

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

VOLUME 32

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NUMBER 1



RAPID EROSION AT PROVIDENCE CANYON, GEORGIA

CREATION RESEARCH SOCIETY

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ARTICLES	DEPARTMENTS
Wernher von Braun; The Father of Modern Space Flight— A Christian and A Creationist . . . Jerry Bergman 7	Membership/Subscription Application Form 3
Late Cretaceous Epeiric Sea or Retreating Floodwater? . . . Carl R. Froede, Jr. 13	Order Blank for Past Publications 4
A Review of Claims about Archaeopteryx in The Light of The Evidence . . . Ernst Lutz 18	Dedication to David Boylan . . . Don B. DeYoung 5
Methodology for Analysis of Science Teaching Materials from A Creationist View . . . Steven W. Deckard, Richard L. Overman, Bryan A. Schneck, Candice B. Dixon, and Robert E. Brook 25	Instructions to Authors 5
Providence Canyon, Stewart County, Georgia— Evidence of Recent Rapid Erosion . . . Emmett L. Williams 29	Editors' Comments 6
Polar Dinosaurs and The Genesis Flood . . . Michael J. Oard 47	Resources for Research and Publication— Lab Director's Report . . . John Meyer 28
PANORAMA NOTES	Errata 46
Reprinted CRSQ Volume 20 . . . Emmett L. Williams 56	Index to Volume 31 of CRSQ . . . George F. Howe 58
	Letters: <i>The Kouznetsov Controversy</i> , by Don B. DeYoung, p. 10 ■ <i>Surficial Replacement of Dinosaur Bone by Opal in Big Bend National Park, Brewster County, Texas</i> , by Carl R. Froede, Jr., p. 11 ■ <i>Silica in Living Organisms</i> , by Emmett L. Williams, p. 11 ■ <i>Objections from Science to Global Flood</i> , by Bill Yake, p. 12 ■ <i>Criticisms of The Universal Flood Based on Unknowns: A Reply to Mr. Yake</i> , by William Waisgerber, p. 21 ■ <i>Plant Survival, Floating Debris, and Soil: An Answer to Yake</i> , by Michael J. Oard, p. 22 ■ <i>Where Are The Flood Waters? A Reply to Mr. Yake</i> , by Carl R. Froede, Jr., p. 22 ■ <i>Seed Sprouting, Research, and The Global Flood</i> , by George F. Howe, p. 23 ■
	Book Reviews: <i>Diatoms to Dinosaurs: The Size and Scale of Living Things</i> , by Carl R. Froede, Jr., p. 16 ■ <i>Biblical Creationism</i> , by Don B. DeYoung, p. 16 ■ <i>Darwinism: Science or Philosophy?</i> , by Wayne Frair, p. 17 ■ <i>Wrinkles in Time</i> , by Don B. DeYoung, p. 17 ■ <i>Voyage to The Planets</i> , by Clifford L. Lillo, p. 24 ■ <i>Creation and Time: A Biblical and Scientific Perspective on The Creation-Date Controversy</i> , by Danny R. Faulkner, p. 43 ■ <i>The Great Ice Sheet and Early Vikings in Mid-America</i> , by Clifford L. Lillo, p. 45 ■ <i>Starlight and Time</i> , by Emmett L. Williams, p. 45 ■ <i>Lonely Hearts of The Cosmos</i> , by Don B. DeYoung, p. 46 ■ <i>The Hidden History of The Human Race</i> , by Peter Line, p. 46 ■ <i>Creation Scientists Answer Their Critics</i> , by Emmett L. Williams, p. 60 ■ <i>Creation: Facts of Life</i> , by Wayne Frair, p. 61 ■



Cover Photograph

This photograph by Emmett Williams shows a contact between the Providence and the Clayton (caprock) Formations at Providence Canyon, Stewart County, Georgia. Rapid erosion

here is a tribute to the great changes that catastrophic events can accomplish in a very short time. The two boys in the center of the photograph lend perspective. See page 29 for this fascinating research report.

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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 969, Ashland, OH 44805-0969. 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.

DEDICATION TO DAVID BOYLAN

DON B. DEYOUNG*



I first met Dr. Dave Boylan when I was a graduate student at Iowa State University. I visited a campus church where Dr. Boylan taught a popular Sunday School class for students. This was no ordinary class; there was a chalk board complete with calculus integrals and engineering data. Technical arguments in support of creation were clearly explained and tied in with Scripture. Over 100 students took careful notes and asked questions. Years later, this challenging class still continues.

Dr. Boylan received Chemical Engineering training at the University of Kansas (B. S.) and Iowa State University (Ph.D.). His professional career has been spent at Iowa State in teaching, research, and administration. Dr. Boylan was Dean of the College of Engineering at Iowa State during the long span from 1970-1988. He has never hidden his creation views, although personal attacks have been frequent. His gracious response disarms most opponents, and his technical competence brings continuing respect from university colleagues. Dr. Boylan has truly helped raise the credibility of creation science on the university level.

Dr. Boylan has served on the CRS Board of Directors since 1977. He has contributed in many ways, most recently in helping update the Society's Bylaws and Constitution. His *CRSQ* input in past years includes several useful articles and book reviews.

Dr. Boylan and his wife, Juanita, celebrated their 50th wedding anniversary in 1994. Retirement from Iowa State duties occurred in 1992. However, David simply "changed hats" and became interim President of Faith Baptist Bible College and Seminary in Ankeny, Iowa during 1993-94. He continues at Faith as Assistant to the President and Adjunct Professor in science.

Dr. Dave Boylan is a Fellow of the American Institute of Chemical Engineers and also the American Association for the Advancement of Science. He belongs to six Honorary Societies and holds many engineering patents. The contributions and stability that Dr. Boylan has given to the Creation Research Society are deeply appreciated. Thanks, Dave Boylan, for your faithful testimony and your example of scientific excellence.

*Don B. DeYoung, Ph. D., 200 Seminary Dr., Winona Lake, IN 46590.

INSTRUCTIONS TO AUTHORS

1. Manuscripts shall be typed and double spaced.
2. An original plus two copies shall be submitted to the editor of the Quarterly.
3. All submitted articles will be reviewed by at least two technical referees. The editor may or may not follow the advice of these reviewers. Also, the prospective author may defend his position against referee opinion.
4. The editor reserves the right to improve the style of the submitted articles. If the revisions of the editor and referees are extensive, the changes will be sent to the author. If the changes are not suitable to the prospective author, he may withdraw his request for publication.
5. Due to the expense involved, manuscripts and illustrations will not be returned to authors.
6. All references (bibliography) must be presented in the style shown in the Quarterly. If a prospective author is not familiar with the *CRSQ* format, the editor will furnish an example reference page.
7. All figures and drawings must be prepared professionally. No sloppy hand drawings or freehand

lettering will be accepted. The editor reserves the right to approve submitted figures. Unacceptable illustrations will result in rejection of the manuscript for publication. Do not send slides.

8. Any manuscript containing more than 25 pages is discouraged. If a topic cannot be covered to the author's satisfaction in this length of pages, the author *must* divide his material into separate papers that can be serialized in the Quarterly.
9. The Quarterly is a journal of original writings. Only under unusual circumstances will we reprint previously published manuscripts. Never submit an article to two or three journals, including ours, hoping all of them will publish your work. When submitting an article, please state if the material has been published previously or has been submitted to other journals.
10. Book reviews should be limited to 500 words or fewer.
11. Authors are requested to supply a list of key words for subjects covered in their articles.

Editors' Comments

In a narrow sense, scientists sometimes view their subject as the study of phenomena which can be analyzed by using **experimental procedures**. By way of contrast, **origins** is a broader survey of how the scientific subjects themselves came into being. *CRSQ* combines both origins and science in every issue.

Research magazines contain first-hand accounts of current laboratory or field investigations. **Review** periodicals, on the other hand, are replete with articles in which only the past literature is scrutinized and summarized. The *Creation Research Society Quarterly* contains both research and review reports. Some of our articles are both research and review essays at once.

Popular scientific journals contain fluffy features with little technical information and only fragmentary documentation. Scholars reading such magazines are left wondering what the details really are. Conversely, authors and editors of **technical** magazines take it for granted that all readers will be privy to the confusing subtleties and the esoteric vocabulary of their particular fields. As a result, a physicist may gain very little by reading an article in a journal of stratigraphy and vice versa! Any issue of *CRSQ*, however, contains both technical and popular features. Even the technical articles in this journal are

edited with an eye for cross-disciplinary communication and a general appeal.

All of the above factors mean that the *CRSQ* is our best attempt to accomplish what the Apostle Paul himself pulled off when he became "all things to all men." The extent to which these goals are being fulfilled is a "tribute" to God's grace and volunteer labor because CRS has no paid staff of authors, editors, or proof-readers. When it comes to promotion, we depend on you, our readers, to keep on purchasing and pushing the *CRSQ*. Consider ordering gift subscriptions for scientifically minded students. Consult your local public and collegiate libraries to see if they would accept *CRSQ* subscriptions donated by you. Stock up on back issues to pass out as creationist "tracts" to interested friends. Buy CRS Books to use as gifts. Help us prevent *CRSQ* and CRS Books from becoming "the best kept secrets in scientific creationism."

To aid the reader who is interested in a particular subject, the *CRSQ* publishes a keyword index to each volume, usually in the December issue of the next volume. We request authors to provide a list of key words for the subjects addressed in their article. Authors should please note that this request has been added to the instructions for authors on page 5.

Eugene Chaffin and George Howe

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WERNHER VON BRAUN: THE FATHER OF MODERN SPACE FLIGHT— A CHRISTIAN AND A CREATIONIST

JERRY BERGMAN*

Received 20 April 1994; Revised 29 June 1994

Abstract

The life and work of Wernher von Braun, the father of modern space flight, is reviewed, focusing on his achievements and his creationist world view. A staunch supporter of creationism, he openly made his views known about his conclusion that the universe is clearly designed by an all-powerful God and that the creationist world view should be taught in the schools alongside the evolutionary world view. His life shows evolutionists that creationism is an entirely inadequate explanation for the reality around us, and that a theistic world view, where God is not only the Creator but also Sustainer, is a defensible position.

Introduction

In 1934 a twenty-two-year-old who was to change the world of science forever received his Ph.D. in physics from the University of Berlin. For security reasons, his dissertation bore the nondescript title "About Combustion Tests." This important theoretical discussion and experimental investigation of the injection, combustion, equilibrium and expansion phenomenon involved in liquid fuel rocket engines was even then recognized as critical for the future. Called the father of modern space flight, von Braun's work probably more than that of any other single scientist brought about the space age (Bergaust 1976).

An account of von Braun's career is a history of the American space program (von Braun 1971). His accomplishments are legendary. The recipient of the Certificate of Merit, National Health Agency; the State of Alabama Academy of Honor; the Order for the Merit of Research and Inventions of Paris, France; American Society of Mechanical Engineers' Man of the Year Award; Associated Press Man of the Year in Science Award; Smithsonian Institution Langley Medal; and the Federal Cross of Merit medal from the Republic of West Germany, 1972, are only a few of his prestigious honors. His scores of honorary academic degrees include Doctorates from Notre Dame University, Emory University in Atlanta, and the University of Pittsburgh.

His Science Work

One of the first persons to describe in detail the principle of a two-stage liquid fueled rocket was German physicist Hermann Oberth. In 1930 Oberth tested a small liquid filled rocket engine—and one of his assistants was eighteen-year-old engineering student Wernher von Braun. The son of a baron, von Braun was educated in Zurich, Switzerland and Berlin, Germany (Green 1966). As an adolescent, von Braun had become interested in rocketry and in 1930, at age 17, joined a group of Germans involved in a rocket club. Included in this club was Willy Ley and other prominent rocket scientists (Asimov 1972, p. 736)

His success became widely known, and in 1932 the German Army began openly supporting the team. When Hitler came to power in 1933, the success of their rocket work was widely recognized, and by 1938 a rocket with an eleven-mile range had been developed

(Asimov 1972, p. 736). Von Braun soon had 80 scientists and technicians working for him at Peenemünde, in northwest Germany (Lamont, 1994). Under his leadership, the first true rocket—a missile which carries both its own fuel and oxidant—was successfully launched in 1942. This rocket is now known as the V-2, meaning the second model of the *vergeltung* (German for vengeance). The V-2 was the world's first operational guided ballistic missile, a technical coup achieved under von Braun's able direction. To achieve this, his team had to make significant progress in understanding aerodynamics, rocket propulsion and guidance systems.

Although von Braun at first supported the German war effort, he soon became disenchanted with Hitler's policies and war aims. As a Christian and a creationist, he believed that all men and women were brothers and sisters who descended from Adam and Eve. Thus, he could not accept Hitler's racial theories and soon began to voice opposition against his policies, especially the war. Even before this, Hitler's suspicions of him and the German government's interference with his programs delayed the development of the V-2. Eventually Heinrich Himmler tried to take over the program, widening the gap between von Braun and his government even further. When, beginning in September of 1944, thousands of V-2 rockets attacked the civilian populations of London, Paris and elsewhere, von Braun objected. As a result he and his top aides were jailed near the war's end. Before the war ended, he was released because Hitler realized that without him, the program could not progress. He soon fled Peenemünde with his entire team and their families—some 5,000 people—and surrendered to the Americans in the spring of 1945. He was one of the 118 "paper clip scientists" and the over 4,500 German army technicians who were brought to the United States in about 1945-1946. About 90 men, ". . . about the entire German staff at the rocket-weapon base. . ." were transferred in September of 1945 alone (*New York Times*, Nov. 18, 1945). The story of his escape to America is well known:

In the spring of 1945, in the closing days of the war in Europe, a young German walked up to an American soldier in Bavaria and announced: "We are a group of rocket specialists. . . . We want to see your commander and surrender to the Americans." The soldier was startled, but brought the man to see his commander. By September, the German scientists were on their way to the United

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States. Among them was an imaginative young visionary who wanted to fly to the moon—Werner von Braun. He had been largely responsible for the development of the world's most successful rocket up to that time—the German V-2 (Gourlay, 1962, p. 48).

The American space program was thus largely a transplant of the German program. When von Braun arrived in America in 1945, he and his German associates continued their research on captured German V-2 rockets, first at Fort Bliss, Texas, and then at White Sands, New Mexico. Once in the United States, he gained the trust and respect of his fellow scientists and his new boss, the American government, winning numerous loyalty and patriotic awards for his service to his new country (Holmes 1962).

He soon became the leader of the Huntsville, Alabama scientists that placed America's first satellite—Explorer I—into orbit on January 31, 1958 (Greene 1966). Asimov states that von Braun “. . . might have preceded Sputnik if he had been given the go-ahead, but he was as hindered by the American policy under Eisenhower as he had been hampered by German policy under Hitler” (1972, p. 736). In fairness, it should be stressed that his problems in the United States were for different reasons than in Germany, and include lack of support for his space program. The Soviets' coup in achieving the first successful satellite was an enormous embarrassment to the Americans, and did much to encourage the development of von Braun's goals for the American space science program. After this, von Braun's success was phenomenal.

Also critical to von Braun's success was his enormous dedication. Holmes (1962, p. 107) concluded that von Braun “. . . must certainly rank among the most single-minded men in recorded history.” With great devotion, he pursued for 35 years the idea of building rockets for space travel. Although he was forced in his early career to build weapons rockets, he realized that this was the only way that he was able to obtain the needed support to develop the technology and hardware for his dream, a space program (Gourlay, 1962). It was only in America that he was able to fulfill his dream to use rockets for the good of humanity in space exploration and by putting up satellites. The incredible importance of satellites for our way of life includes communications, weather information, scientific research, as well as military purposes. One of the major reasons for the success of the Gulf war was because of the use of space satellites.

Between 1950 and 1955, von Braun directed the development of the Redstone, the first American operational ballistic missile. A modified Redstone served as the first stage of the rocket that launched America's first artificial satellite, Explorer I, into space. In 1959, von Braun and his team also placed Pioneer IV, the USA's first interplanetary probe, which traveled around the Sun, in space. In 1960 he supervised the development of the Saturn liquid fuel rocket which eventually provided the basis for manned space flight—taking Neil Armstrong and his crew to the moon. Project Apollo was probably the peak of the American space program—and Wernher von Braun was at the center of it all.

The Scientist as Creationist

Dr. von Braun was also an active creationist, a Lutheran who over the years wrote “a good deal about his Christian faith,” and gave “a number of speeches on the subject” (Bergaust 1976, p. 109). An open supporter of creationism, he concluded that it is “a viable scientific theory for the origin of the universe, life and man” (quoted in Segraves, 1973, p. 7). In a letter he wrote in support of the two-model approach, which was read to the California State Board of Education by Dr. John Ford on September 14, 1972, Dr. von Braun stated:

For me, the idea of a creation is not conceivable without invoking the necessity of design. One cannot be exposed to the law and order of the universe without concluding that there must be design and purpose behind it all. In the world around us, we can behold the obvious manifestations of an ordered, structured plan or design. We can see the will of the species to live and propagate. And we are humbled by the powerful forces at work on a galactic scale, and the purposeful orderliness of nature that endows a tiny and ungainly seed with the ability to develop into a beautiful flower. The better we understand the intricacies of the universe and all it harbors, the more reason we have found to marvel at the inherent design upon which it is based.

While the admission of a design for the universe ultimately raises the question of a Designer (a subject outside of science), the scientific method does not allow us to exclude data which lead to the conclusion that the universe, life and man are based on design. To be forced to believe only one conclusion—that everything in the universe happened by chance—would violate the very objectivity of science itself. Certainly there are those who argue that the universe evolved out of a random process, but what random process could produce the brain of a man or the system of the human eye? (Segraves 1973, pp. 7-8)

He adds that those who argue that science has been unable to prove the existence of a designer

. . . admit that many of the miracles in the world around us are hard to understand, and they do not deny that the universe, as modern science sees it, is indeed a far more wondrous thing than the creation medieval man could perceive. But they still maintain that since science has provided us with so many answers, the day will soon arrive when we will be able to understand even the creation of the fundamental laws of nature with a Divine Intent. They challenge science to prove the existence of God. But, must we really light a candle to see the Sun? (Segraves 1973, pp. 7-8)

His beliefs regarding the importance of studying God's creation—to learn more about God the Creator—are vividly expressed in the following words:

The more we learn about God's creation, the more I am impressed with the orderliness and unerring perfection of the natural laws that govern it. In this perfection, man—the scientist—catches a glimpse of the Creator and his design for nature.

The man-to-God relationship is deepened in the devout scientist as his knowledge of the natural laws grows. (Bergaust 1976, p. 113)

When asked if he felt our new scientific “enlightenment” and traditional Christian beliefs are incompatible, von Braun confidently answered,

I consider it one of the greatest tragedies of our times that this dangerous error is so widely believed. . . . By not telling the children about nature’s mysteries, its infinite number of unexplained and unexplainable miracles, we deny them the most important dowry for their future life. . . . By adoring our own scientific achievements we kill humility, the mother of any true scientific progress. . . . (Bergaust 1976, p. 111)

Relative to the modern church-state conflict in America, von Braun openly stated,

There is no reason why God cannot retain the same position in our modern world that He held before the natural sciences began to pierce through the wall of dogma erected by the Church. (Bergaust 1976, p. 112)

He was especially impressed by Paley’s watch hypothesis, an von Braun’s own words vividly reveal how important the design argument was to him.

I have discussed the aspect of a Designer at some length because it might be that the primary resistance to acknowledging the “Case for Design” as a viable scientific alternative to the current “Case for Chance” lies in the inconceivability, in some scientists’ minds, of a Designer. The inconceivability of some ultimate issue (which will always lie outside scientific resolution) should not be allowed to rule out any theory that explains the interrelationship of observed data and is useful for prediction.

