of science is a durable reality untouched by moral considerations" (p. 4) and that "science is a social fact in much the same way that religion or political ideology or art are social facts" (p. 5).

The author includes a short but fairly accurate history of modern creationism and covers the diversity of religious backgrounds of the early leaders, especially Lutherans. Tourney gives an especially favorable treatment of the Seventh-day Adventist church and creationism. He notes that the changing moral climate in the western world has encouraged the development of efforts to return to our roots—and part of these efforts was to return to a more meaningful and relevant Christianity. Much of his focus is on the events of the 1970s and 1980s and all of the major creationist groups and individuals involved are covered. Tourney concludes that the ICR faculty have "absolutely respectable, legitimate doctorates from major American universities . . . [and] are consistently well-prepared, and generally articulate . . ." (p. 104). In his analysis of science, the author states that "ICR's followers take science more seriously than most scientists do. . . . [and that] Scientific discovery can be [circuitous] and . . . its conclusions" tentative. Tourney concludes that "the scientific creationist movement is both diversified and robust—or, as an evolutionist might say, it has hybrid vigor" (p. 180).

This work also discusses extensively a select group of creationists in North Carolina to provide insight into the typical local creationist activist. Tourney provides a sympathetic, detailed explanation of the movement which belies many of the common media stereotypes. He even concludes, "knowledgeable activists like [the creationists that I studied] . . . give creationism a more stable center of gravity than its opponents ordinarily realize" (p. 396). Another research conclusion is that "more than half of the adults in North Carolina accept the general outline of the creationist argument" (p. 275).

*Jerry Bergman, Ph.D., Northwest Technical College, Archbold, OH 43502.

Tourney also discusses the background of the creationism controversy at Liberty University and within the Southern Baptist movement as a whole. Much about denominational politics, especially those among Southern Baptists, and some of the struggles that various evangelical groups have had over the creation-evolution controversy is also included. The author makes it clear that the issue is far more complex than "fundamentalists" accepting creation and mainline Protestantism accepting theistic evolution.

In reviewing the work, it should be kept in mind that it was written for an anthropology Ph.D by a Roman Catholic committed to evolution. While this study does an excellent job of refuting many of the myths about the opposition to evolutionism, it is not exhaustive, and is primarily the observations of one researcher based on limited fieldwork and selected printed resources. Although some of the common myths are repeated, it is a sincere effort to evaluate and understand the social dimensions and the background of the movement. It would have been very helpful if the author had asked knowledgeable creationists to proof the manuscript, at least for factual errors. As example: he concluded that George McCready Price "blasted" those "who accepted the Gap Theory, Day-Age Theory, and anything else that deviated from the simple Ussher chronology" (p. 157). In fact, as Numbers (1992) demonstrates and is obvious from Price's own writings, he oscillated on the age question and as a whole saw this as a decidedly peripheral issue.

In short, the book is interesting, often entertaining, written in an informal, friendly, "letter to friend" style quite unlike most doctoral dissertations. Tourney concludes "I urge you to do what I have done. . . meet the creationists. Know them not by superficial caricatures, and judge them not by the words of their worst enemies. Instead, meet them eye to eye, for then they will let you look right into their hearts, where God tries to help them—and us—make some moral sense of our times" (p. 507).

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## Quote

Just how, then, did man complete and perfect himself and what role did that perfection play in the question of equality? Rousseau tells us that mentally yet another factor in addition to compassion distinguishes man from the brutes. Man has a faculty of self-improvement, a *perfectibility*, which is, Rousseau adds, "the source of all human misfortunes" as it draws him out of his original state "in which he would have spent his days insensibly in peace and ignorance." One immediately notes the ambivalence Rousseau has toward the ideas of progress and perfectibility.

Tonsor, S. J. 1987. The Father of totalitarian democracy: Jean-Jacques Rousseau. *Modern Age* 31:247.

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