Many men who are intelligent and of good faith say they cannot visualize a Designer. Well, can a physicist visualize an electron? The electron is materially inconceivable and yet, it is so perfectly known through its effects that we use it to illuminate our cities, guide our airliners . . . and take the most accurate measurements. What strange rationale makes some physicists accept the inconceivable electron as real while refusing to accept the reality of a Designer on the ground that they cannot conceive Him? I am afraid that, although they really do not understand the electron either, they are ready to accept it because they managed to produce a rather clumsy mechanical model of it borrowed from rather limited experience in other fields. . . . (Segraves 1973, p. 8-9)

And von Braun also stressed that relative to the above views he hoped that

More scientists will get off their ivory towers and publicly say what I am saying here . . . with all the modern means at our disposal, with schools, churches, educational institutions, press, radio, and television, they should tell the world that religion and science are not incompatible; that, to the contrary, they belong together. (Bergaust 1976, p. 112)

He believed that the two-model approach should be presented in the schools, and his own words vividly reveal the depth of his conviction (Segraves 1973, pp. 9-10). He also stated that

We in NASA are often asked what the real reason was for the amazing string of successes we had with our Apollo flights to the Moon. I think the only honest answer we could give was that we tried to never overlook anything. It is in that same sense of scientific honesty that I endorse the presentation of alternative theories for the origin of the universe, life and man in the science classroom. It would be an error to overlook the possibility that the universe was planned rather than happening by chance. (Segraves 1973, pp. 8-9)

And von Braun added that the two major realities of human existence are

. . . the laws of creation and the divine intentions underlying the creation. Through science man attempts to understand the laws of creation; through religious activities he attempts to understand the intentions of the Creator. Each approach is a search for ultimate truth. (Bergaust 1976, p. 112)

He did not argue, as many do today, that science and religion should be separate and not mixed, but on the contrary, he concluded that,

Science in its drive to understand the creation, and religion in its drive to understand the Creator, have many common objectives. Nevertheless, there have been conflicts in the relationship between science and religion. . . . Personally, I find this state of affairs unsatisfactory, for I wish to regard the Creator and His creation as an entity. . . . [To von Braun] science and religion are like two windows in a house through which we look at the reality of the Creator and the laws manifested in His creation. As long as we see two different images through these two windows and cannot reconcile them, we must keep trying to obtain a more complete and better integrated total picture of the ultimate reality by properly tying together our scientific and religious concepts. (Bergaust 1976, p. 114)

His Religious Views

In the authoritative and definitive biography of von Braun, Bergaust recorded a conversation he had with von Braun in which the rocket scientist openly stated,

We cannot live without ethical laws and some belief [that they are from God]. . . . More than ever, our survival depends upon adherence to some basic ethical principles. . . . It seems to me that two stimuli are necessary to make man endeavor to conform to the accepted ethical standards. One is the belief in a last judgment, where every one of us has to account for what we did with God’s precious gift of life on Earth. The other is the belief [that we] . . . can cherish the reward or suffer the penalty decreed in the Last Judgment. (Bergaust 1976, p. 110)

When Bergaust asked him about religion and science, specifically if “technological methods and religious beliefs are really compatible?” von Braun answered,

While technology controls the forces of nature around us, ethics try to control the forces of nature within us. . . . I think it is a fair assumption that the Ten Commandments are entirely adequate—without amendments—to cope with all the problems the technological revolution not only has brought up, but will bring up in the future. The real problem is not a lack of ethical legislation, but a lack in day-to-day guidance and control. . . . When science freed itself from the bonds of religious dogma, thus opening the way for the technological revolution, the Church also lost much of its influence on the ethical conduct of man (Bergaust 1976, p. 111).

And, what did the Father of the American Space Program feel regarding the Bible? In his own words, he stated that the Bible was established as, “The most effective bulwark ever built against the erosive effects of time. . . . The Bible is . . . the revelation of God’s nature and love . . .” (Bergaust 1976, pp. 115-116). Prayer too was critically important to von Braun. When asked when his need to pray was particularly strong, he stated,

I certainly prayed a lot before and during the crucial Apollo flights, and I also prayed during the last days in Germany—when things collapsed all around me. Indeed, during those hours of decision, when we decided to surrender to the Americans, my anxiety was at the bursting point. I prayed then that our surrender would be accepted in good faith (Bergaust 1976, p. 117).

In summary, as Morris notes, von Braun believed that:

Manned space flight is an amazing achievement, but it has opened for mankind thus far only a tiny door for viewing the awesome reaches of space. An outlook through this peephole at the vast mysteries of the universe should only confirm our belief in the certainty of its Creator. I find it as difficult to understand a scientist who does not acknowledge the presence of a superior rationality behind the existence of the universe as it is to comprehend a theologian who would deny the advances of science (Morris 1982, p. 110).

Von Braun died in Alexandria, Virginia on June 16, 1977, leaving the world a radically different place than existed when he was born on March 23, 1912 in Wirsitz, Germany.

Conclusion

A study of the history of western science has revealed that religion was the major motivation for many of the greatest scientists. A few examples are Newton, Copernicus, Galileo, Kepler and George Washington Carver. They realized that God reveals Himself both in the Scriptures and in His creation, and to get closer to God, it is incumbent upon the believer to study His creation. This is clear from the writings of the aforementioned and many other scientists. That this motivation is also important today for some scientists is best illustrated in the case of Wernher von Braun. Although he is by no means the only example, he was more open about his religious beliefs than many eminent religious scientists. Dr. von Braun knew the consequences of speaking out publicly for what he believed—and was willing to pay the price, both in Nazi Germany and in America as well. He was thus a good example of the wisdom of the Bible’s words that we must obey God rather than man (Acts 4:29). Though this commandment may be difficult to keep in the short run, the life of Wernher von Braun proves its wisdom.

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LETTERS TO THE EDITOR

The Kouznetsov Controversy*

Questions have been raised about the writings of Soviet creation scientist Dmitrij A. Kouznetsov. The validity of his data and references have been challenged by critics (Larhammar, 1994, 1995). One article by Kouznetsov appeared in the March 1991 *CRSQ* and another in the June 1991 issue. Whether or not these articles have deficiencies remains uncertain. Be assured that all *CRSQ* material will continue to be evaluated and peer reviewed to the best of our ability.

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*Editorial Comment: Dr. Kouznetsov was sent a letter offering an opportunity to reply. We have not received a reply and do not know whether Dr. Kouznetsov received our letter.

Surficial Replacement of Dinosaur Bone by Opal in Big Bend National Park, Brewster County, Texas

Andrew Snelling (1995) presents some very interesting information regarding the rapid formation of the mineral opal. Opal is a hydrous silicon oxide (a variety of quartz) which occurs in many different environmental settings in the U.S., more commonly found in the western states (Chesterman, 1978, p. 507).

According to Snelling (1995, pp. 16-17), Dr. Len Cram, an Australian Lightning Ridge creation scientist has "grown opals in three months with the same physical features as opals purported to have required many millions of years to form. Additionally, Snelling (1995, p. 14) reports: "Occasionally, bones, seashells, and seed pods are found fossilized by having been "turned" into opal"

This author applauds the findings reported by Snelling (1995) and the work conducted by Len Cram in support of the young earth Flood model!

This letter is to add new information regarding the occurrence of opal (variety Hydrophane?) which has formed as a thin replacement layer on dinosaur bone found in a specific area of Big Bend National Park, Brewster County, Texas.

While performing field work in the Dawson Creek area of Big Bend National Park it was noted that dinosaur bone fragments occurred in concentrated areas within the bentonitic clays of the Javelina Formation ("dated" by Uniformitarians as being from the Upper Cretaceous). Lehman (1990, p. 362) identifies these bone fragments as being from ceratopsians, carnosaurs, pterosaurs, hadrosaurs, ankylosaurs, and omithomimids.

These bentonitic clays are clearly derived from the alteration of volcanoclastic sediments originally generated from the local surrounding volcanic (i.e., caldera) sources within Big Bend National Park. The depositional environment of the original volcanoclastics is suggested by this writer as being subaqueous with the mixing of dinosaur bone and petrified wood within it.

The alteration of the original volcanoclastic material resulted in the release of free silica which replaced, in a thin layer, the outer surface of the bones with opal. No opal was observed within the internal bone structure. Additionally, no opal was observed associated with the petrified wood, rather much of the wood exhibits microcrystalline quartz replacement with quartz crystal growths occurring in the hollow sections of the petrified wood. See Williams, et al., 1993 as well as other articles in the series of essays on fossil wood from Big Bend National Park.

This selective opal replacement process was observed on most of the dinosaur bone fragments found at Dawson Creek. It appears that the opal layer formed around the original bone and that subsequent reworking of the bone resulted in its fragmentation. This is supported in that only the "outer" surface of the bone fragments appeared to have been replaced by opal.

The fact that opal replaced the outer surface of the dinosaurian bone requires some amount of "time." That it is purported to take millions of years is now, based on the research performed by Dr. Len Cram, not necessary. Rather, opaline replacement could have occurred within several months following the bone burial in the

volcanoclastic sediments. The occurrence of an opal layer around the dinosaurian bones found at Dawson Creek in Big Bend National Park provides another possible "characteristic" of a volcanic paleoenvironment. As we continue to define and refine the young earth Flood model it is incumbent on us to develop "physical" mechanisms to explain what is found in the stratigraphic record. The rapid formation of opal from a volcanic source material provides us with one such example.

Conclusions

We find the alteration of a volcanic sediment provides the free silica necessary to replace the outer layer of bone with opal, and wood by microcrystalline quartz. While many sources of opal have been suggested (e.g., hydrothermal vents, siliceous oozes, altered volcanic sediments, etc.) we must "create" it within the short timeframes dictated by the young earth Flood model. It is through the research efforts of individuals such as Australian scientist Dr. Len Cram which allow us the "scientific" confirmation of the truth of Scripture within the young earth timeframe.

Acknowledgements

Thanks to Dr. E. F. Chaffin and Dr. E. L. Williams for their review and comment on this letter and to my wife Susan for allowing me the time to write this letter. Glory to God in the highest (Pr 3:5-6).

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Silica in Living Organisms

In his beautifully illustrated article on diatoms and design, Armitage (1994, pp. 167-170) states:

Consider for a moment that these tiny wonders [diatoms] use glass, an inert silica compound to build their cell walls with. What other organism would ingest glass to develop a stronger skeleton or skin? (p. 169)

The answer is many organisms. Horsetails (*Equisetum* sp.) store silica (SiO₂) in the inner walls of their outer "epidermal" cells. Howe, Williams and White (1987, pp. 141-143) wrote a note discussing this plant from the standpoint of design. Williams (1993, pp. 106-111), in an article on the silicification of wood, cited Scurfield, Anderson and Segnit (1974, p. 211) as claiming that "... 440 species distributed over 144 genera and 32 families ..." form wood in which silica occurs. Then Williams stated (p. 107):

Thus one could reach the conclusion that some plants either have an affinity for silica, readily absorb it or utilize the compound in their structure.

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Objections from Science to Global Flood

I'm still weighing the arguments concerning the Flood: was it local or global? This letter encompasses a few more of the objections to a universal Flood which come from friends and critics. The Apostle Peter states that in the "last days" men would be willingly ignorant of the Flood and the evidence for it (2 Peter 3:5). Consequently, I infer from this that we may be able to provide "evidence" of the Flood. While I would be the first to agree with you that we should not discount the aspect of the miraculous in the events of the Genesis Flood, we also try to present evidence in an apologetic forum to support the biblical history of the Flood. I would greatly appreciate your perspective and thoughts on these questions/scenarios. Although there are perhaps no right or wrong answers, I would greatly appreciate your thoughts on how you would respond to a critic who posed these objections to a universal Flood. Thanks again for your help!

1. Most creationist Flood theorists maintain that not only was almost all of the world's sedimentary rock deposited during the Flood, but that the original ocean basins were enlarged to accommodate the retreating flood waters. Therefore, the amount of water in the ocean is basically equivalent to that of the Flood. This volume of water is equal to $1,350 \times 10^6$ cubic kilometers. In addition, the volume of Phanerozoic sedimentary rock ("Flood deposits") is 654×10^5 cubic kilometers. Essentially, this is a 2:1 ratio of water to sediment. For the sake of argument, even if there were more water, the earth would have essentially been a mud bowl. How could any fish have survived this mud pie?

In addition, add to this mud slide large amounts of rock, ash and noxious gases (released by subterranean volcanoes) and one wonders if anything could have survived this catastrophe. Typically volcanoes decimate all surrounding life. If one multiplies the typical heat generated during a single volcano by the number purported by many creationists (I recall the number being around 1,500 to 2,000), a staggering 3.65 octillion calories would have been generated which is enough to raise the ocean temperatures by more than 2700° C. This would have baked everything, including the Ark the critics argue.

2. Creationists often refer to the experiment performed by Dr. George F. Howe (CRSQ, December 1968) in which three of five species showed germination after soaking in sea water for 20 weeks. However, critics argue that two of these species sprouted only when their seed coats were scarified (cut). The force

of the Noahic deluge would have easily scarified the seed coats, but much too soon. The seeds would have sprouted under water and died. The vast majority of seeds only become dormant to endure either cold temperatures or prolonged drought. In warm Flood waters, most seeds would have germinated immediately and would have subsequently drowned for lack of oxygen. On top of that, most seeds would have been buried unmercifully under millions of tons of mud and rock. One could argue that some would have survived by floating, yet less than one percent of spermatophytes produce disseminules which drift for as long as one month, much less one year.

And, yet, when the Flood waters receded and the seeds were exposed to dry land, what would have guaranteed their scarification? Even if, for some reason they were scarified, they would have probably died due to top soil saturated with sea salt which would have proven too toxic for all but the hardiest halophilic plants. Seawater contains 35 grams of salt per liter, but most plants can only tolerate about 1/10 of this concentration. All of which begs the question, how could any seeds have survived?

Assuming some seeds did reach a survivable spot, how long could their flowers wait before birds and insects from Ararat to cross-pollinate them? One also has to wonder how many birds were on the Ark and how they could cross-pollinate all the plants?

3. Many creationists refer to the Karroo Formation in Africa which is estimated to contain the remains of 800 billion vertebrate animals or 21 vertebrate animals per acre on earth (average size would be that of a fox). It's been estimated that the Karroo Formation houses about one percent of the vertebrate fossils on earth, meaning that there would have been 2,100 vertebrate animals per acre. Surely, the critics argue, the earth could not house any where near this amount (21 vertebrate animals) let alone 2,100. Therefore, they contend that this formation is not evidence of a global Flood, but an accumulation over the eons. What do you think about this objection?

4. Flood geologists usually contend that both the ocean basins and the continents consist of the same crust. If this were true (Deluge swept continents), then most of the sediment and sedimentary rocks of the world would be found in ocean basins. However, the reverse is true. The continents and continental shelves are covered by as much as 12,000 m of sediment and sedimentary rock, whereas the ocean are, for the most part, covered with much less than one km of sediment and sedimentary rock. Critics also argue that continents are mostly slabs of granite about 30 to 60 km thick. The granitic continental crust stands higher above the ocean basins while having roots more deeply sunk than those of the ocean basins because granite is lighter than basalt, and hence "floats" more buoyantly upon the viscous mantle of the earth. They argue that this (poses a grave difficulty for Flood geologists).

If you have any other articles, papers, etc. that would aid me with the above, I would also appreciate them. Thank you very much for your consideration to these questions.

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LATE CRETACEOUS EPEIRIC SEA OR RETREATING FLOODWATER?

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Abstract

The uniformitarian Middle to Late Cretaceous seaway of North America serves as an interesting feature in earth's past. Much paleontological work has been performed and many environmental reconstructions have been attempted to determine conditions during this time. What does this period of time hold for young earth creationists? This paper examines the uniformitarian Cretaceous seaway within the young earth Creation/Flood model and suggests that this seaway did exist, but only as Flood waters slowly receded from the North American continent.

Introduction

Uniformitarian geologists have proposed that, during the Middle to Late Cretaceous Period, a relatively warm shallow epeiric** sea extended from the Gulf of Mexico across the western United States into Canada (Figure 1). This proposal is based on the fossil remains (micro and macro, invertebrate and vertebrate) which are found in sediments "dated" to the time the ancient seaway existed. This interval of geologic time is believed to have had a warm global climate, elevated atmospheric CO₂, and high sea-level (Jewell, 1993, p. 579).

Many of the Late Cretaceous sediments are believed to have been deposited during a transgressive sea-level time frame (Type 1 sequence boundary) with little to no terrigenous deposition. This resulted in the forma-

tion of sediment starved areas (i.e., condensed sections) and hardgrounds (i.e., omission surfaces). Many of these Cretaceous fossils reflect a nearshore to shallow marine type setting and are believed to have been buried with the rise of sea-level during this time. Puckett (1991) examined "sighted" ostracodes found in the chalk and marl sequences associated with the Cretaceous seaway. The results of the microfossil analysis approximates the seaway as being within the photic zone (i. e., less than 295 feet, but ranging between 114 to 213 feet) [Puckett, 1991, p. 452]. Additionally, the assemblage of uniformitarian Late Cretaceous fossils (i.e., bivalve mollusks, fish, turtles, sharks teeth, etc.) is consistent with what is viewed as a nearshore environment.

Cretaceous Fossils and Environment

Many different types of vertebrate and invertebrate fossils have been found in the sediments associated with this seaway (see Stephenson and Monroe, 1940; Richards, 1959, 1962; Frazier and Schwimmer, 1987). However, many more marine types of fossils have been found than terrestrial and this has led to the determination that this was a nearshore to shallow marine type of environment. Some fossils common to the Late Cretaceous include bivalve mollusks, shark's teeth, bony fish skeleton and teeth, marine reptiles (e. g., mosasaurs). Other large vertebrate fossils include turtles, crocodilian species and various terrestrial dinosaurs.

An interesting and curious assemblage of marine fossils has led to speculation as to the exact setting (i.e., shallow versus deep water) in which this seaway existed. For example, Schwimmer, Stewart and Williams (1994) report finding giant fossilized skeletal parts of an extinct coelacanth fish (*Megalocoelacanthus dobiei*) in outcrops of Late Cretaceous rocks in Alabama and western Georgia. Sharks teeth of the deep water goblin shark (*Mitsukurina*) along with teeth and skeletal parts of the Bulldog fish or Cretaceous giant tarpon (*Xiphactinus*) have also been reported (see Thurmond and Jones, 1981; Case and Schwimmer, 1988). These are believed to be deep water species of fish. What brought these creatures into what is commonly believed to represent nearshore conditions? These questions and many others remain unanswered.

Either and Diner (1985) have suggested that the seaway was of normal salinity, while others (Jewell, 1993, p. 579; Arthur, Dean, Pollastro, Claypool and Scholle, 1985; Glancy, Arthur, Barron and Kaufmann, 1991) have suggested that the seaway contained brackish-water as a result of the wet climate and the associated river inflow from the surrounding highlands. Jewell (1993, pp. 579-592) suggests that the influx of



Figure 1. Generalized diagram showing the epeiric seaway across the North American Continent during the Late Cretaceous (Maastriichtian) as proposed by uniformitarian scientists. The Mississippi embayment marks the boundary between the two distinct faunal provinces (i.e., eastern and western). Modified from Stanley, 1993, p. 395.

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**A sea on the continental shelf or within a continent. Syn: inland sea; epicontinental sea.

fresh water served to stratify the seaway thus causing the formation of anoxic bottom water conditions. Additionally, Jewell (1993, p. 579) believes that the anoxic conditions are manifested by a lack of benthic fauna and relatively high amounts of organic carbon and siliciclastic sediment.

Modern Analogy

Today, the Hudson Bay and Baltic Sea are generally recognized as being epeiric seas (Allaby and Allaby, 1990, p. 127). However, they compare poorly to the Cretaceous epeiric sea of earth's past. Hence, there are no epeiric seas on earth today which we can use to directly compare with those postulated as having occurred in the past. Any models used to reconstruct this Middle to Late Cretaceous sea (i.e., paleoecology, climate, depth of water, etc.) are based purely on conjecture using the fossil record as evidence. The lithologic units in which these fossils are found, date (via biostratigraphy) to the uniformitarian Middle to Late Cretaceous Period (circular reasoning).

Death of the Dinosaurs

Various causes have been suggested, by the uniformitarians, for the mass extinction "event" found at the Cretaceous-Tertiary boundary. They include extraterrestrial impacts (Alvarez, Alvarez, Asaro and Michel, 1980; Allaby and Lovelock, 1985; Sharpton and Ward, 1990), volcanic eruptions (Axelrod, 1981; Rice, 1990; Lockley, 1990) and sea-level changes (Tschudy, 1984, p. 333) which occurred as the Late Cretaceous seaway withdrew and exposed the continental land surface.

Uniformitarian Terrestrial Dinosaur Provinces

Study of the fossilized terrestrial vertebrate fauna contained within the Late Cretaceous sediments on the North American continent has revealed two totally distinct faunal provinces (i.e., eastern and western). This has lead the Uniformitarians to propose that two separate continental landmasses existed during the Late Cretaceous Period and that each landmass had a separate and distinct assemblage of terrestrial vertebrate fauna. A boundary separating the two provinces can be drawn along the approximate center of the Mississippi embayment. East of the embayment (i.e., Georgia to New Jersey) the same genera and sometimes species of dinosaurs have been found. The western U.S. (i.e., Texas to Western Canada) contains a different and unique dinosaur assemblage of its own as well.

Dinosaur remains found in the Late Cretaceous sediments, in the eastern U.S., indicate that the creatures died near the shoreline (typified as a backbay type of environment) and were carried out to sea where they bloated and floated (and were eaten by marine creatures). Eventually the dinosaurs returned to the near-shore and either were eaten, rotted or were buried. Many shark and crocodile bones are found in association with the dinosaur remains. Additionally, several dinosaur bones have been found containing shark teeth embedded in them. Sea turtle shells have also been found with what are believed to be shark teeth marks (i.e., scratches) and crocodile teeth holes. It is believed that the sharks and crocodiles gorged themselves on the floating remains of dead dinosaurs and sea turtles.

Flood Model Interpretation

The creationist geologist also has several models to explain why terrestrial and marine fossils are found in this "seaway." The author proposes that the epeiric seaway did in fact exist and that the terrestrial and marine sediments and fossils found reflect the middle to late Flood Event Time frame (after the rain had stopped and the Flood waters had started to recede from the continents [i.e., greater than 150 days after the beginning of the Flood event]). Additionally, it is interpreted that initially there was rapid run-off of Flood waters from the newly forming topographically high areas (due to orogenies, tectonic forces, etc.) on the continental landmasses. However, this run-off rate slowed as the accommodation space for the receding Flood waters decreased. The orogenic and tectonic events which occurred on the continent could have resulted in sea-level changes and the deposition of transgressive and regressive sequences of sediments as the Flood waters slowly receded from the North American continent.

The author suggests that, as the Flood waters slowly receded from the North American continent, shallow areas and possibly even exposed land surfaces could have formed. Marine communities (vertebrates and invertebrates) began to establish along these areas, hence forming the "epeiric seaway." Bloated and floating dinosaurs, drowned during the Flood event, drifted on the receding Flood waters and became grounded or sank onto the "Middle to Late Cretaceous shore" as the Flood waters receded. Marine communities (i.e., sharks, bony fish and crocodiles) fed on the decomposing "dinosaur" carcasses. Eventually, many of these creatures were subsequently buried as a result of orogenic events and deposition from various sediment sources (e.g., terrestrial sediments, volcanics, etc.). This author believes that calcium carbonate rich seawater created lime mud conditions which coupled with volcanic eruptions contributed a significant amount of sedimentary material, orogenic uplift contributing secondarily. This is reflected in the limestone-marlstone cyclothems. It has been well documented that many of the Cretaceous sediments are composed of lime muds, chalks and altered volcanics (Axelrod, 1981, pp. 13-20; Clarke, 1968, p. 14; Rice, 1990) which occur as cyclic rhythms believed to reflect changing environmental and climatic influences (Eicher and Diner, 1991; Einsele and Ricken, 1991).

Examples From The Eastern U.S. "Late Cretaceous" Deposits

Two specific areas in the eastern U.S., which reflect the author's interpretation using the creationist Flood model, are found in "Late Cretaceous" outcrops exposed in northeastern Mississippi and southwest Georgia. In Northeastern Mississippi, several excellent "Late Cretaceous" outcrops are exposed along various roadways (see Russell, Keady, Mancini and Smith, 1983). In Georgia, the best outcrops of the Late Cretaceous deposits are located in the western portion of the state and along feeder streams and tributaries of the Chattahoochee River (see Case and Schwimmer, 1988; Arden, Beck and Morrow, 1979; Marsalis and Friddell, 1975).

Fossils found in both areas include invertebrate and vertebrate micro and macro fossils. All of the fossils

tend to reflect a nearshore to shallow marine environment and many of the invertebrates suggest burial in their original life position. Many of the terrestrial vertebrate fossils are disarticulated and seem to indicate that they were not buried alive, but rather were dead and were subsequently buried (i.e., "bloat and float"). The author believes that the sharks and crocodiles living in the seaway were possibly buried alive, during the receding of the Flood waters from the continental landmass. This is because both shark and crocodile fossils (i.e., skeletons) are found relatively complete. However, the dinosaur and turtle remains are composed of bits and pieces of bone and bone fragments.

The Western U.S. "Late Cretaceous" Deposits

A very important piece of the puzzle in reconstructing the "Late Cretaceous" receding Floodwaters/epiiric sea lies with dinosaur eggs and nests found in the western U.S. In order to project the Flood as having drowned the dinosaurs, one then must consider the nests and clutches of dinosaur eggs found within the "Late Cretaceous" sediments (Horner and Gorman, 1988, pp. 34-36). In terms of size (all reptiles continue to grow until they eventually die) the larger dinosaurs reflect what this author believes is several hundreds of years of growth and hence were living in the Antediluvian timeframe (compare Antediluvian to Post-diluvian human lifespans). If the dinosaurs were drowned in the Flood then why are nests and clutches of eggs found nearby? How could dead dinosaurs produce nests of eggs? This paper will not attempt to address this western "Province," but merely raises what are viewed as serious questions to be resolved in reconstructing the Western U.S. "Late Cretaceous" conditions. Additional research and field work should be conducted to further develop the young earth Creation/Flood model for the Western U.S. "Late Cretaceous" deposits.

Conclusions

The author believes that the young earth Creation/Flood model provides a better explanation for the formation and existence of an "epiiric sea" across the North American continent using the slow receding of Flood waters. However, serious questions remain concerning the reconstruction of the original environment (paleoecology) and the climatic conditions during this time in earth's past. Further research and field work is required to better define and refine our model for both the Eastern and Western U.S. "Late Cretaceous" deposits. Many questions remain to be answered, such as where are the possible source areas for sediment influx (i.e., volcanic, biological, terrigenous, etc.) and what was the paleoecology of the exposed land surface (if one really existed!) and seaway.

Acknowledgments

The information presented in this note reflects field trips, made by the author, to various "Late Cretaceous" outcrops in the Eastern U.S. Additional information has been provided to me by uniformitarian specialists working in the study and reconstruction of the "Late Cretaceous" Thanks are due to Dr. E. L. Williams and the other reviewers who helped make this a better article. The author has learned, during the review

process of this article, that the Western U.S. Late Cretaceous deposits are being addressed in an article which will be published before this one. It is hoped that the questions raised here will be answered in that article. The author thanks that reviewer for much needed clarification on several issues regarding Western U.S. Cretaceous deposits. Additionally, I thank my wife Susan for giving me time to research and write this article. Glory to God in the highest (Pr 3:5-6).

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Quote: When will they ever learn?

When will scientists and others learn that naturalism is a philosophical point of view with no more claim to the status of science than any other philosophical viewpoint?

John C. Green. 1989. Afterword, in *History, Humanity and Evolution: Essays for John C. Green*. James R. Moore, Ed. Cambridge diversity Press. New York. p. 404.

BOOK REVIEWS

Diatoms to Dinosaurs: The Size and Scale of Living Things by Chris McGowan. 1994. Island Press. Washington, D.C. 288 pages. \$24.95.

Reviewed by Carl R. Froede, Jr.*

Chris McGowan, a vertebrate paleontologist with the Royal Ontario Museum, Canada, presents a fascinating account of the nature and intricacy of creatures, both living and extinct. His discussions on the variety and complexity of living things range quite literally, as the title reflects, from single celled protozoa to the little understood dinosaurs. Although McGowan openly credits evolutionary processes in explaining the complexity of nature, he readily admits that the design and variation seen among fauna are still not completely understood within the context of evolution.

Throughout the book McGowan presents evidence which reflects "Intelligent Design." Chapter after chapter document unique and innovative design in creatures either now extinct (e.g., dinosaurs, pterosaurs) or still on the planet (e.g. birds, giraffes, elephants, protozoa). Examples used to show life's complexity include: the "I-Beam" structure of dinosaur bone which provides strength despite its light weight, the amazing wing structure of various flying creatures, the aerodynamic design of marine life which can be measured by their Reynolds number, and the change in viscosity, of both air and water, in relationship to the size of the object in question. Serious questions are raised about the circulatory schemes of the large sauropod dinosaurs which are not resolved within the book. Many more interesting items are discussed between the covers of this most absorbing book. When read from a creationist's perspective, this book presents an excellent testament to the complexity and variety of life which is best explained within the framework of intelligent design.

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Biblical Creationism by Henry M. Morris. 1993. Baker Books. Grand Rapids. 276 pages. \$22.00.

Reviewed by Don B. DeYoung*

Every new book from Dr. Henry Morris is a delight. One can always count on original thinking in new areas of creation study. This volume shows what each Bible book teaches about creation and the Flood. Morris then goes further and also analyzes the Apocrypha, Pseudepigrapha, and the writings of Josephus. These writings include fanciful additions to biblical history, but they never compromise the creation and flood accounts or subtract from them.

Dr. Morris reveals a tremendous arsenal of creation/flood references throughout Scripture. Many are explicit; others are "possible poetic allusions," such as intimations of the Garden of Eden in the Song of Solomon (p. 109). Those critics who doubt the recent-creation history of Genesis also face problems with each of the remaining 65 Bible books. A flawed motivation for Scripture accommodation by Christians is uncovered: The hope to thereby appease their non-Christian academic colleagues (p. 214).

Dr. Morris presents many intriguing ideas for reader reflection. Six of them: Hebrew was probably the language of Adam (p. 27). The stars were made to be residences for angels (p. 74). The Law of Gravitation began on the second day (p. 106). The Flood occurred 1656 years after creation (p. 226). Creation must be included if we truly preach the gospel (p. 229). Some creationists are opinionated cranks and self-seeking charlatans (p. 270). Thanks, Dr. Morris, for speaking out!

There are some points of minor confusion. Josephus is credited with writing that Adam had both 30 sons (p. 29) and 33 sons (p. 246). A reference is left incomplete (p. 206). Subject and Scripture indexes also would have been valuable. Regardless, deep thanks is due to Henry Morris for this reference volume. He is uniquely qualified to write about creation and the Flood, and has succeeded once again.

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Darwinism: Science or Philosophy? Proceedings of a symposium, entitled: "*Darwinism: Scientific Inference or Philosophical Preference?*" 1994. Jon Buell and Virginia Hearn, Editors. Foundation for Thought and Ethics, P.O. Box 830721, Richardson, TX 75083-0721. 229 pages. \$37.50.

Reviewed by Wayne Frair*

Does Darwinism generally favor metaphysical naturalism (atheism)? This topic was the main focus of a symposium at Southern Methodist University in Dallas, Texas, 26-28 March 1992. In the printed proceedings 11 philosophers and scientists have published their talks. Of the 25 chapters, 13 are main presentations, including two each by Phillip E. Johnson and Michael Ruse. The book includes information on the participants, an Introduction by P. E. Johnson, and an eleven-page Index.

P. E. Johnson, author of *Darwin on Trial*, sets the stage, distinguishing between methodological naturalism (an aspect of the current scientific method) and metaphysical naturalism, the latter existing "only when the limitations of science are taken to be limitations upon reality" (p. 15). This must exist for Darwinists "to make a convincing case" (p. 1).

Three evolutionists (M. Ruse, Leslie K. Johnson, K. John Morrow) among the following 10 main speakers agree that the physical universe constitutes the total of reality with Ruse being the most tolerant of other views. Morrow, who is accused by his discussant of setting up straw men, states that "mechanistic explanations are entirely adequate" (p. 146); "purpose is a hindrance" (p. 147); and "a rejection of evolutionary theory would pull the rug out from under the whole edifice of modern science, allowing it to crash down in rubble all around us" (p. 138). Two other evolutionists (Frederick Grinnell, Arthur M. Shapiro) stress that science and religion are separate issues.

The definition of a focus of science is a basic issue separating the evolutionary speakers from the other participants (Stephen C. Meyer, Michael J. Behe, William A. Dembski, David L. Wilcox, Peter van Inwagen). The first group considers science to involve only a study of the natural universe; whereas the others feel that the natural **and** implications regarding the **supernatural** should be included in a scientific study.

Meyer says, "The (historical) question that must be asked about biological origins is not 'Which materialistic scenario will prove adequate?' but 'How did life as we know it actually arise on earth?' Since one of the logically appropriate answers to this latter question is that 'Life was designed by an intelligent agent that existed before the advent of humans: I believe it is anti-intellectual to exclude the 'design hypothesis' without consideration of all the evidence, including the most current evidence, that might support it" (p. 34).

A popular position Behe disagrees with in his well-written chapter on proteins is that "the believer in the universal application of physical law" says "... I can measure only material phenomena, and therefore nothing else exists" (p. 70). And Wilcox concludes that Darwinian naturalism has "failed to explain the core of

the apple... a complex and structured genome that is characterized by programmed and error-checked entities, a cybernetic base for biotic reality... Why then has it [neo-Darwinism] been considered an adequate (nay, a necessary and vital) explanation for all of biological reality?" (p. 215).

How important is this whole book, edited by Buell and Hearn? In spite of its cost, my suggestion, to paraphrase a popular advertisement, is "Don't be involved in creation/evolution studies without it." Views of participants in this symposium cover a wide spectrum, with some stress on the increasingly popular intelligent design position. In contemplating the various presentations I wondered how well some participants themselves, particularly among the evolutionists, had digested competing views. But in spite of this, in order to understand how others (including our opponents) are thinking and thus to clarify our own positions regarding origins issues, we need this book.

Wrinkles in Time by George Smoot and Keay Davidson. 1993. William Morrow. New York. 331 pages. \$25.00

Reviewed by Don B. DeYoung*

It is like seeing God (p. 289); the most important discovery of the century, if not of all time (p. 283); the Holy Grail of cosmology (p. 280). These are just a few of the accolades poured upon the COBE satellite and team leader physicist George Smoot. Of course the very same hype was given to the discovery of other galaxies (1925), universe expansion (1922), background radiation (1965), pulsars (1967), etc. Smoot spent many years searching for a variation in the background radiation of space. Such a variation or temperature difference is required by the big bang theory. The book describes Smoot's experiments using high-altitude balloons, U-2 spy planes, trips to the South Pole, and satellites. He is indeed a capable and exacting experimentalist.

The Cosmic Background Explorer satellite did indeed measure a variation in the microwave background radiation, of a few parts in 100,000. This has been promoted as a vote of confidence for the big bang and its related inflation theory. In truth however, the big bang theory is so poorly defined that *any* variation whatsoever can be made to fit. The experts are simply overjoyed that *some* variation was measured. As the big bang theory waxes and wanes, supernatural creation certainly remains a credible alternative.

Author Smoot names 34 corporations who made COBE possible. He also lists 1,526 people who worked on the project and helped place the Smoot name in headlines (pp. 298-315). Left out is the American taxpayer who is Smoot's ultimate employer, and who paid for the COBE experiment as well as Smoot's education and research career.

At the close of the book Smoot touches on philosophy and theology. He is very impressed with the artistry and order of the universe (p. 297). If God exists, he must be hidden behind the singularity which existed before the big bang (p. 291). Smoot apparently does not value or recognize the special revelation of God's word.

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A REVIEW OF CLAIMS ABOUT *ARCHAEOPTERYX* IN THE LIGHT OF THE EVIDENCE

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Abstract

Archaeopteryx has widely been claimed to be the outstanding piece of evidence for macro-evolution in general and for evolution from reptiles to birds in particular. But while it is the oldest known bird and also an interesting mosaic containing some features also found in reptiles, there is neither evidence of a lineage from reptiles to *Archaeopteryx* nor from it to any living birds. Further, and also most importantly, natural selection is inadequate as a possible mechanism to explain the descent of *Archaeopteryx*. In view of the evidence, science has oversold the case for *Archaeopteryx* as a transitional form.

Strong claims are frequently being made in scientific journals, textbooks, and the secular press about “the fact of evolution.” On the other hand, Johnson (1991) and others argue that, while micro-evolution within a species does occur, real evidence for macro-evolution does not exist, notwithstanding repeated claims to the contrary. Also, authors like Goldsmith (1990) find Neo-Darwinism unsatisfactory in its explanatory power and criticize the reductionistic and mechanistic paradigm of science.

Whether evolution is a theory or whether it is a scientifically established fact depends, or should depend, to a significant extent upon the existence of fossils that would support the claimed evolution, be it gradual or be it punctuated by evolutionary spurts. The main focus of this study is on evolutionist and creationist interpretations of one important fossil—that of *Archaeopteryx*—that have been made over time. Evolutionists have claimed for over a century that remains of a “reptile-bird” named *Archaeopteryx* were the best evidence for a transitional form and thus for macro-evolution. Wesson (1992, p. 38), for example, highlighted the exceptional importance given to *Archaeopteryx* by evolutionists and correctly put it into the broader context of a fossil record that does not seem to support Darwin’s theory by stating that

[Darwin] was much concerned with the incompleteness of the fossil record. He attributed it to the accidental absence or erasure of parts of the record and the inadequacy of exploration, and he was confident that in time the gaps would be filled. This was not implausible in his day. But since then the hundredfold multiplication of the number of known fossils has not much improved the continuity of the record. The most impressive intermediate—the reptile-bird *Archaeopteryx*, the most famous of all fossils—was aptly discovered in 1861 when debate over the new theory was most heated, encouraging the hope that more digging would uncover many more such discoveries. But no equally admirable bridging form has been found.

As we will see below, even this “bridging form” looks much more like a lone obelisk than a connection between two sides of a gulf.

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Wide-spread Claims About *Archaeopteryx* Over Time

For over 130 years, *Archaeopteryx* has been presented by many evolutionists as the outstanding piece of fossil evidence for a transitional form between reptiles and birds and that it therefore provided empirical support for the theory of evolution. Proponents of the theory of evolution have shown little or no restraint or used no caveats when writing about *Archaeopteryx*. Wellnhofer (1990, p. 70) stated that

Archaeopteryx provides paleontologists with their most conclusive evidence for the evolution of birds from reptiles. . . . Its combination of anatomical characteristics from two distinct classes of animals make [it] the oldest known bird, a textbook example of a transitional form between reptiles and modern birds. *Archaeopteryx* is a perfect example of a transitional form in the evolution of modern birds from reptiles.

Other examples of statements on *Archaeopteryx*, spanning a large part of this century, include the following. Thomson (1925, p. 58) referred to the

thrill it must have been in the world of naturalists when *Archaeopteryx* was discovered in Jurassic strata in Bavaria—an extinct bird linking the creatures of the air back to the reptiles of the earth.

Beadnall (1934, p. 112) wrote that “[*Archaeopteryx*] was, in fact, a link in the evolutionary chain, a creature that had been a reptile but was not yet bird—a true reptile-bird.” Carter (1954, p. 46) said that *Archaeopteryx* is a fossil “truly intermediate between birds and reptiles.” Mayr (1976) refers to *Archaeopteryx* as “a virtually perfect intermediate between birds and reptiles.” Ruse (1976, p. 14) mentions *Archaeopteryx* as “the bird/reptile” and as the best known bridging fossil between major classes of organisms supporting “the fact of evolution.” Grasse (1977, p. 74) refers to the outstanding evidence of *Archaeopteryx*, “which exhibits a real mixture of reptilian and bird-like characters.” Gould (1977, p. 187) refers to *Archaeopteryx* as an intermediate form between cold- and warm-blooded vertebrates. Leakey (1979, p. 15) mentioned that the finding of *Archaeopteryx* in 1861 was “a triumph for Darwin.” Futuyma (1986, p. 38) refers to *Archaeopteryx* as an “exquisite intermediate between birds and reptiles.” Reichhoff (1992, pp. 89-90) praises *Archaeopteryx* as demonstrating “the way of evolution,” and that, when it was discovered, “the euphoria was understandable, a place in all textbooks assured.”

To conclude this sample of statements over time, one needs to refer to the International *Archaeopteryx* Conference held in Eichstatt, Germany, in 1984, and the proceedings published by Hecht et al. (1985). The conference brought together many of the top researchers in the field. Pros and cons of many issues were freely discussed, and there were some disagreements on some matters (and since that time, some of the hypotheses had to be revised or abandoned because of new evidence such as the work by Feduccia, 1993). However, conferees did unanimously agree to the declaration that: "Organic evolution is a fundamental process of biology and we recognize the importance of the *Archaeopteryx* contribution to that problem" (Preface, in Hecht et al., 1985; complete statement bold-faced in original). Expressing strong allegiance to evolutionary doctrine does not necessarily mean, as many papers in the volume show, that the individual contributions addressing various narrowly focused, specific issues are biased. But some authors show little restraint; Hecht (1985, p. 149), for example, in the abstract of his paper, says that "... the discovery of *Archaeopteryx* is presented as historical evidence for the Darwinian theory of evolution." The problem is that working with only one pre-analytic vision, at the exclusion of any other, must lead to biases at a more general level, as shown in this article by comparing claims with the evidence.

The Evidence: *Archaeopteryx* Is A Bird with Peculiarities

Feduccia (1993) measured the curvature of the foot claws of the three best *Archaeopteryx* specimens and compared them with 500 species of existing birds. He concluded that "One can infer from the claw-arc measurements of the pes of *Archaeopteryx* that it was a perching bird" (p. 793). Further evidence suggests that *Archaeopteryx* had an advanced aerodynamic morphology, for which Feduccia lists nine documented facts. He therefore concluded unequivocally that: "*Archaeopteryx* was arboreal and volant, considerably advanced aerodynamically, and probably capable of flapping, powered flight to at least some degree. *Archaeopteryx* probably cannot tell us much about the early origins of feathers and flight in true protobirds because *Archaeopteryx* was, in the modern sense, a bird" (p. 793). That Feduccia is working from the perspective of the evolution model comes through when he refers to feathers including their microstructure as being "unchanged in structural detail over 150 million years of evolution." It seems contradictory using the term evolution and applying it to a feature with no change whatsoever for over 150 million years.

While Feduccia's findings were much publicized, they represented no surprise to some paleontologists and to most creationists. The thoroughness and comprehensiveness of his work, however, confirmed what has been argued previously based on the analysis of the available evidence. For example Owen (1863) 130 years earlier did an extremely thorough analysis of the London specimen of *Archaeopteryx* that was published along with four beautifully drawn plates. He concluded: "The best determinable parts of its preserved structure declare it unequivocally to be a Bird, with rare peculiarities indicative of a distinct order in the class" (p. 46).

There have been others, particularly creationists but also evolutionists, who have classified *Archaeopteryx* as a bird. Olson (1965, p. 182), an evolutionist and geologist, concluded that, because of the possession of feathers, "[*Archaeopteryx*] shows itself to be a bird." Gish (1973, p. 60), partly basing his conclusions on that of Olson and others, states: "[*Archaeopteryx*] is not intermediate at all because, as paleontologists acknowledge, *Archaeopteryx* was a true bird—it had wings, it was completely feathered, it flew. It was not a half-way bird, it was a bird." Martin (1985, p. 182) concluded that "*Archaeopteryx* is a genuine bird," and Ostrom (1985) also wrote: "There can be no doubt that *Archaeopteryx* was a true bird." Brown (1987, p. 78) refuted in some detail arguments about *Archaeopteryx* being an intermediate. He concludes that "much more of the anatomy of *Archaeopteryx* could be discussed, but there is surely enough presented here to show that the creature was a true bird and not some kind of intermediate stage between reptiles and birds." Junker and Scherer (1992, p. 199) also state that *Archaeopteryx* was surely a bird because of feathers that are identical to those of modern birds.

Because of peculiarities of *Archaeopteryx*, some evolutionists such as Gould and Eldridge have used the term "mosaic" for it, because it has some features that are similar in morphology to those of reptiles. In their 1977 article (p. 147) they state that: "At the higher level of evolutionary transition between basic morphological designs, gradualism has always been in trouble, though it remains the 'official' position of most Western evolutionists. Smooth intermediates between Bauplaene are almost impossible to construct, even in thought experiments: there is certainly no evidence for them in the fossil record (curious mosaics like *Archaeopteryx* do not count)."

***Archaeopteryx* as Seen from the Perspective of the Evolution Model**

The evolution model predicts that birds have evolved either directly from dinosaurs or from crocodile-like creatures that were the ancestors of both the dinosaurs and the birds. For such a significant transformation to happen there would have had to be millions and millions of intermediates. As Darwin wrote: "... the number of intermediate varieties, which have formerly existed, must be truly enormous (Darwin, 1967, p. 292). Darwin's explanation for the lack of transitional fossils at his time was the imperfection of the geological record. But if it was a valid argument at that time, this is no longer the case. As Gish (1993, p. 111-12) stated

In the natural history museums of the world are to be found more than 250,000 different fossil species, represented by tens of millions of catalogued fossils. These have been taken from every one of the so-called geological periods. Thus, the fossil record is almost immeasurably rich. An appeal to the "poverty of the fossil record" is no longer available.

Thus, if macro-evolution was an empirical fact rather than just a theory, there should be many true transitional forms in evidence in the fossil record.

To qualify as a true intermediate between reptiles and birds in support of macro-evolution, one would

ideally wish to prove that some class of reptiles or other creatures were actually the ancestors of *Archaeopteryx*. But such proofs are near impossible to find. In their absence, one would wish to be able to show, as an evolutionist, that the morphological characteristics of *Archaeopteryx* represent modifications, by natural selection, of characteristics found in reptiles.

Views on who the ancestors of *Archaeopteryx* have changed over time. The prevailing view during the last two decades or so has been that it descended from small running dinosaurs known as coelurosaurian theropods. In the words of Padian (1989, p. 202)

the study of the origin of birds and their flight underwent a renaissance in the 1970s and 1980s spurred largely by John Ostrom's demonstration that they evolved from small carnivorous dinosaurs.

Ostrom's views were summarized, for example, in his paper given at the *Archaeopteryx* conference where he stated that

the five known specimens of *Archaeopteryx* preserve the only solid physical evidence of the earliest recognizable stage of bird evolution and thereby provide the most compelling evidence about bird origins—which all point to a coelurosaurian ancestry—not crocodilian and not thecodontian (Ostrom, 1985, p. 174).

But there are significant differences between *Archaeopteryx* and (coelurosaurian) theropods. (a) *Archaeopteryx* had feathers that are identical to those of modern birds, whereas theropods had none. (b) *Archaeopteryx* had a hypertrophied furcula (fused clavicles); theropods do not have one. (c) Manus claws of *Archaeopteryx* differ markedly from those of predatory dinosaurs (Feduccia, 1993). (d) *Archaeopteryx* had a fully reversed hallux, the large rear toe, with a strongly curved claw on the ungual phalanx, which is typical of modern perching birds and unlike any known theropod dinosaur (Feduccia, 1993). (e) *Archaeopteryx* had teeth, which is among the reasons why *Archaeopteryx* has been connected to reptiles. But the crowns of *Archaeopteryx*'s teeth were unserrated, the waist present, the root expanded, and the tooth replacement resorption pit oval to circular. On the other hand, in the reptiles *Pseudosuchia* and Coelurosauria, the crowns were serrated, the waist absent, the root straight and unexpanded and tooth replacement resorption pit elongate (Brown 1987, p. 78).

Not only are there problems in linking *Archaeopteryx* to theropods, there is no link from it to any modern birds. Martin (1985, p. 182) states: "*Archaeopteryx* is not ancestral to any group of modern birds. It has specializations in its tarsometatarsus and skull which show conclusively that it is on a side branch of avian evolution." Since this is so, where then, one may ask, are the alleged intermediates lying on the main branch?

To use an interesting fossil as evidence for macro-evolution, should one not have a reasonable, detailed explanation on how it could have evolved, tiny step by tiny step, by the mechanism of natural selection and from which ancestors? But how, for example, could scales become feathers and not only be useful in the intermediate stages but provide a comparative advantage? Further, as pointed out by Gould and Eldridge (1977, p. 147), and I believe it is applicable for this

case: "Smooth intermediates between Bauplaene are almost impossible to construct, even in thought experiments."

If gradualism cannot provide the answers, the only other mechanism would be saltations, but this moves us outside the sciences and into the realm of creative miracles. And without proven or even imagined *mechanism* for a possible reptile to *Archaeopteryx* lineage, one should not accept *Archaeopteryx* as evidence for macro-evolution from reptiles to birds.

Since Darwin proposed his theory, large investments in terms of human and financial resources have gone into research to substantiate the evolution model. Scientific research on the development of the creation model has been marginal at best. So it is not surprising that considerable opportunities for the development of the creation model remain.

Concluding Comments

Given the claims that have been made for over a century that *Archaeopteryx* presents evidence for macro-evolution between reptiles and birds, questions emerge from this case study concerning the accuracy of these claims. As stated by Johnson (1991), such science appears to be far more a platform to advance a belief in scientific naturalism than true science. This case study further supports and illustrates Johnson's findings.

Interesting in the context of this note is also a statement by Raup (1983, p. 156) that

we actually may have fewer examples of smooth transitions than we had in Darwin's time, because some of the old examples have turned out to be invalid when studied in more detail,

and that was written for a publication that was to refute creationism! If, after over a century of searching, *Archaeopteryx* is the best piece of evidence for macro-evolution, as many evolutionary texts have claimed it to be, this suggests that the theory lacks the support it would need to be a proven scientific theory. The repetition of unqualified and unsubstantiated claims also raises the question of how self correcting the science of origins is.

From the beginning, an anti-Creator philosophy was at the root of Darwinism and in fact was the element that held the various views of the movement together. In the words of Mayr (1991, p. 99):

There is indeed one belief that all true original Darwinians held in common, and that was their rejection of creationism. . . . That was the flag around which they assembled and under which they marched.

Further,

the conviction that the diversity of the natural world was the result of natural processes and not the work of God was the idea that brought all so-called Darwinians together in spite of their disagreements on other of Darwin's theories . . .

According to Darwinism, natural selection (in combination with mutation) is an innovative evolutionary process capable not only of producing new kinds of organs but even new phyla. Rather than going to empirical evidence to test a doubtful theory, many scientists have approached this matter by uncritically look-

ing for confirmation for the only theory that they were willing to tolerate. As for the case of *Archaeopteryx*, claims of evidence should therefore be taken with caution, carefully reviewed, and not trusted without objective verification.

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Editor's Note

Readers will discover two other CRSQ articles on *Archaeopteryx*: Calais, R. and G. Duffett. 1988. A theory for the birds. *CRSQ* 24:183-185. Calais, R. 1989. Response to Padian. *CRSQ* 25:202-207.

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LETTERS TO THE EDITOR

Criticisms of The Universal Flood Based on Unknowns: A Reply to Mr. Yake

Bill Yake's letter is interesting because the letter introduces objections from friends and critics to a universal Flood. Mr. Yake willingly sides with the skeptics in an apparent effort to get at the truth, which is admirable, though not necessarily productive.

The objections proposed in Yake's letter are not directed at the premise that there was a universal Flood. Rather the objections are directed at explanations offered by those who believe in a world-wide Flood. Defeating those explanations does not necessarily allow for a conclusion that the Flood was not universal, because explanations can be finer-tuned or even discarded and replaced while one continues to support the one and only universal Flood.

Mr. Yake is correct in suggesting that perhaps there are no right or wrong answers. I know of no university that offers a PhD in Omniscience, sub-standard though

that major would be when contrasted with the omniscience of God. Consequently any scientific explanation by evolutionist or creationist is generally limited to that scientist's knowledge (and biases and deficiencies) within his particular profession. There is therefore one source of truth. It is the Bible and Mr. Yake's citation of 2 Peter 3:5 suggests agreement. Everything else is scientific babel, except that babel is a healthful grist for one's own scientific mill. How else would we hone our scientific minds and learn if varieties of explanations were not offered?

If Genesis 6:7 informs that a unique Flood wiped man, animals, creeping things and birds from the face of the earth, then there should be field evidence for a unique Flood that could have destroyed man, beast, reptiles and birds. The uniqueness of the biblical Flood suggests universality. Genesis 7:19,20 indicates that the unique Flood covered the mountains. Further, God promised in Genesis 9:11 that He would never send another Flood capable of destroying earth and all that

was in it. Certainly, anthropological studies of earth's cultures indicate the existence of a unique Flood in cultural histories.

Back to Yake's letter, some supporters of the universal Flood do, in fact, "... maintain that not only was almost all of the world's sedimentary rock deposited during the Flood, but that original ocean basins were enlarged to accommodate the retreating Flood waters."

For supporters of the universal Flood, to "maintain" is to hypothesize. Further, to quantify water volume and "flood deposits" as was done in the Yake letter is to hypothesize also. Neither "maintenance" nor "quantification" is verifiable. We do not know positively, earth's environment prior to and during the time of the Flood; nor is it likely that we ever will. We do not know earth's initial surficial configuration nor do we know the chemical and physical dynamics involved within earth's early atmosphere, crust, mantle or core.

Yake's friend's estimation that "... a staggering 3.65 octillion calories would have been generated which is enough to raise ocean temperatures by more than 2700 degrees C." is just that, an estimation followed by a conclusion. Unfortunately estimations are subject to revision readily, and estimations are not verifiable scientifically in the field.

Furthermore, estimations do not take into account obvious balances built into earth by God, to guard against the excessive. Excessive heat created temporarily by volcanic eruptions can be dissipated by vigorously circulating air and ocean water. High in the sky there is a virtual unlimited source of "cold" which can be brought to earth by hurricane force vertically circulating winds. Also, volcanoes did not exist everywhere; there are areas on all continents where cratonic sediments were deposited quietly, in the absence of volcanoes. The cratons do exhibit volcanically derived tuffaceous sediments, often with appropriate vertebrate fossils.

As for the Karoo Formation in Africa, we see in the Yake letter, evidence of a numbers game using estimates of vertebrate animals. How does anyone know that Karoo Formation vertebrates represent one percent of the total vertebrate fossils on earth? Who has counted earth's vertebrate fossils? Who knows where all the vertebrates are? Has anyone looked under Antarctica's ice cover?

What is needed in Africa is a detailed lithologic study to determine if the Karoo Formation were laid down by the Flood. In stratigraphy, one definition of a formation is that, "it is a response to an environment" The time of the Flood represents a unique, temporary environment unlike any other environment that ever existed. The formations laid down by the Flood must be unique also, and temporary in time. This means also that formations can exist below the presumed Flood deposits and above the deposits that were the product of localized floods.

My problem with the last subject matter (the ocean basins and the continents) is this. Why did granite slabs concentrate under continents and why do the continents stand higher than ocean basins? If we knew, we might be able to understand the ocean basins better. Certainly the slowly disintegrating theory of plate tectonics has nothing to do with locations of granite slabs under continents, nor with uplifted continents. Along

the strike-slipping San Andreas fault in California, rock formations abutting southerly parts of the fault rise about 6,000 ft. (about 2,000 m) above sea level, whereas northerly of San Francisco, the fault and abutting rocks sink beneath the ocean.

Except that there is a paucity of data available for ocean basins, the last subject matter does pose "a grave difficulty for Flood geologists" Assuming similar pre-Flood conditions for the continents and the ocean basins as exist today, Flood dynamics would violate the law of gravity if the basins were not covered with sediments before the continents were. Yet we do not know what the pre-Flood conditions were.

It is reiterated herein, we should understand that there could be sedimentary formations that seemingly relate to localized erosion and deposition. Local floods and their products of deposition neither prove nor disprove the unique biblical Flood. Finally, localized sedimentary deposits should be readily contrasted from sediments derived from the unique Flood because each is a response to a different environment.

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Plant Survival, Floating Debris, and Soil: An Answer to Yake

Uniformitarian scientists are constrained by their metaphysical belief in generally present processes. Because the Flood was an event that no one but God observed, there likely will be questions that we will never be able to answer. So, just because we do not have all the answers, does not mean that the Flood was not universal. We do not have all the facts, and if we did, we are not smart enough to integrate all of them. Creationists are working on many of these problems, and we are finding reasonable solutions to some of them.

Many plants and trees were unable to survive the Flood waters. They are now extinct, as we observe. It would be difficult, but possible, to surmise why each plant or tree survived.

We would suppose that plants and trees would float for awhile during the Flood and after the Flood. The floating debris model has great potential to solve many botanical problems. Many trees would float upright during the Flood, and those that floated horizontally could still have half their seeds, leaves, and fruits above water for a period. Not all of this vegetation would have settled out in the Flood. (There still are floating logs in Spirit Lake, Washington, years after Mount St. Helens blew.) So, some vegetation would settle on land as the Flood waters drained and could germinate.

The top soil would not necessarily be saturated in salt water. I believe much of the salt of the ocean is a result of the Flood. So, some top soil for awhile may have had 70 parts per thousand salt (twice modern sea water) and some may have had much less (the oceans probably were not well mixed with salt yet). I can imagine that the earth could be repopulated with plants, trees, insects, etc. in a very short time by geometric progression in an uninhabited world.

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Where Are The Flood Waters? A Reply to Mr. Yake

Recently this author was forwarded a letter from a Mr. Yake who asked a number of questions regarding creationist issues and the Flood. Mr. Yake's questions are stated with possible creationist explanations which follow. Unfortunately, the data used by Mr. Yake to calculate his "presumed" values were not available for analysis. However, I will attempt to show that the numbers presented are suspect, if not in fact inaccurate, and are not essential in answering his questions.

Yake comment: A mass balance of the earth's waters requires that all waters presently found in the earth's oceans are from the Flood event.

This statement, equating the Flood waters to today's oceans, appears to be accurate. However, a closer examination shows that it is not. Water is stored on and in the earth in many ways. In order to "accurately" estimate the volume of water that flooded the earth, all water sources must be considered. Additionally, tectonic mechanisms must be invoked to raise the "original" sea-level to the Flood levels described in the Bible (Genesis 7: 17-20). Tectonic mechanisms may be inferred from Genesis 7:11 with the "breaking of the fountains of the deep."

Water is found in the atmosphere, in the polar ice caps, in continental glaciers, as permafrost, as connate water in sediments, in magmatic rocks, and finally in the earth's oceans, seas and lakes. Water is recycled at subduction zones and is generated at volcanic and spreading centers. Hence, any calculation of the volume of water involved in the Flood event would require all of these volumes of water to be added into the total.

Various Uniformitarians have stated that, if we could squeeze all the water from the atmosphere, it would cover the land surface with only two inches of water which would not significantly raise the sea level position to any "Flood" level. Also, we are told that, if we could melt the polar ice caps, sea-level would be raised up to 100 feet above the present level which still would not flood the earth's higher land areas.

The Uniformitarians propose that large continental seas, such as epeiric seas, once covered much of our present day land surface (e.g., Cretaceous Seaway). See Froede (1995) for a discussion of the Cretaceous seaway as related to receding Flood waters. However, these seaways did exist and insufficient modern water sources can be found to recreate them today, all of which creates a problem for Uniformitarians. To explain this shortcoming, they invoke tectonic uplift or downwarping together with periods of glaciation to create the necessary conditions they use for the development of these continental seas. The theory which they use to explain the transgressive and regressive sea-level cycles is called sequence stratigraphy, and I have offered a catastrophist interpretation for that theory (Froede, 1994).

Fossils found on all of the seven continents reveal that all the land has been covered by water at some point in time. The Uniformitarians use millions of years of transgressive and regressive sea-level changes due to tectonic uplift or downwarping, and multiple glaciations. Flood geologists use a short timeframe global

Flood. The physical evidence for both models is the same, only the interpretation of the data varies.

Creationists can infer from Bible statements that during the Flood all of the water found on the earth today covered the earth sufficiently to kill all mankind and non-aquatic animals outside the Ark. Tectonic uplift and downwarping coupled with all sources of available water could adequately provide sufficient depth (approximately 22 feet above the highest point-Genesis 7:20) to have accomplished this. World wide fossil evidence clearly fits with the global Flood interpretation of Scripture.

I shall address other questions raised by Mr. Yake in future letters.

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Seed Sprouting, Research, and The Global Flood

Scientists who proffer objective evidence in support of a global Flood face two problems: (1) it is not possible to retrace all the procedures God used to restore post-diluvial ecosystems and (2) closed-minded critics can routinely downplay the applicability of any evidence to a post-Flood scenario.

I selected propagules from five species growing near my home in Montecito, CA. I made no attempt to pick plants that possess special seed survival systems and nonetheless seeds of most species I studied sprouted after prolonged soaking in saltwater or freshwater. Some soaked seeds even needed nicking (called scarification) of their seed coats to induce germination after such submergence (Howe, 1968, pp. 105-112).

In that research paper I likewise reviewed Charles Darwin's amazing data on germination of seeds immersed in ocean water directly or within floating animal carcasses. I cited a research report by Boyko of Israel who found that seedlings flourish when irrigated with salt water. I noted that the many botanical species which are now found only in the fossils fit with a pattern of extinction associated with a global Flood model. The following restrained inferences were drawn and they still apply:

... it may be concluded that seeds of many flowering plants could have resisted the direct contact of Flood waters and germinated vigorously after the Flood. Thus seed plant survival during the Flood may have occurred by many means—both inside and outside the ark. Howe (1968, p. 111).

Now it is interesting that sceptics of this study are forced to dodge the data collected and originally interpreted by a creationist. John Meyer (1994, pp. 159-160) noted that those who gather the data in science have the first rights to interpret them.

Still the critics of a global Flood who have talked to Mr. Yake can counter my research results by giving baseless negative answers to all of the following questions:

- (1) Could some seeds with resistant coats have escaped scarification during the Flood?
- (2) Could plenty of those seeds have been scarified by action of wind, water, or frost after the Flood?
- (3) Could many plants have survived by resprouting from stationary or uprooted specimens in the manner of chamise shrubs resprouting after fire? (See Howe, 1982, pp. 3-10; Howe and Carothers, 1980, pp. 5-13.)
- (4) Could some seedlings have endured the salt concentrations in soil solution (whatever those were) as the Flood waters drained?
- (5) Could plants requiring insect or bird pollinators have survived for a short time after the Flood when populations of pollinating insects and birds were building?
- (6) Could many bees and other insects have withstood the Flood outside the ark and rapidly reproduced as the waters waned?

But if the answer to the preceding questions and many others like them is even partly "yes" then plants may well have weathered a global Flood without miraculous intervention on the part of the Designer.

Evidently Yake's critics do not believe that the Creator would have utilized any technical means to reclothe the Earth's vegetation. But lately even botanists have mastered the scientific art of cloning plants. Hundreds of orchid individuals for example can be formed from one seedling or even from callus tissue in culture.

People have already achieved limited success at changing genes in plants ("genetic engineering"). If we grant that God had the ability and the right (!) to clone and to undertake some genetic engineering after the Divine judgement, then restoring Earth's post-Flood botanical landscape would have been a celestial "piece of cake." But if individuals are predisposed to reject a global Flood, no amount of science, theology, or creative speculation can induce them to accept it even as a possibility.

Meanwhile creation scientists need to perform more of our own research on this and other subjects. Such research:

... might provide data which would be of value in experimental plant physiology and in understanding of Bible history. Howe (1968, p. 111).

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BOOK REVIEW

Voyage to The Planets, by Richard Bliss and Donald B. DeYoung. 1994. Institute for Creation Research, El Cajon, CA 92021. 128 pages. \$11.95.

Reviewed by Clifford L. Lillo*

Readers of the *CRSQ* who are looking for a technical book on astronomy to give to teen-age children and grandchildren will be delighted with this new book. It is the second in the series of "Voyage" books to be released by the Institute for Creation Research.

Although librarians may have difficulty cataloging this "fiction/non-fiction" book, astronomy buffs will appreciate the lightly flavored fictional account of a trip into space aboard a modified space shuttle by two teenagers. A knowledgeable scientist, Capt. A. D. Venture, who took the young people on a prior shuttle ride, reunites with the students, who are identified as Jonathan Andrew and Ann Jackson, and tells them they will accompany a NASA crew on a journey from earth to all the other planets in our solar system. However, prior to the actual flight, Capt. Venture instructs the teen-agers on technical aspects of the planets, and a unique cartoon character occasionally appears to illustrate some of the captain's points.

During their instruction, the youths display a high aptitude for understanding scientific principles and appear eager to learn everything that their instructor

tells them, an attitude that all parents would want their children to display. Subjects covered include a comparison of planet volumes, mass, speed, brightness, and number of moons.

During the actual flight, the spacecraft is able to travel at a fictional "warp" speed, and thus it completes the round trip in what appears to be a matter of weeks or months, rather than several lifetimes. Flybys are made of Mercury, Jupiter, Saturn, Uranus, Neptune, and Pluto. Captain Venture, Ann, and Jonathan journey to the surface of Mars in a lander to collect rock samples and take photographs. A sudden dust storm forces them to cut short their excursion and return to the spacecraft.

Frequent references to the fact that the solar system was designed and created by God make the reader aware of man's unique position on earth and his relationship to his Maker, which also makes this treatise unusual for books on astronomy, and thus a highly desirable part of any young Christian's library.

Dr. Bliss, a widely traveled scientist-educator, died suddenly while on a speaking ministry for ICR in November 1994. *Voyage to the Planets*, co-authored with Dr. Don DeYoung, was his last published work. Dr. Bliss had expected to write many more books in the "Voyage" series, but God had other plans for him. Hopefully, ICR will continue his work and complete the task contemplated by Dick Bliss. He will be missed.

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METHODOLOGY FOR ANALYSIS OF SCIENCE TEACHING MATERIALS FROM A CREATIONIST WORLD VIEW

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Abstract

This article introduces a methodology for analyzing science materials for evidence of creationist content. The Institute for Creation Research tenets were used as a basis for the analysis. A field test of the methodology as used on four Christian publisher's science texts is presented.

Introduction

Various Christian publishers have attempted to include a creationist based world view in their science education materials. Concerned citizens also recognize the need for creationist based curricular materials and frequently contact the Institute for Creation Research (ICR) requesting information about such materials. ICR has not analyzed Christian science education materials for secondary schools. Therefore, the authors recognize the need for an analysis of the materials currently available. This paper presents a methodology for such an analysis and the results of its application.

Christian creation science materials should provide knowledge that explains the natural world scientifically and Biblically and have the ability to unify, illuminate, and integrate other facts.

Why Creation Science?

All knowledge is not equally important and curriculum decisions require that distinctions and priorities be made. In selecting content for the biological sciences, knowledge that explains the natural world scientifically and that has the ability to unify, illuminate, and integrate other facts must be emphasized. Creationist tenets cannot meet these criteria. (Shankar and Skoog 1993).

This bias is typical of many secular humanistic science educators. Another example is an article by one of the world's leading geneticists, Theodosius Dobzhansky (1973), entitled "Nothing in biology makes sense except in the light of evolution?"

It is our position that science (including biology) should not be taught from an evolutionary world view but rather from a creationist world view. The false nature of evolution has been clearly demonstrated and described in numerous publications by both ICR and other authors.²

Many authors have also written about a crisis in science education. It is our opinion that this crisis is partly due to the evolutionary based assumptions found in much of science education today. This crisis has manifested itself in both student attitudes and student interests. For example, Gogolin and Swartz (1992) measured students attitudes after the first college science course. Among students who intended to major in science, they found a decrease in student attitudes

toward their teacher, as well as a decrease in their value of science, their self esteem, and their enjoyment of science. Furthermore, their anxiety toward science increased, and their motivation to take additional science classes decreased. Similarly, Yager (1986) found that after taking a science class, many students lost interest in science and retained almost nothing of what they were taught. However, Bliss (1978) found that high school students

seem to be more highly motivated and to learn more effectively when studying science from a two-model (creation/evolution) approach. . . . The experimental group seem to develop more critical thinking habits than those who studied origins from an evolutionary model only.

Research Questions

The major questions considered in this research were: Do selected Christian curricular materials show evidence of being creationist based? Can evidence of the scientific and or Biblical creation tenets be found in the text?

Creationist Tenets

To analyze Christian science materials, the tenets of the Institute for Creation Research (ICR) will be used to determine the presence or absence of the creationist world view. These tenets are found in the July 1980 Impact Article entitled *The tenets of creationism*, by Henry M. Morris.

Methodology

Analysis team. The reviewers involved in this analysis included four ICR graduate students and Professor Steve Deckard. These persons were participants in the study of Curriculum Design in the ICR graduate school program in Science Education.

Selection of materials. The ICR Department of Science Education sent a letter to 15 Christian publishers requesting science materials be submitted for analysis. Four publishers responded, two with standard classroom textbooks and two with self-paced materials. One of the reviewers brought a fifth publisher's science materials, resulting in five publishers' materials being considered for analysis. One of the sets of materials was written for middle school use and was not included in this study. The other four included a variety of high school level disciplines. The discipline common to all four, biology, was chosen for analysis. The publishers and their materials were:

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A Beka Book Publications. *Biology: God's Living Creation*. Pensacola, FL, 1988.

Accelerated Christian Education. *Biology PACES*. rev. ed. Lewisville, TX, 1993.

Bob Jones University Press. *Biology for Christian Schools*. second ed., by William S. Pinkston, Jr. Greenville, SC, 1991.

Christian Light Publications. *Science: God's Light in Science*. rev. ed. Harrisonburg, VA, 1980.

Sampling of content. The standard classroom textbooks were analyzed by chapter. The self-paced materials were analyzed by booklet, and we treated each booklet as a chapter. Each reviewer selected chapters for analysis based on an examination of the titles and subheadings in the table of contents. Titles and subheadings were examined for expected evidence of creationist tenets. Two additional chapters were selected by a random drawing with replacement. A chapter was randomly chosen from each text for each reviewer to practice the analysis process. The chapter used for practice was not included in the results.

Analysis process: preparation and development. Before the analysis began, the team reviewed each of the tenets. Each reviewer read their randomly selected practice chapter looking for evidence of the tenets. This practice analysis revealed the need for guidelines. The resulting analysis process was:

1. Before beginning a chapter analysis, the reviewer reread the tenets.
2. Information found in the student text including boxes, articles, charts, diagrams, and illustrations was considered for analysis. Student review questions were not included.
3. Each chapter was read for evidence of the tenets.
4. The rating categories used were:
yes (y): text expresses stated tenet. implied yes (I+): text alludes to stated tenet. no (n): text is contrary to stated tenet. implied no (I-): text appears to contradict stated tenet.
5. If any portion of a scientific or Biblical tenet was recognized in the text, it was considered as evidence of the entire tenet.
6. When evidence of a tenet was found the reviewer rated the phrase by comparing it to the specific tenet.
7. Some key phrases that were common to most texts were used to indicate evidence of specific tenets. The scientific tenets were categorized as shown in Table I.

Table 1. Key Phrases with Corresponding Tenets.

	Scientific			Biblical
	physical sciences	biological sciences	human biology	
"God made"	1	2	4	4
"God designed"	8	3	3	4
"God created"	1	2	4	4
"God sustained"	6	6	6	3

Example of the Analysis Process

The following example is extracted from: Accelerated Christian Education. *Biology PACES*. rev. ed. Lewisville, TX, 1993. This example illustrates evidence for

scientific tenets number two and three. The text is from the Biology booklet number 1107 and is found in a chapter entitled Man: Reproduction, Genetics, and Embryology on page six. It reads as follows:

"When God created the process of sexual reproduction, He designed each step with great care."

This was marked as a yes (Y+) for tenet number two and an implied (I+) yes for tenet number three. The two tenets are:

2. The phenomenon of biological life did not develop by natural processes from inanimate systems but was specially and supernaturally created by the Creator.

3. Each of the major kinds of plants and animals was created functionally complete from the beginning and did not evolve from some other kind of organism. Changes in basic kinds since their first creation are limited to "horizontal" changes (variations) within the kinds, or "downward" changes (e.g., harmful mutations, extinctions).

Results

Results are presented in Table II. The reader may request copies of tables of the raw data from the senior author.

Table 2. Frequency of Occurrence of Tenets (y and I+).

Scientific Tenets	Publisher				Total Occurrence
	A Beka Book	ACE	Bob Jones	CLP	
1	2	2	2	3	9
2	1	7	3	3	14
3	3	7	3	1	14
4	2	4	3	1	10
5	1	5	2	0	8
6	2	1	4	4	11
7	4	1	2	1	8
8	3	2	2	1	8
9	1	0	1	2	4

Biblical Tenets	Publisher				Total Occurrence
	A Beka Book	ACE	Bob Jones	CLP	
1	2	1	1	3	7
2	1	7	3	2	13
3	3	1	4	3	11
4	3	5	4	2	14
5	2	4	1	0	7
6	0	6	2	3	11
7	0	4	2	1	7
8	0	2	2	1	5
9	0	4	2	1	7

Discussion

The tenets were found useful for analyzing Christian science materials. The review team found that it was possible to identify evidence of the tenets in the material analyzed. Little indication of evidence of the rating factor "n" was found and no evidence of the rating factor "I-" was found. This may be likely because the reviewer would have had to try and read the authors' intention into the material. On the other hand it was

very easy to recognize consistent usage, especially since evidence of any part of the tenet could be rated as either "y" or "I+."

The tenets also appear to be useful for making comparisons of different curricular materials. On the basis of this analysis strengths and weaknesses of tests were evident by their inclusion or exclusion of the various tenets. Materials can also be screened for contradictions to the tenets. This process does not serve as a complete analysis of curricular materials, but it could be used as an important first step in making a choice among different curricula. For the purposes of this study, this analysis was limited to high school level biology texts, but the process is versatile enough to be used for analyzing other science curricular materials.

The issue of inter-rater reliability was discussed and addressed by use of the practice exercise. The data from all four publications seems to indicate that the rating of items was consistent with that which might be expected. According to Table 1, scientific tenets 1 and 8 were more closely related to the discipline of physical science and scientific tenets 2 and 3 to biological science. Although inter-rater reliability does not appear to be a serious problem, a process for measuring its consistency needs to be developed.

The analysis indicated some weaknesses for all four publications in the representation of the scientific and Biblical creationist tenets. Some publications did not show evidence of all of the tenets.

Recommendations for Further Study

Tenet usage. Science curricular materials should be studied for proper integration of the tenets. Sometimes all aspects of a tenet were not used. Taking concepts from a tenet and inserting them into the material is not integration. Therefore, complete and appropriate usage of the tenets in an integrative fashion becomes an issue.

Quality and quantity. An analysis based solely on the creationism tenets does not include the issues of currency and accuracy or quality and quantity of the scientific principles covered in the text. Currency and accuracy should also be subject to analysis. Finally, the depth and breadth of coverage should be considered when analyzing a curriculum.

Scope, sequence, and continuity. All of the science materials (all disciplines and grade levels) of a publisher should be studied to provide a full representation of the publisher's use of the tenets. Some tenets are more applicable to particular disciplines than others.

Other considerations. Other considerations include the organizational sequencing of subject matter and the overall appearance and attractiveness of the materials.

Charts, graphs, maps, and illustrations should be clear and easy to use. The readability of text, usage of vocabulary, level of abstraction, and application of higher cognitive skills need to be appropriate for age and grade level. Other ancillary materials such as questions, laboratory activities, student workbooks, teacher manuals, and any other supplementary materials should be analyzed.

Analytical techniques. Techniques for analyzing and measuring the above considerations in order to facilitate further studies need to be developed. Applying an objective tool will lead to greater validity and inter-rater reliability than a subjective analysis.

Endnotes

1. The ICR Science Education Department does not endorse a particular curriculum but can provide an analysis from a creationist perspective. This article describes a field test that lays the ground work for a long term research program for analyzing science education materials.
2. For example refer to the following works:
Bird, Wendell R. 1991. *The origin of species revisited*. 2 vols. Regency, Nashville.
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———. 1985. *Evolution: challenge of the fossil record*. Creation-Life. El Cajon, CA.
———. R. B. Bliss, and W. R. Bird. 1981. Summary of scientific evidence for creation. *Impact* 95-96.
Ham, Ken, A. Snelling, and C. Wieland. 1992. *The answers book*. Master Books. El Cajon, CA.
Johnson, Phillip E. 1991. *Darwin on trial*. Intervarsity Press. Downers Grove, IL.
Morris, Henry M. 1984. *The biblical basis for modern science*. Baker Book House. Grand Rapids, MI.
———, and G. E. Parker. 1987. *What is creation science?* 2nd Ed. Master Books. El Cajon, CA.
Oller, W., Jr. 1988. *A theory in crisis*. *Impact* 180.
Thaxton, C. B., W. L. Bradley, and R. L. Olson. 1984. *The mystery of life's origin*. Philosophical Library. New York.
Whitcomb, J. C., and H. M. Morris. 1961. *The Genesis Flood*. Presbyterian and Reformed. Phillipsburg, NJ.

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- Bliss, Richard B. 1978. A comparison of students studying the origin of life from a two-model approach vs. those studying from a single-model approach. *Acts and Facts* 9(7):i-iv ICR Impact No. 60).
- Dobzhansky, T. 1973. Nothing in biology makes sense except in light of evolution. *The American Biology Teacher* 35:125-129.
- Gogolin, Luanne and Fred Swartz. 1992. A quantitative and qualitative inquiry into the attitudes toward science of nonscience college students. *Journal of Research in Science Teaching* 29:487-504.
- Morris, Henry M. 1980. The tenets of creationism. *Acts and Facts* 7(6):i-iv (ICR Impact No. 85).
- Shankar, G. and G. Skoon. 1993. Emphasis given evolution and creationism by Texas high school biology teachers. *Science Education* 77:221-233.
- Yager, Robert E. 1986. What's wrong with school science? *The Science Teacher* 53:145-147.

Quote: Lincoln on the danger inherent in surrendering government to the Supreme Court

"I do not forget the position, assumed by some, that constitutional questions are to be decided by the Supreme Court. . . . At the same time, the candid citizen must confess that if the policy of the government, upon vital questions affecting the whole people, is to be irrevocably fixed by decisions of the Supreme Court, the instant they are made . . . the people will have ceased to be their own rulers, having to that extent practically resigned their government into the hands of that eminent tribunal."

Lincoln, Abraham. 1861. First inaugural address. Reprinted in Doren, Carl Van. 1942. *The Literary Works of Abraham Lincoln*. The Readers Club. New York. pp. 175-185.

RESOURCES FOR RESEARCH AND PUBLICATION — LAB DIRECTOR'S REPORT

JOHN R. MEYER,* Director of the C.R.S. Van Andel Research Center



Fifty million dollars per year is the price tag on the operation of the Joides Resolution deep sea drilling ship. The goal? To study the evolution of the ocean basins of the world. Over 1.5 billion dollars was the price tag to build and place in orbit the faltering Hubble space telescope. The goal? To study the evolution of the universe. These two research projects represent your tax dollars at work to prove evolution! And

how much of your tax dollar goes to support the dogmatic teaching of evolution in our schools, colleges, national parks, and state and federally-supported museums?

Evolution, as the cornerstone dogma in the religion of secular humanism, even requires protection under the legal system so it can thrive unchecked throughout the land. The ACLU, financed by tens of millions of dollars from the major secular foundations, stands ready, willing, and able to threaten the most lowly, grade school teacher if he or she shows signs of forsaking the evolutionary faith and suggesting creationist alternatives to school children. Nearly every Christian student who has studied science in the secular colleges and universities of this land has felt the oppressive hand of evolutionary dogma in the classroom.

It is this evolutionary philosophy and indoctrination at the highest academic levels that the Creation Research Society seeks to challenge through the publication of scientific research in the field and laboratory. In addition, we have found a growing ministry of challenging evolution on the secular college and university campuses by presentations of the hard evidence gained through our research. And this is being done without a cent of government aid.

It is being accomplished because dedicated members are investing time, money, and equipment into the research effort. Some of the recent major donations of equipment have included a pickup truck, a Magellan Global Positioning System, a 486 computer, a FAX machine, and a radio frequency signal generator.

The pickup truck, for example, was the key item in a recent lengthy field trip into the Kanab Canyon area north of the Grand Canyon and west of the Kaibab Plateau. Without a high clearance vehicle, that ongoing study of rapid canyon formation would be impossible.

It may be that within the CRS our members own surplus and unused equipment items that could be of

significant help to us. A few of the currently needed items are listed below:

- Shop tools: table saw, drill press, sander, mechanics tools, wood working tools, small electric and gas welders, moto-tool engraver, tool chest.
- Lab equipment: Bench-top autoclave, incubators, microscope, fume hood, salt water aquaria, analytical balance.
- Electronics equipment: Oscilloscope, amateur radio equipment, power supplies, audio tape editor and duplicator, strip chart recorders.
- Photo equipment: Film developing equipment, cameras (large format and 35 mm), lenses, copy stand, enlarger, professional quality video camera.
- Miscellaneous: Rugged garden tractor with accessories, lap-top computer, high-speed modem, steel storage cabinets, steel bookshelves, shipping scales.

We can use only good quality equipment. We also need technical books, but these present special problems in selection. If you have equipment items or books which might be of use in origins research from a creationist perspective, please contact the Van Andel Research Center at 520-636-1153.

Remember, you have no control over your tax dollars which are at work to promote evolution. But this can be off-set by your support of origins research through the Creation Research Society!



Panamint Mountain Range, Death Valley, CA—note salt deposits on the floor of Death Valley from prehistoric Lake Manley. This is evidence for a "wetter" climate in earth's past—Carl R. Froede, Jr.



Aerial photograph of Crater Lake, Oregon, by Carl R. Froede, Jr.

*Van Andel Research Laboratory, Creation Research Society, Box 376, Chino Valley, AZ 86323.

PROVIDENCE CANYON, STEWART COUNTY, GEORGIA — EVIDENCE OF RECENT RAPID EROSION

EMMETT L. WILLIAMS*

Received 8 October 1994; Revised 5 November 1994

Abstract

In 10 years of observing the erosion of unconsolidated sediments at Providence Canyon State Park in southwestern Georgia, it is concluded that catastrophic events are more devastating or ruinous than slow, gradual processes. More erosional work was accomplished during a catastrophe than that observed in previous and later years of "normal" erosion. Also the evidence of a catastrophic erosional and depositional event can be obscured by later "normal" erosional processes.

Introduction

Acceptance of a recent Creation and Flood model of earth history implies that many natural events such as canyon formation are assumed to have occurred quickly. Involved in rapid canyon formation is rapid erosion, a topic often discussed in the Quarterly. For instance, three articles (Williams, Meyer and Wolfrom, 1991, 1992a, 1992b) presented various views on the formation of the Grand Canyon of the Colorado River. Also see Oard, 1993; Williams 1993 and Austin 1994a. An introductory study on the erosion of Pine Creek Gorge in Pennsylvania has been published (Williams, Chaffin, Goette and Meyer, 1994).

This paper deals with the recent erosion of Providence Canyon in southwestern Georgia. Based on the field observations at this site, various suggestions are offered on possible catastrophic events and gradual processes that could have occurred after the Flood and their effect on unconsolidated sediments.

History of Canyon Name

The Canyon is named for Providence United Methodist Church (Figure 1) which is adjacent to Providence Canyon State Park. A Georgia Historical Commission marker on state highway 39C at the church reads as follows:

Providence Church, when first organized, 1832-33, was a log building on the south side of the road. Two acres were donated by David Lowe for a church and school (Providence Academy). This land is now between two of the canyons. The present building was built in 1859 on the north side of the old Lumpkin-Florence road. . . .

Location

Providence Canyon in the state park system is within the coastal plain physiographic province** (Figure 2) and is referred to as Georgia's Little Grand Canyon (Joyce, 1985, p. 1). Giving an exact location, Donovan and Reinhardt (1986, p. 359) state:

Providence Canyons (sic) State Park is located in Stewart County, Georgia, in the Lumpkin SW 7½ minute quadrangle. The park entrance . . . is located 0.15 mi . . . west of the intersection of Stewart County Road 23 and Georgia Road 39C.

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**The canyon is actually in the Fall Line Hills region of the Coastal Plain. See McVety (1971, p. 3).



Figure 1. Providence Methodist Church for which the canyons are named.

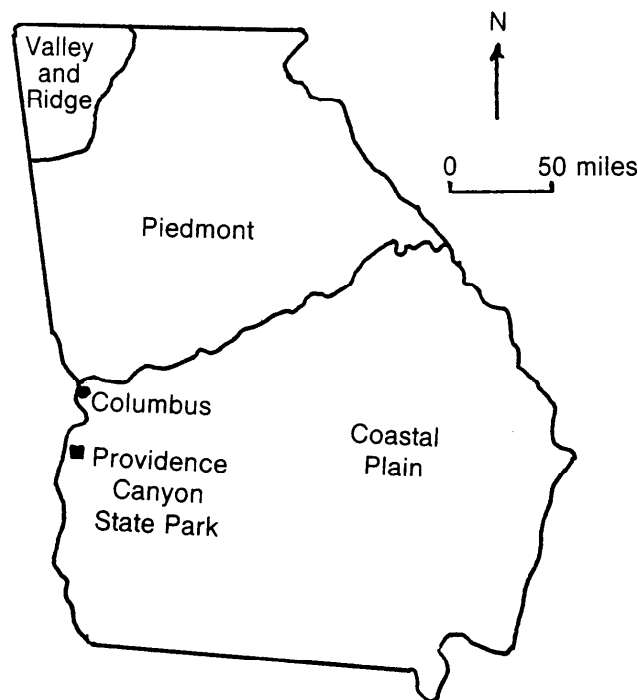


Figure 2. General physiographic provinces of Georgia and the location of Providence Canyon State Park (after Joyce, 1985, p. 2).

Fact and Folklore

As one drives south from Columbus on US Highway 27 and turns west onto Georgia 39C in the town of Lumpkin, the county seat of Stewart County, a Georgia Historical Commission marker about the Canyon reads as follows:

Providence Canyons

— 8 mi —→

Trickles of water running down old Indian paths to springs formed the Providence Canyons, natural wonders of the Southeast.

These canyons, named for an old church that had to be moved out of their path, are often called "Little Grand canyons" because of brilliant color effects of the 43 different soils revealed in the walls. These vari-colored walls and sharp pinnacles make the view awe-inspiring.

The canyons cover several hundred acres. The largest is a half mile long, 300 feet wide and 150 feet deep.

Daniels wrote about his visit to Providence Canyons or caves in 1938 (pp. 299, 302). He had been told by the Chief of the Soil Conservation Service to be sure to

... see the famous Providence Cave in Stewart County, Georgia near the town of Lumpkin. This is a celebrated gully probably more than 150 feet deep at the head, yet formed in soil within the past half century. It is but one of the numerous similar gullies which have ruined a large area of good land in Stewart and two adjacent counties (p. 299).

Daniels waxed eloquently about his visit (p. 302).

They are, of course, not caves at all. They are ditches. But ditches of the same genus as the grand canyon of the Colorado. Down through the red soil to almost pure white clays the chasms run in the midst of cultivated Georgia farms. They come perilously close to the highway and seem ready to engulf road and farm-house and church. They run beside the road for what seems to be miles. . . .

Arnall (1946, p. 63), a former governor of Georgia, expressed an extremely negative view of the erosion at the site:

One day, in Southwest Georgia . . . I looked into the deep chasm of Providence Canyon. I saw the perverse beauty of the great cut across the face of nature: the mosaic of colors, as one layer after another of clay was revealed. Where once there were fields of cotton and corn, was this great chasm. Within a generation, the unprotected land had been despoiled of its richness, then swept away, until there was a nothingness panelled in red and yellow and cream and a score of variations of these colors.

The United States Parks Service has called the canyon the most remarkable and most beautiful natural phenomenon east of the Mississippi. It may be. Certainly the colors are striking enough and the gorge is big enough.

To me it was almost the ultimate in horror. . . .

One wonders how Arnall would have described the erosion at the Grand Canyon in Arizona!

Sisk (1935, p. 12) claimed that the Providence caves or canyons were initiated by the run-off from a barn built by one of the Pattersons in 1855. He opened his essay with an expansive, vivid science fiction statement:

"Providence Cave, like some Gargantuan monster, has devoured everything that stood in its path" (p. 12).

Donovan and Reinhardt (1980, p. 415) attempted to quantify the accelerated erosion that had occurred in Stewart County:

The Coastal Plain section of western Georgia consists of sediments middle Cretaceous and younger in age. Most of the units are unconsolidated elastic deposits. . . . Natural erosional processes have formed a . . . 20 mi.-long northwest-facing cuesta. . . . Formation of the cuesta is clearly related to downcutting by streams draining into the Chattahoochee River. Before settlement of this region, the cuesta margin had a relatively stable, steeply sloping undulatory surface densely covered by pine and some hardwoods. After settlement in the 1820's, much of the primary forest was removed for farming, and gullies began to form locally near the top of the cuesta margin, apparently along natural swales in the topography that concentrated surface runoff. . . . Today many large gullies and dendritic gully systems can be seen along the cuesta margin. In an 81-acre area encompassing Providence Canyon State Park, a single drainage system formed since 1850 has produced severe distinct gullies as much as . . . 1300 ft. long, . . . 600 ft. wide and . . . 160 ft. deep. Between 1850 and 1930, accelerated erosion removed an estimated . . . 6 x 10⁷ ft³ of sediment from the gullied areas. Using this figure, we calculated an average downcutting rate of 21 cm/yr for the gully system known as Providence Canyon.

Anyone familiar with the southern United States is aware of the large number of gullying and sheet erosion problems within the region. Morris (1937, pp. 364-365) suggested several reasons for this erosion of unconsolidated sediments. These are listed below with appropriate comments. Also see McVety (1971).

1. The presence or absence of a vegetative cover. Even with a forest, shrub or grass cover, erosion of unconsolidated material will occur in the South but the process is inhibited by a cover of vegetation. As soon as the cover is removed, rapid erosion can and normally does take place.

2. The character of the agriculture. Generally this is the most likely suggested reason for rapid erosion, poor farming techniques.

3. The intensity of the rainfall. The South receives an abundance of rainfall and much of it is in the form of downpours or cloudbursts which increase the probability of severe erosion.

4. The degree of slope. The rolling topography of the region leads to erosion.

5. The character of the soil and the soil profile. The ample thicknesses of unconsolidated sediments near or just under the surface of the ground encourages erosional damage.

Most of the hand-wringing in the scientific and popular literature is done over no. 2, poor farming methods, because erosion possibly can be prevented if proper care is taken during cultivation. Obviously once land is cleared for agriculture, then reasons 3-5 become of paramount importance. However I have seen evidence in the Southeast of fresh gully development in forests where there is ample vegetative cover.



3a



3b

Figure 3. The rolling topography of the region about six miles south of Providence Canyon State Park at the Stewart-Quitman county line (1984).

- a. View east along Georgia highway 27.
b. View west along Georgia highway 27.**

Also the degree of slope or rolling topography in the South indicates that likely considerable erosion likely has occurred in the past. Vast post-Flood erosion was possible before a stable vegetative cover was achieved on the unconsolidated sediments which were themselves a product of Flood and post-Flood erosion processes. The rolling topography of the region slightly southwest of Providence Canyon is illustrated in Figure 3. Is this evidence of an earlier erosion cycle before settlement of the area?

The erosion resulting from rain storms in the southern United States has been recorded previously in the Quarterly: Virginia (Williams, 1986); Tennessee (Williams, 1991); Oklahoma and Texas (Williams, et al., 1991, pp. 96-97).

Appearance of the Canyon

Aerial views of Providence Canyon, taken in 1977, are shown in Figure 4. A diagram of the Park is given in Figure 5. The series of canyons is numbered and often referred to as "fingers" (1-9). Some erosional features in the Canyon can be seen in Figure 6.

Stratigraphy

Providence Canyon is cut mainly through the Upper Cretaceous Providence Formation. This unit is capped by the Paleocene Clayton formation (Figure 7) and at the base of the Providence Formation is the Upper Cretaceous Ripley Formation (Figure 8). Table I contains a brief description of the formations.



4a



4b

Figure 4. Aerial photographs of Providence Canyon State Park (1977) by Robert Baxter.

- a. Overview of the Park with Georgia highway 39C seen skirting the canyon.
b. A closer view of some of the canyons.**

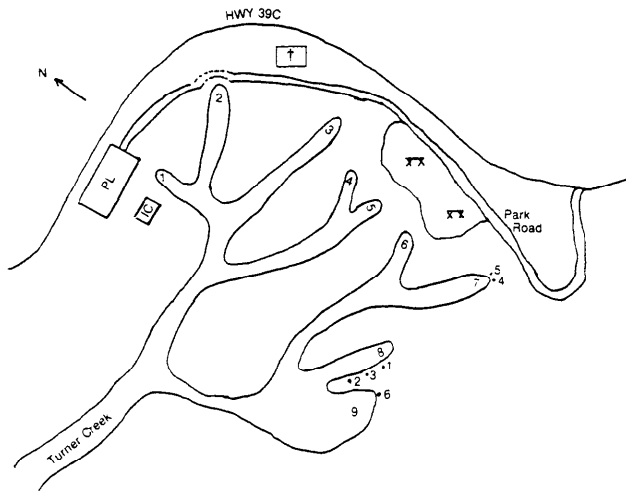
Note the crossbedding in the Providence sands (Figure 9). Table I was derived using Eargle's stratigraphic designations (1955, p. 77). Recently Donovan has proposed a change in the stratigraphy of the Providence Formation eliminating the Perote member. Table II shows a comparison of these stratigraphic differences.

One may wonder why there is a difference in opinion over the stratigraphy at the canyon. Possibly Eargle's comment in 1953 (p. 3) will explain this quandary,

In hardly any other part of the country may a geologist find such an accumulation of weathered debris to confuse geologic detail as in the sandhills of the Coastal Plain.

For readers interested in studying the Cretaceous formations in the southeastern United States, a selected bibliography is given in Appendix I.

How do these formations fit into a creationist framework? Suggestions are given in Table III. For an example of a creationist geologic timetable, see Austin (1994a, p. 58).



- [] — Providence United Methodist Church
 XX — Picnic Area
 --- — Rerouting of Park Road
 IC — Interpretive Center
 PL — Parking Lot
 • — Measuring Stations

Figure 5. A diagram of the canyons (1-9) in Providence Canyon State Park (not to scale).

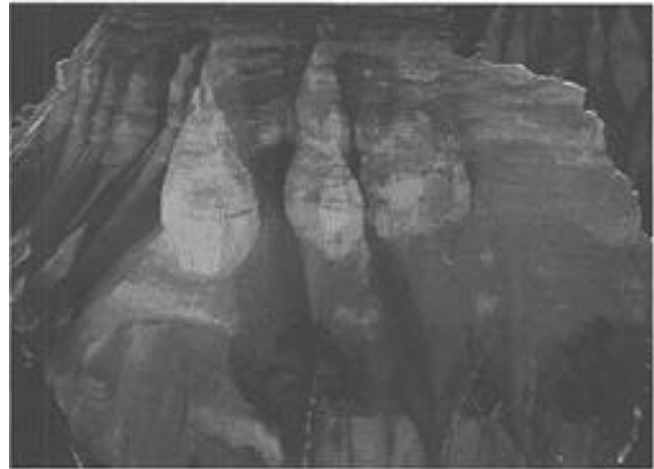
Table I. Description of Formations in Providence Canyon.

Formation		Lithology
Clayton		Red ferruginous clayey sand (residuum) with iron ore at base of formation
Providence	(upper member)	Massively cross-bedded micaceous sands with kaolin lenses; varicolored sands—tan, red, yellow, white, pink, lavender; clay balls, <i>Ophiomorpha</i> ichnogenus
	(Perote member)	Brownish-gray to dark-gray, micaceous, carbonaceous sand with silt and yellow clay
Ripley		Dark gray to black fine micaceous carbonaceous clayey sand with yellowish-orange staining, highly fossiliferous

Interestingly, the Providence and Ripley formations have been correlated with the Aguja and Javelina formations in west Texas (Stephenson, King, Monroe and Imlay, 1942). Petrified and charcoaled woods from the Aguja formation recently have been studied (Williams and Howe, 1993; Williams, Matzko, Howe, White and Stark, 1993). A penetrating creationist commentary on geologic formation correlation was given by Froede (1994). Could it be that many of the Cretaceous formations in North America, supposedly deposited in the "Cretaceous" or "Mesozoic" Sea (see Figure 3, Williams and Howe, 1993, p. 51) were actually deposited in the final phases of the Flood? Was this "sea" in reality the final stages of the Flood in North America as the water withdrew from the continent?



6a



6b

Figure 6a. A pinnacle is all that remains of a 160 ft. canyon wall after years of lateral erosion (1984).

b. Talus cones photographed in late evening at Providence Canyon State Park yielding an eerie but beautiful effect (1984).



Figure 7. The Clayton formation lies unconformably over the Providence sands. Measuring station 2 is to the left of the eroded portion of the Clayton formation (1991).

Table II. Measured Stratigraphic Sections on Providence Canyon.

Donovan*			Eargle (1955, p. 77)**		
Formation		Thickness (feet)	Formation		Thickness (feet)
Clayton		19	Clayton		19
Providence	Upper	60	Providence	Upper	99
	Lower	39		Perote Member	32
Ripley		42	Ripley		10

*See Reinhardt (1986, p. 33).

**Eargle's measured section has been adjusted to conform to the 160 feet height of Donovan's measured section.

Table III. Timetable of Formation Deposition—Providence Canyon.

Formation	Series	Flood Sequence
Clayton	Paleocene	Post-Flood?
Providence	Upper Cretaceous	Late Stages of Flood?
Ripley		



Figure 8. An exposure of the Ripley formation (1992) near the bottom of Providence Canyon.



Figure 9. Cross-bedding in the beautiful Providence sands (1994) by Carl Froede, Jr.

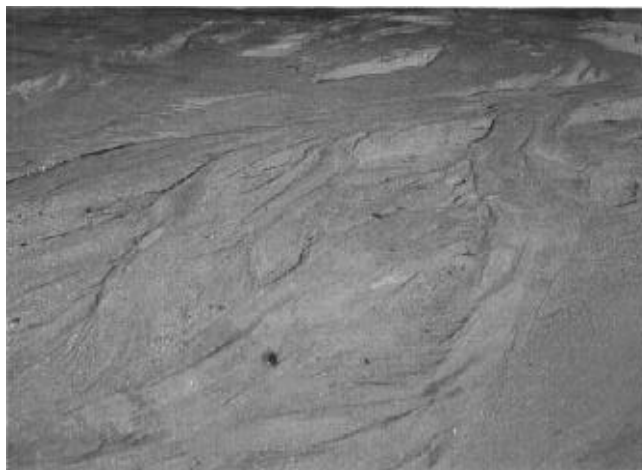


Figure 10. Braided stream pattern of Turner Creek choked with sediments from the canyons (1984).



Figure 11. "Hanging on for dear life." Undercutting and sediment slumping have placed this pine in a precarious position. Its tap root is exposed and the lateral roots hold it in position (1988).

Geomorphic Studies

Braided Stream Pattern

As mentioned earlier, the consensus among geologists and soil conservationists is that once the land was cleared of vegetation in the 1800's for farming, and modern soil management practices had not been developed, the steep-sided gullies of Providence Canyon began to form (Joyce, 1985, pp. 8, 9). The capping Clayton formation is fairly stable, but the Providence sands erode readily. Providence Canyon is at the headwaters of Turner Creek and the wet weather stream is choked with the eroded sediments from the Providence sands during periods of rainfall, forming a braided stream pattern (Figure 10). As Joyce (1985, p. 9) noted: "A tremendous volume of sediment is carried by runoff and transferred to the stream, . . ."

Undercutting, Sapping, Slumping and Mass Wasting

Joyce (1985, pp. 10-12) claimed that as rainwater permeates the Providence sands, it continues downward until it reaches a lens of kaolin which is impermeable to water penetration. There the groundwater moves laterally toward the canyon wall carrying sediment with it which weakens the wall. The overlying sediments, being undercut (Figure 11), often slump downward (Figure 12) forming a talus cone (Figure 6b). This mass wasting process* causes the canyon to widen.

Downcutting, Headward and Lateral Erosion

As the canyons began to form, it is thought that the major erosional process was downcutting, tending to make the canyons deeper. Joyce (1985, pp. 13-14) stated:

The average rate of downcutting for the years 1820-1930 was calculated to be approximately 8 inches per year and was based on an estimation of the total volume of sediments removed by erosion.

The higher clay content of the Ripley formation renders it more difficult to erode. Thus the downcutting process is slowed when this formation becomes exposed. Figure 13 shows pictures of Providence Canyon taken in the 1920's, 1940's and early 1970's.

As the downcutting developed, headward erosion made the canyons longer. Estimates of headward erosion between 1955 and 1968 were determined to be approximately six feet per year. Yet between 1968 and 1976 headward erosion rates decreased to about two feet per year likely because of vegetative stabilization of the canyon walls reducing the erosion rate (Joyce, 1985, pp. 14-15).

Canyon widening by the process of lateral erosion (generally by slumping) sometimes leaves isolated "islands" of vegetation (Figure 14) and barren pinnacles. Joyce (1985, p. 16) claimed:

Between 1955 and 1968, lateral erosion operated at an average rate of about 2 feet per year, but between 1968 and 1976, calculations indicate that this rate had increased to an average of approximately 6 feet per year.

*This process is similar to sapping discussed by Austin (1994, pp. 99-100) in relation to the formation of amphitheaters in the Grand Canyon of the Colorado River.



12a



12b

**Figure 12a. Recent collapse or slumping of canyon wall caused a tree to fall into the canyon after the sediments below it were undercut (1984).
b. Slumping of canyon wall sent sediment and tree down into the canyon (1990).**

Joyce thought that the impact of man on the canyon has increased the lateral erosion process. She stated (1985, p. 18):

The area around the park has undergone substantial development in the past few years, which has eliminated more of the area's natural vegetation, thus exposing the land to increased amounts of runoff. This excess runoff could cause erosion to occur at a faster rate. Another possible cause of accelerated widening of the canyon is the increased use of the area since its establishment as a park in 1971. Many visitors have been unable to resist climbing the canyon walls or carving on them. Besides defacing the canyon walls, this disrespect has helped to accelerate the rate of lateral erosion.

See Figure 15 for examples of the impact of man's activities on the canyon.

The slowing of the erosional processes in Stewart County is probably due to the planting of vegetation on abandoned farmland. Loblolly and shortleaf pine forests deter erosion. Also McVety (1971, p. 19) explained that:



13a



13b



13c

- Figure 13a.** Providence Canyon in 1922, a cornfield can be seen at the head of the gully. Photograph by S. W. McCallie from Furcron (1956, p. 120).
- b.** Providence Canyon in 1940, this section is barren of vegetation (from McVety, 1971, p. 51).
- c.** Providence Canyon in 1970, this section shows more vegetation cover than a. and b. (from McVety, 1971, p. 51).



Figure 14. Lateral erosive forces have isolated this island of sediment stabilized at the top by vegetation. Note the bank overhang held in place by tree roots in spite of undercutting by slumping sediments. A talus cone can be seen at the corner of the island (1988).

The planting of cover crops and grasses has also been effective. Bermuda grass has been widely employed, and of the shrubs and vines kudzu, sericea, and Japanese honeysuckle have been used more widely and successfully . . .

However kudzu grows so rapidly in Georgia (can grow up to 50 ft/year), it can cover everything in its path including trees, little-used roads and abandoned houses so that it is often considered more of a problem than a solution unless it is kept in check.

Measurements

In 1984 I initiated a series of measurements to quantitatively determine the advance of the upper edge of a canyon wall by either lateral or headward erosion. The measurements were conducted in a more remote area of the Park to eliminate as much as possible any effects caused by man's activities. (See Figure 5 for location of measuring stations.) The distance from a tree trunk or fence post to the upper edge of a canyon wall constituted a measurement. As erosion processes cause the advance of a canyon wall, a shorter measured distance is recorded each succeeding year.

No bank undercutting was measured so as not to disturb the canyon wall at the measuring stations. Likewise no volume of sediment lost during erosion was measured. Since canyon wall advance often means the loss of much or all of the 160 ft. gully depth, this translates into considerable mass wastage. Table IV contains measurements of the advance of the upper canyon wall caused by lateral erosion.

The lateral erosion along the same canyon wall is not uniform. One particular location (station 2) obviously was more susceptible to erosive forces. This particular position is adjacent to a collapsed section of the canyon wall (Figure 7).

Table V contains upper canyon wall advance measurements caused by headward erosion. Also the loss of material during headward erosion is not uniform along the same advancing canyon wall.



15a



15b

Figure 15a. In the center of the photograph, writing can be seen in the cross-bedded Providence sands (1984).

b. Notice the two boys in the center of the photograph who have climbed up the Providence sands and are positioned at the Providence/Clayton contact. Steps dug into the sediment can be seen.

Table IV. Lateral Erosion of Canyon Wall.

Date of Measurement	Distance to stable object (inches)*		
	Measuring Station		
	1	2	3
2/26/84	84	132	—**
3/9/85	79	128	89
3/16/86	77.5	128	89
5/2/87	77	126	87
3/5/88	76.5	124	85.5
3/25/89	75	122.5	82
3/24/90	75	87	82
5/8/91	75	85	82
5/3/92	70.5	85	82
2/18/94	65.5	74	80
Total wall advance (inches)	18.5	58.0	9.0

*accuracy of measurement ± 1.0 in.

**measurements at station 3 initiated in 1985.

Table V. Headward Erosion of Canyon Wall.

Date of Measurement	Distance to stable object (inches)*		
	Measuring Station		
	4	5	6
3/10/85	255.75	—	146
3/16/86	255	—	144
5/2/87	240	203	139
3/5/88	234	201	136
3/25/89	209	198.5	133
3/24/90	209	195	132
5/8/91	208	195	132
5/3/92**	—	193	132
2/18/94	—	188	132
Total wall advance (inches)	47.75	15	14

*accuracy of measurements ± 1.0 in

**measurements at station 4 abandoned in 1992 due to removal of fence post by Park personnel.

Catastrophic Erosion

About 0.3 mile east of the entrance to Providence Canyon State Park on Georgia Highway 39C, another canyon had been forming along the northeast side of the road. Collapse of a section of this growing canyon was noted adjacent to the highway in March of 1988 (Figure 16). Undercutting in this portion of the canyon had been effective in undermining the upper strata resulting in the collapse of a sizeable section of sediment. The perimeter of the half circle of collapsed material was 55 ft. The depth of the one-half cylindrical section was 18 ft. and using these approximate measurements, it was found that 8660 ft³ of sediment slumped from the wall into the growing canyon. By March of 1990 continued lateral erosion had caused the wall advance to encompass approximately a half circle of 96 ft (perimeter) and the downcutting had increased the depth of the section to 24 ft for a total removal of 35,300 ft³ of sediment (Figure 17).

On March 24, 1990 I made my annual visit to the canyons to obtain the series of measurements of canyon wall advance. It was evident that recent erosion on a vast scale had occurred. I asked the Park Superintendent what had happened. He told me that exactly one



16a



16b

Figure 16. Collapsed section of steep-sided gully adjacent to Georgia highway 39C (1988).
a. View from highway.
b. View looking toward highway 39C in the background.



Figure 17. A large section of sediment with honeysuckle cover has slumped about 18 feet from the bank surface into the steep-sided gully continuing to enlarge the encroaching canyon (1990).

week before I arrived, the region had received a 13.5-inch rain on March 17.* His vivid description was that "It was raining so hard, it looked like a stream of water running out of a fire hose." He had come from his home during the downpour to ascertain the extent of damage to the canyon and he experienced the driving rainfall firsthand.

After recording the wall advance measurements, I walked into the canyons to survey the erosional damage. The first noticeable effect was the enormous amount of sediment deposited along Turner Creek (Figure 18). Evidences of slumping (Figure 19), debris slides (Figure 20) and small alluvial fans (Figure 21) were seen. Severe erosion of the canyon walls occurred during the cloudburst. Compare Figure 22 with Figure 15b. A portion of the wall that the young men used to climb to the top of the canyon was eroded badly during the rainstorm of March 1990.

Fences often have to be relocated at Providence Canyon State Park because of continuing erosion processes. Figure 23 shows an old fence that collapsed into the canyon in 1990 and the new fence that was placed to prevent visitors from venturing too near the edge of the canyon. Figure 24 is a photograph taken in 1992 of a section of the Park road, from the entrance to the Interpretive Center, that had been damaged by erosive forces in spite of a dense kudzu and honeysuckle cover. By 1994 this road had to be rerouted (Figure 25) to safely avoid the collapsed section. One does not relish the job of the Providence Canyon State Park personnel who must stay a step ahead of an ever-enlarging canyon.

Destruction of Evidence of a Catastrophe

Often one creationist may propose a catastrophic origin of a particular geologic feature. Then another creationist may claim that there should be some evidence remaining that the catastrophe indeed did occur. Concerning the 1990 catastrophic erosion of Providence Canyon, much of the evidence of the extreme erosion

*The amount of rainfall was reported to me by the Superintendent of Providence Canyon State Park. Unfortunately no precipitation data are available from the National Climatic Data Center for the Lumpkin Georgia 2 SE Station for the month of March 1990.



18a



18b



18c

Figure 18a. Turner Creek in 1988 near a Park trail that crosses it. Generally the water flows over a broad relatively level bed of sediment and this view is typical of what had been observed in previous visits.

b. Same area of Turner Creek in March, 1990 as seen in 18a. Note the bank of deposited sediment (up to 6 ft in height). The opposite bank of the Creek is shown in Figure 26a.

c. Deposited sediment upstream from views shown in 18a. and b. All of the headwaters of Turner Creek were choked with loosely packed sediments making walking treacherous. I sank up to my knees in many places when walking to survey the damage (1990).



19a



19b

Figure 19a. Fresh canyon wall is revealed after sediments slumped from it. Note talus below the fresh exposure (1990).

b. Large blocks of sediments that slumped from the canyon wall during the cloudburst (1990).

is not present now. Normal erosive forces have removed much, if not all, of the evidence of the 1990 catastrophe. Likewise vegetative growth has obscured some evidence of the catastrophe. Of the six feet of deposited sediment along the bank of Turner Creek in the canyon bottom in 1990, only small isolated de-



Figure 20. Debris slide containing slump blocks and smaller sections of sedimentary material from freshly-eroded canyon wall (1990).



Figure 21. Small alluvial fan formed on canyon floor during the March 1990 cloudburst.

posits remain (Figure 26). Is it possible that evidence of many such catastrophes as this one have been destroyed by later natural events in a short period of time? The possibility of such a sequence of events could have obscured many catastrophic geologic events and easily misled many scientists into adopting a uniformitarian philosophy.



Figure 22. Extensive canyon wall erosion due to 1990 rainstorm. Compare with Figure 15b.



Figure 23. The erosion in one of the canyons in 1990 engulfed an old fence which was replaced by another one several feet away from the edge of the canyon.

Conclusions and Speculations

It would appear from 10 years of observation at Providence Canyon that catastrophic events are more effective in causing extensive erosion and deposition than gradual slow processes. Both types do occur but catastrophic events are more devastating. Considering



Figure 24. One of the canyon fingers (2) has eroded headward during the 1990 rainstorm until it encroached upon the Park road (1992).



Figure 25. Construction to reroute Park road to avoid continually eroding canyon (1994).

measuring stations 1, 2 and 3, on the same canyon wall, erosion at 1 and 3 was less. These positions have been stabilized by vegetation, i.e., tree roots. Wall advance at station 2 sharply increased from 1989 to 1990, likely because of the torrential downpour in March, 1990. The wall advance during that year was over 35 inches, a major loss of sediment.

The headward erosion at stations 4, 5 and 6 was greater than the lateral erosion at stations 1, 2 and 3. The erosional loss at stations 5 and 6 was more gradual than at station 4. A wall advance of 25 inches between 1988 and 1989 resulted from the collapse of a sizeable amount of sediment during that year at station 4. Vegetative stabilization at stations 5 and 6 slowed the headward erosion at those sites.

A sudden slumping of material east of the State Park was noted. Possibly runoff from the highway accelerated the erosion at this site, but again catastrophic collapse occurred suddenly. Also the rainstorm of March, 1990 caused major damage at the Park. As shown in Figures 18b-23, the amount of erosion and subsequent deposition seen in that year was not duplicated during any of the other years of my study.

Another important observation is the disappearance of the evidence of catastrophic erosion at the Park after 1990. An observer would not realize that a single catastrophe had caused much mass wastage upon viewing the canyon walls and the deposition of sediments on the canyon floor and along the headwaters of Turner Creek four years later. Is it possible for natural processes to eventually obscure erosional evidence in a temperate climate zone a few years after a catastrophe? If the climate after the Flood was as postulated by Oard (1990, 1993), the amount of rainfall then would have been considerable. Much prior evidence of catastrophic erosion during and immediately after the Flood could have been destroyed. Thus catastrophic erosional processes could have been more active in the past than we can imagine and finding evidence for such events may be impossible. Such possible conditions make the job of catastrophists more difficult when speculating about past occurrences. This would be particularly true in the southeastern United States where unconsolidated sediments are often exposed and susceptible to rapid erosion by rainstorms.

Extrapolate the above postulations back to a hypothesized post-Flood wet climate. Assume that some of the sediments deposited by the Flood had not completely lithified, extensive erosion of the deposits would have been possible, particularly before any vegetative growth or subsequent lithification would have stabilized them. Thus early post-Flood canyon formation, as well as the development of a rolling topography in fairly flat regions (coastal plains), could have occurred. The greater the rainfall, the greater the chance for these circumstances to exist.

All of these conclusions are tentative and limited in scope. The speculations are offered to encourage more discussion on the subject of erosion in the years after the Flood. However the present is definitely not the key to the past. In more realistic terms, the present may obscure the past! Also a more recent catastrophe may destroy the evidence of an earlier one!

Appendix I

Selected Bibliography for Cretaceous Formations in Southeastern United States, Particularly Georgia and Alabama

References concerning stratigraphy that are given in the bibliography of this article will not be repeated in this Appendix but should be consulted.

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26a

Figure 26a. Sedimentary deposit, six feet in height, along Turner Creek one week after catastrophic erosion of canyons during March, 1990 rainstorm.

b. The same view as a., one year later (1991). The sedimentary deposit is 4.5 feet in height.

c. The same view as a. and b. four years after the catastrophic rainstorm of March 1990. A small sedimentary deposit, one foot in height remains (1994) where a considerably larger deposit existed. Turner Creek has the same appearance as it did in 1988.



26b



26c

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Appendix II Rapid Gully Erosion at Other Locations

In 1846 Charles Lyell observed an eroding gully near Milledgeville, Georgia in the Piedmont physiographic province. Ireland (1939) studied the continuing steep sided gully erosion at the same site almost 100 years later. This "Lyell" gully has many features similar to the Providence canyons.

Gully erosion in San Mateo County, California by soil piping and tunneling was examined by Swanson, Kondolf and Boison (1989). This type of erosional action could be quite common in unconsolidated sediments.

The rapid erosion that occurred at Mount St. Helens in 1980 was recorded by Steve Austin (1984a, 1986). Likewise the Catastrophe Reference Database collected by Austin (1994b) contains over 50 references concerning instances of rapid erosion. Also see Austin, 1984b.

Acknowledgments

My wife, Mary, faithfully helped with the measurements during the 10-year period of study. Carl Froede, Jr. helped with the measurements in 1994 and offered valuable insights into the geology of the southeastern United States.

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Glossary

Braided Stream — a stream that divides into an interlacing network of branching and reuniting shallow channels. Possibly the stream is unable to transport its sediment load.

Clastic — pertaining to a rock or sediment composed primarily of fragments (clasts) derived from pre-existing rocks or minerals and transported some distance from their place of origin

Cuesta — An asymmetrical ridge with a long, gentle slope on one side and a steep or cliff like face on the other side.

Downcutting — Stream erosion in which the cutting action is directed in a downward direction.

Ferruginous — pertaining to or containing iron.

Headward erosion — The lengthening of a valley or gully by erosion at the source of a stream.

Lateral Erosion — The erosion of a canyon or gully walls by water action and gravitational forces causing the canyon to widen.

Lithification — The conversion of newly deposited sediments into a solid rock.

Mass Wasting — A general term for the downslope movement of large amounts of soil and rock material caused by gravitational forces.

Ophiomorpha — Trace fossil genus* generally ". . . restricted to the littoral or shallow sublittoral zone and normally to occur in neither fresh nor deeper marine water" (Crimes, 1975, p. 117). However Bishop and Brannen (1993, p. 23) claim: "The presence of *Ophiomorpha* usually indicates the presence of a thalassinoid burrowing shrimp but does not necessarily indicate a nearshore environment because many thalassinoids range to the edge of the continental shelf."

Residuum — What remains of a soil or rock after a process such as weathering.

Sheet Erosion — The removal of thin layers of surface material from an area of gently sloping land by broad continuous sheets of running water.

Slumping — The downward movement of a mass of rock or unconsolidated material moving as a unit parallel to the cliff or slope from which it descends.

Talus Cone — A small cone-shaped or apron-like landform at the base of a cliff, consisting of poorly sorted debris that has accumulated episodically by mass wasting.

Unconformity — The general name given to a surface of erosion that has been buried within the earth under sediments or strata.

Unconsolidated — A sediment that is loosely arranged or unstratified or whose particles are not cemented together (not lithified).

Undercutting — To cut away material from a bank or wall of soil or rock leaving a portion overhanging.

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BOOK REVIEWS

Creation and Time: A Biblical and Scientific Perspective on The Creation-Date Controversy by Hugh Ross. 1994. Navpress. Colorado Springs. 187 pages. \$10.00.

Reviewed by Danny R. Faulkner*

In his previous two books Hugh Ross put forth his ideas on creation. His views are probably familiar to most readers: he accepts the Big Bang cosmogony as well as the 4.6 billion year age of the earth. He accepts the uniformitarian interpretation of the fossil record, though he rejects the concept of evolution, preferring a type of progressive creation instead. He accepts the Genesis creation account, interpreting it with the day-age theory. In short, he accepts nearly all, if not all, of what modern science has to say about origins, while trying to hold on to biblical theology. Ross's main appeal in his writings and his organization, Reasons to Believe, is to intellectual people who would normally have difficulty accepting Christianity because of (as he would have it) a misconception many have about the date of creation implied by scripture. Ross firmly believes that the proper rendering of Genesis one has been confirmed by modern science and that recent cosmological discoveries (the anthropic principle, the origin of the universe as a singularity) strongly lead one to theistic ideas.

This teaching is obviously opposed to the position of the Creation Research Society. This latest book by Hugh Ross is wholly dedicated to this difference, with ICR particularly coming in for criticism. The author thinks that a literal six day creation week is intellectually indefensible and that such a position does great harm to the cause of Christ. He rejects the notion that anything but a recent creation undermines Christianity

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and ultimately leads to atheism and immorality or at least a lack of evangelism. His counter example is his own ministry and associates who otherwise appear to be orthodox and are involved in evangelistic endeavors.

I do not wish to dispute this latter point occurring at this time, but will it be true in the future for the people that Ross is affecting? While giving much ground to modern ideas, Ross does hold to the correct position on some important issues, such as the literal historicity of Adam and the Garden of Eden not that long ago. I fear that many of those influenced by him may reject these doctrines at a later time.

In Chapter 10 several indicators for a young earth or universe are discussed. On pp. 107-108 gravitational contraction powering the sun is discussed. Such a possibility caused quite a stir in recent creationist circles 10 or 15 years ago, but most opinion turned against this suggestion with the culmination of a good paper by DeYoung and Rush (1989). Ross states quite correctly, I believe, that the computed temperature and density at the sun's center should ignite nuclear fusion. However he grossly overstates the case when he wrote that

... that various measured characteristics of the sun—including its effective temperature, luminosity, spectra, radius, outflow of neutrinos, and mass—all guarantee that the sun is burning by nuclear fusion and that this fusion has been proceeding for about 5 billion years.

This is wrong on both counts. The gross properties of the sun are consistent with both nuclear fusion and gravitational contraction. The chlorine based neutrino experiment is consistent with no solar neutrinos, and the gallium experiments thus far have yielded results below those predicted by nuclear fusion. Furthermore there is simply no evidence from the sun itself that

suggests a five billion year age: that information is gleaned from radiometric ages of meteorites with an evolutionary model of solar system origin.

On pp. 107-108 Ross dismisses the argument that the velocity dispersion of clusters of galaxies suggests a much younger age than generally thought. His main counter argument is that these velocity dispersions are caused by unseen (or dark) matter and that there is compelling evidence for unseen matter accounting for as much as 90% of the universe. What he does not tell the reader is that much of this evidence is the velocity dispersions of clusters of galaxies. That is, non-luminous matter has been concocted to explain the great age of galaxy clusters. Non-luminous matter may very well exist, but this circular reasoning proves nothing.

On pp. 116-117 Ross discusses what the existence of comets has to reveal about the age of the solar system. Comets are very flimsy and could not have survived the many trips around the sun if they have been around for 4.6 billion years. This is usually explained by hypothesizing the Oort comet cloud, but, amazingly, Ross never mentions this. His suggestion that comets are interstellar interlopers is not held by anyone that I know of, and I have no idea where this originated.

Some may find that Ross really blasts recent creationists in this book, but I disagree. Considering the vast difference that exists, it is a wonder that he is not more critical. That is not to say that I did not resent anything in the book, his accusation in Chapter 11 that recent creationists reject physical reality comes to mind. It just appears to me that Ross has tried to be as civil as possible, and the book could have had a much more fierce attitude.

I will also shock some in my recommendation of the book: it is a very good account from Hugh Ross of how he views the controversy. Just as recent creationists are having an influence on the church today, Hugh Ross is having an influence. Many people have heard both and are genuinely unsure, such as James Dobson with his radio interview with Duane Gish and Hugh Ross in 1993. In order for recent creationists to properly respond and hopefully to win the minds and hearts of people, it is necessary to understand his arguments.

Nearly every page has something that someone will disagree with, but let me only mention a few. I was disappointed that Chapter 16, entitled "Making Sense of Genesis 1," was only seven pages long, because its treatment of the creation account lacked many specifics. Nor are his thoughts on the Flood mentioned anywhere. I suspect that this is because he realizes that his views on these doctrines are much more liberal than the vast number of Christians that he is attempting to reach. If he were to proclaim these teachings clearly he would be exposed, and people would begin to see inconsistencies of his beliefs with other important doctrines.

The book makes a very good point about light travel times and the size of the universe. If the speed of light has been constant then how light got to earth within a few thousand years requires explanation. The most common explanation is that God created the universe fully functioning so that light was created in transit, but the light that we receive from other galaxies did not originate in those galaxies. This is often compared to the appearance of age that Adam, plants, animals, and land forms would have had shortly after creation.

A fully functioning creation has a logical consistency, but Ross makes a point that I have been quietly trying to make for some time. Seven years ago we observed a supernova in the Large Magellanic Cloud, a small satellite galaxy of the Milky Way at a distance of about 160,000 light years (incorrectly given in Ross's book at half that distance). The changing spectrum and decreasing light has given us a very good picture of the physical processes that have accompanied the eruption, and a light echo from light reflected off a dust cloud near the supernova has been observed. If all of this light was created in transit, then we are seeing very fine details of things that never occurred. Ross (as have I) compares this to the idea originated by Gosse a century ago to explain the fossils of dinosaurs and other extinct creatures: that God created the remains in situ in the rocks, even though these creatures never existed. No one seriously holds that position today, but is not the creation of light in transit to explain light travel times in terms of a recent creation very similar?

Ross goes for the jugular on this point, accusing recent creationists of believing in a deceitful God, one that creates a universe that appears to be several orders of magnitudes older than it actually is. But Ross is not immune to this sort of charge either. He espouses a sort of progressive creation, over the same time interval that evolutionists claim. He appears to accept the usual palaeontological interpretation of gradual development in the fossil record. Ross strenuously (and quite correctly) rejects evolution on the grounds that its extremely low mathematical probability makes it an impossibility. In short, he hypothesizes a creation that, from the fossil record, is indistinguishable from evolution. Would this not be a deceitful God? I am most perplexed that in a previous book Ross even accepts the gradual (but created) progression of hominid creatures toward *Homo sapiens* upon which most physical anthropologists insist. From this one must conclude that man did not evolve, he only appeared to evolve.

Again, while not endorsing this book, I do highly recommend it. Hugh Ross has definitely fired a shot across our bow with this book, and it behooves us to read it and respond to his criticisms.

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DeYoung, Don B. and David E. Rush. 1989. Is the sun an age indicator? *Creation Research Society Quarterly* 26:49-53.

The Great Ice Sheet and Early Vikings in Mid-America by Orval Friedrich. 1993. Rt. 1, Box 64, Elma, IA 50628. 122 pages. \$6.00.

Reviewed by Clifford L. Lillo*

The statements by Friedrich in this book that may be of most interest to creationists are:

A very strong relationship exists between the early Viking presence and the Great Ice Sheet. . . . Vikings were anchoring their ships . . . high on the landscape in eastern Dakotas, western Minnesota, northern Iowa, . . . between 1000 and 1400 A.D. The body of water involved was the Melt Water Sea. . . . that body of water was the result of the melting of the Great Ice Sheet [from the last ice age] (p. 2-l).

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Evolutionary scientists probably would scoff at the concept that remnants of the glacier that covered parts of the American midwest during the last ice age were still around in 1000 A.D. But, if Friedrich is right, and he seems to have ample physical evidence to support his belief, then creationists should listen to him and give him support, for such evidence throws the evolutionary geologic column into considerable doubt.

Orval Friedrich trained in both science and theology. He worked 12 years as a soil scientist, after which he went to seminary and became an ordained minister. He completed 15 years in the Christian ministry but then felt a call to combine his two interests into one. *The Great Ice Sheet and Early Vikings in Mid-America* is his third book, and certainly his best.

Some evolutionists believe that the glacier at the time of the last ice age covered North America from coast to coast and even extended into the Gulf of Mexico. However, most evolutionists probably would tell you that the ice sheet extended southwest from Pennsylvania to the Ohio River and then westward to the Missouri River. Friedrich shows this area on a map and he says, "The primary glacial deposits are found as shown . . . however, this does not necessarily limit the Great Ice Sheet to these boundaries" (p. 2-3).

Friedrich then shows what he considers to be "the projected extent of the Great Ice Sheet in mid-America . . ." (p. 2-24). The western edge runs from Calgary, through Denver, and south nearly to Houston and San Antonio. The eastern edge follows the Appalachians south to Louisville, and runs just north of Nashville, Memphis, Little Rock, and Dallas-Fort Worth. Obviously, his "Great Ice Sheet" covers a much greater area than most evolutionists are willing to accept. A significance of the size is that the larger the area of ice, the longer it would take for the glacier to melt.

Although he has done extensive research of a literary nature, personal observation of soil features by Friedrich at the assumed periphery of the ice sheet and at salient points throughout the area covered by it form the basis for his belief in the greater size of the ice sheet. He says,

In the Mesa, Arizona area, wide caliche plains are interspersed between relatively narrow mountain ranges. These plains are water deposited and underlain by sand, gravel, and cobble as deep as 100 feet. The evidence of water action is everywhere (pp. 2-4).

Glacial deposition known to have occurred in the Ohio River valley, northern Missouri, eastern Nebraska, northeastern Kansas, southern Minnesota, and all of Iowa is believed to have been the result of the huge ice blocks. . . . Deep in the cut, glacial till is capped with 'gumbotil,' then another layer of glacial till with the 'gumbotil' cap. Until identified as lacustrine or water-laid by an alert geologist, the 'gumbotil' was thought to be highly weathered glacial till. . . . ages of 30,000 and 15,000 years were ascribed to the two till sheets. The lacustrine deposits could have been made overnight between the movement of two huge ice blocks (p. 2-14).

Physical evidence of a Viking presence that has been found on the North American continent includes hal-

berds, battle axes, swords, boat hooks, fire-steels, a sukker saks, hundreds of mooring stones, and runestones. Throughout Scandinavia, holes have been found in rocks at the height of the ocean water level which existed at the time of the Vikings. Having a unique, triangular appearance, the holes have been identified as "mooring holes," for use in anchoring Viking ships. Rocks with similar holes have been found on the North American east coast and in the midwest. Friedrich has included in his book many pictures of such rocks in Minnesota, Iowa, and North Dakota. "Runestones," rocks containing inscriptions using Norse runes, or letters, are also pictured, from Kensington, Fergus Falls, Ortonville and Chokio, Minnesota, and from sites in Iowa and Oklahoma.

Scientists, both creationist and evolutionist, are in agreement that a melt water sea existed at one time in Minnesota and parts of the midwest, with the main disagreement being the time when it was there. Orval Friedrich presents facts showing that mooring holes for anchoring ships are found at different elevations, but almost always at a 45 to 60 degree angle to the previous waterway, indicating that humans were there when the water level was either rising or falling. The inescapable conclusion that must be drawn is that the last ice age did not end 10 to 15 thousand years ago. The water from the glacial sea was still draining just 1,000 years ago.

Starlight and Time: Solving The Puzzle of Distant Starlight in A Young Universe by D. Russell Humphreys. 1994. Master Books. 133 pages. \$5.95

Reviewed by Emmett L. Williams*

Using concepts from the general theory of relativity, the author has derived a young-earth cosmology. Assuming that the universe has a boundary, observing that it has expanded, and then deducing that it once was in a white hole [" . . . a black hole running in reverse" (p. 24)], a unique scientific hypothesis is developed.

Dr. Humphreys employs an "event horizon" from the general theory to explain why light from stars millions of light-years in distance from the earth reached our planet on the fourth day of creation. Thus the oft-asked question of why do we see starlight that *should* require millions of years to reach the earth is effectively answered scientifically. A young universe and "old" starlight are compatible within the author's postulated framework.

The young-universe cosmology and its scientific advantages are outlined in simple terms early in the book. Defects in the big bang theory also are noted. The author's idea of what happened during the creation week as related to his hypothesis is presented. He discusses previous creationist explanations for a young earth and compares their shortcomings to his hypothesis.

Humphreys delivered two papers at the 1994 International Conference on Creationism on his model for the origin of the universe. These are included in the book. Paper 1 (Appendix B) offers a biblical basis for the cosmology. Paper 2 (Appendix C) is a technical discussion of the "young-earth relativistic cosmology."

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Thus a scientist familiar with general relativity as well as a novice can profit from reading the book.

As in so many of his papers in the Quarterly (Humphreys, 1983; 1984), the author believes that the initial created matter of the universe was water and his method-of-creation scheme employs this concept. Whether one agrees with the proposed cosmology or not, it certainly makes for fascinating reading. Also I am sure that Dr. Humphreys would welcome both positive and negative criticism of his model.

Creationists continue to develop scientific hypotheses to defend their world view. This book is a result of such efforts. The author, a member of the Board of Directors of the Society, is to be congratulated for suggesting a cosmological model within a young-earth framework.

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Lonely Hearts of The Cosmos by Dennis Overbye. 1992. Harper Perennial. New York. 438 pages. \$13.00 paperback.

Reviewed by Don B. DeYoung*

This unusual book title refers to the often-solitary nature of cosmologists. Their nights are spent alone in remote observatories; days are spent reducing data or debating theories with peers. Author Overbye also writes for *Time* magazine and *Sky and Telescope*. For this book project he spent years visiting scientists, observatories, and professional meetings. The story of astronomy over the past fifty years is told in dramatic detail.

A key player in the book is astronomer Allan Sandage. A student of Edwin Hubble, Sandage has carried on the Hubble legacy of discovery. In recent years Sandage has become somewhat of a loner in promoting a Hubble constant H_0 of 50, which implies a universe that is 15-20 billion years old. Sandage is far outnumbered by the new generation of cosmologists who accept an H_0 of 100, and a universe only half as old. The tentativeness of such basic ideas is clearly shown by Overbye: "It's a great story, the modern version of the history of the universe, and maybe it's even true" (p. 3).

Astronomer Allan Sandage is described as having converted to Christianity around 1980 at age 54. His testimony is that he does not believe life is a "dreary accident" (p. 393). In recent years, Sandage has become enamored with the progressive creation views of Hugh Ross.

The book provides a personal look at most of the key cosmologists of our time, from Stephen Hawking to the late Marc Aaronson, killed in a freak accident in 1987 while observing at Kitt Peak. The astronomers' intellect, passion for astronomy, and occasional arrogance are all explained in detail. This is a worthwhile book for creationists to read, pausing to insert biblical cosmology between the lines.

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The Hidden History of the Human Race by Michael Cremo and Richard Thompson. 1994. Govardhan Hill Publishing, P.O. Box 52-211, Badger, CA 93603. 352 pages. \$22.95.

Reviewed by Peter Line*

This book is must reading for anyone interested in human origins. I was surprised to come across the book in a major U.S. book chain store, given that its contents strongly contradict the standard view of human origins. Although the authors do not explicitly state how they believe the human race came into being, they make it clear that their theoretical outlook is derived from the Vedic literature in India, which supports the idea that the human race is of great antiquity.

Phillip E. Johnson writes a favorable foreword to the book, which is a condensed version of a much larger unabridged volume, but makes it plain that he does not share the authors' religion or motivation, as neither do I. The authors present evidence for the existing of man in the Pliocene, Miocene, and even earlier periods, if one assumes that the evolutionary time scale and dating methods are valid. A lot of the evidence is based on stone tools, but there is also anomalous human skeletal remains mentioned as well.

The authors have made accessible to others valuable information that is not readily available due to the existence in the scientific community of "a knowledge filter that screens out unwelcome evidence" (p. xvii). Particularly informative is the authors' discussion involving "morphological dating," where the morphology of a fossil often determines the date assigned to it. Also informative are the examples showing the ease at which contradictory evidence is dismissed or discredited by members of the scientific establishment, whereas evidence in support of the orthodox evolutionary view is accepted all too readily.

This book presents ample evidence, most of which is open to dispute no more than "orthodox" evidence for evolution is, that humans have always existed alongside their supposedly ape-men ancestors. I found the most controversial part of the book the chapter on living ape-men, which incorporates many "wildmen" stories, some of the stories being too far-fetched.

As a recent earth creationist, I would not accept the evolutionary time scale that the authors appear to accept. However, the authors have shown that even if you accept the evolutionary view of a vast age for the earth, the theory of human evolution cannot be supported.

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Errata

In *CRSQ* Volume 28(4), Harald Heinze's name was misspelled and the degree was incorrectly applied to his name. Mr. Heinze has an extensive education in physics and other subjects, but he does not have a Ph.D. We apologize for the error.

CRSQ Vol. 31, March 1995, p. 204, Dr. Jerry Bergman's article was received 31 December 1993 and in revised form 7 March 1994.

POLAR DINOSAURS AND THE GENESIS FLOOD

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Abstract

Many dinosaur fossils have recently been discovered at polar latitudes. Warm-climate vegetation is also found at these latitudes. However, general circulation climate models consistently show that mid and high latitude continental areas would be very cold in winter during the Cretaceous and early Tertiary. This contradictory information is difficult for the uniformitarian scientist to explain. The creationist model offers at least three possible solutions to this mystery. One solution is especially emphasized because it also provides a possible solution to two creationist problems: 1) billions of dinosaur tracks found around the world and 2) dinosaur nests with newly hatched baby dinosaurs. Both of these events occurred on top of thousands of meters of Flood sediment. It is proposed that a strip of land, roughly paralleling the continental divide of North America, was temporarily exposed during the first 150 days of the Flood.

Introduction

Climatic mysteries of the past are mounting up for the evolutionary/uniformitarian paradigm. Abundant evidence has come to light supporting a warm Cretaceous and early Tertiary fossil flora and fauna at mid and high latitudes or paleolatitudes (McKenna, 1980; Jefferson, 1982; Creber and Chaloner, 1985; Taylor, 1990; Francis, 1991; Felix, 1993).

Recent discoveries of dinosaur nests, eggs, and even newly hatched baby dinosaurs suggest new hypotheses on dinosaur behavior to uniformitarian scientists. This new data is difficult to explain within the Flood paradigm because these discoveries are within sediments most creationists would accept as Flood deposits.

The Paluxy River is not the only area where dinosaur tracks occur in profusion. During the past 15 years, dinosaur tracks have come to light in many parts of the world. They likely number in the billions (Gillette and Lockley, 1989; Lockley, 1991). In western North America, the tracks have been discovered within and east of the Rocky Mountains. They are especially numerous in Colorado and Utah.

More dinosaur graveyards have been recently discovered in Montana and Wyoming. A few of these dinosaur graveyards contain thousands of fossilized dinosaurs packed into a small layer. These occurrences suggest catastrophic burial.

In this article, I will describe the uniformitarian problem of dinosaurs that presumably lived within the Arctic circle. In the process of suggesting how polar dinosaurs fit within a Genesis Flood paradigm, I will also offer a creationist explanation for dinosaur nests, tracks, and graveyards.

Geographic Distribution of Polar Dinosaurs

Up until 1980, evidence for polar dinosaurs came from only one location. This location was the dinosaur footprints from Spitsbergen (Colbert, 1964). Now, dinosaur fossils and footprints are found at many polar locations, or from presumed polar locations based on the inferred paleolatitude (Monastersky, 1988). For instance, dinosaur fossils have been unearthed on the Colville River of the North Slope of Alaska (Brouwers et al., 1987; Parrish et al., 1987; Rich and Rich, 1991, p. 35; Clemens and Nelms, 1993). They have also been

discovered in northern Canada: from the Yukon Territory, the western part of the Northwest Territories, and possibly the Queen Elizabeth Islands of northeast Canada (Davies, 1987, p. 199; Weishampel, 1991). An ankylosaurus fossil has been dug out of central Siberia (Weishampel, 1991, p. 104, 105). Dinosaur bones have been unearthed on New Zealand (Weishampel, 1991, p. 139), which allegedly was located near the South Pole at the time (Figure 1). Dinosaur fossils have been discovered at two locations on Antarctica: 1) an ankylosaurus and a hypsilophodontid from James Ross Island and nearby Vega Island, respectively, of the Antarctic Peninsula (Crame, 1989; Benton, 1991); and 2) at least four types of dinosaurs, including a unique *Tyrannosaurus rex*-like dinosaur, in the Transantarctic Mountains, 650 kilometers from the South Pole (Hammer and Hickerson, 1994).

Of special interest is the recent analysis of a diverse megafauna and megaflore that contains many types of dinosaurs in southern Victoria, Australia (Douglas and Williams, 1982; Rich et al., 1988, 1989; Rich and Rich, 1991, 1993). The current latitude is about 38°S but, according to the plate tectonics paradigm, southern Victoria was located at about 75°S during the early Cretaceous (Figure 1). The fossil dinosaurs, which make up 5,000 individual bones and two partial skeletons, include allosaurus, ankylosaurus, and hypsilophodonts. Pterosaurs and plesiosaurs are also represented. Because the environment was assumed to be terrestrial, based on abundant fossil flora and the dinosaurs themselves, the plesiosaurs are said to have lived in "lakes" The allosaurus was long thought extinct by this time.

Many other vertebrates and invertebrates, as well as plants, were discovered with the dinosaur fossils of southern Victoria. Vertebrate fauna include birds, turtles, amphibians, a lizard, and many types of fish, including the lungfish. Remains of labyrinthodont amphibians, supposedly ancestral to modern amphibians and reptiles, were also found. They were thought extinct by 160 million years ago, but the sediments are dated at 115 million years old, based on the other fossils. More than 80 species of invertebrates have been identified. There are ostracodes, spiders, bryozoans, bivalves, and twelve orders of insects, including mosquitoes. Very diverse megaflore is associated with the megafauna. Ferns with large fronds, tree ferns, ginkgo, many types of conifers, and angiosperms were associated with the diverse fauna. The tree ferns imply

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at least a subtropical climate. Tree rings from the conifers are up to seven millimeters wide, very wide for the assumed paleolatitude (Douglas and Williams, 1982, p. 178). In fact, the flora and fauna of southern Victoria, if they died where they lived, are more consistent with the current latitude than with the inferred paleolatitude.

Since it would have been dark and cold for up to four months at the presumed paleolatitude of southern Victoria, some evolutionists have suggested that the dinosaurs migrated to lower latitudes before winter. Other cold-sensitive animals, such as turtles, lungfish, amphibians, and lizards may have hibernated. However, many of the principle investigators do not believe migration was likely (Brouwers et al., 1987; Rich et al., 1988). First, the vegetation indicated at least a mild climate. Second, migration would have been difficult for the small hypsilophodont dinosaurs. Third, many of the other vertebrates could not have migrated. Fourth, the fact that more than half the dinosaur fossils are juveniles suggests "... that these dinosaurs were not just casual visitors but lived near the pole for much of the year, using the area as a nursery during the period of maximum sunlight" (Rich and Rich, 1993, p. 53). Brouwers et al. (1987) also suggest that young hadrosaur fossils found on the North Slope of Alaska indicate year-round residency.

The premise that dinosaurs once lived through the dark winters at polar locations has reinforced the idea of endothermy (warm bloodedness) in dinosaurs. Some of these investigators also question both the asteroid and the volcanic hypothesis for the end-Cretaceous extinction of the dinosaurs and many other animals (Brouwers et al., 1987; Rich et al., 1988; Clemens and Nelms, 1993). These hypotheses claim that dust from either an asteroid impact or widespread volcanism caused an "asteroid or volcanic winter." These scientists suggest that if the dinosaurs were already acclimated to the cold and dark, they should have survived an asteroid or volcanic winter.

Climate Simulations Produce Cold Mid and High Latitude Winters

The climate at mid and high latitudes during the Mesozoic and early Tertiary, based on the flora and fauna, has been variously interpreted from cool temperate to tropical. Moreover, the climate was mostly equable—lacking seasonal or diurnal extremes. The tree rings also indicate that the precipitation was sufficient for rapid tree growth. Regardless of specific interpretations, the flora and fauna indicate that the polar areas were much warmer than at present. Douglas and Williams (1982, p. 172) state that polar warmth is a major unsolved mystery for conventional Paleobotany and palaeoclimatology:

Frakes (1979) considered that the former existence of high-paleolatitude Mesozoic and early Cenozoic floras apparently unadapted to enforced winter dormancy during prolonged periods of darkness presents palaeobotany and palaeoclimatology with a major unresolved problem.

Plate tectonics does not solve the climate problem because the latitude of the polar areas has changed little since the Mesozoic. In the Northern Hemisphere, many continental areas were even farther north in the

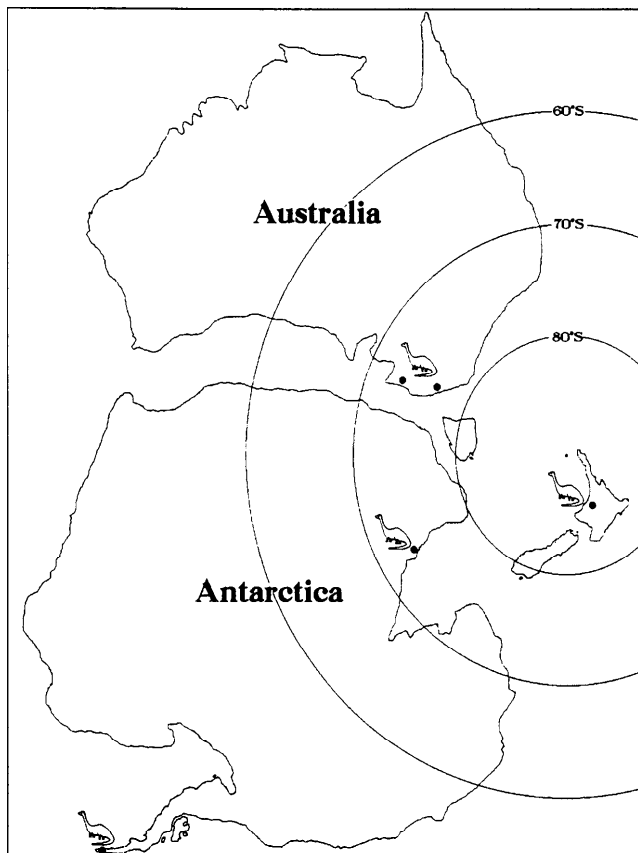


Figure 1. The presumed grouping of southern continents around the South Pole in the early Cretaceous of geological time. Picture of the dinosaur marks the locations where dinosaur fossils have been discovered (After Rich and Rich, 1991. and drawn by David Oard).

Cretaceous than they are today. For instance, the current latitude of the Colville River on the North Slope is 70°N while in the late Cretaceous it was supposed to have been at 85°N (Clemens and Nelms, 1993). In the Southern Hemisphere, there presumably was even more land at high latitudes than today. New Zealand and southern Australia are believed to have been within the Antarctic Circle during the Cretaceous Period (Figure 1).

Evolutionists are scratching their heads trying to explain the mysterious occurrence of dinosaurs in a mild polar climate with months of winter darkness. Because of the presumed polar habitat of the animals and the results of climate models (discussed below), uniformitarian scientists are attempting to reinterpret the presumed Cretaceous paleoclimatic evidence as cool as the various data will allow. In southern Victoria, Rich et al. (1988, 1989) claim that oxygen isotope ratios on calcite within the sediments suggest that mean annual temperatures were less than 8°C and perhaps as low as -5°C. This is very cold, and the fossil flora and fauna do not justify such an interpretation. The floral evidence indicates a climate with no widespread freezing temperatures, even though darkness would have lasted several months at that paleolatitude. Some of the fossil vegetation, such as the tree ferns, grows today only in subtropical climates. Especially mysterious are the fossil fragments of lungfish. Lungfish today have a very restricted tropical environment, and

they cannot reproduce in water less than 10°C (Rich and Rich, 1993, p. 52).

The accuracy of oxygen isotope ratios for determining the precise paleotemperature can be questioned. The oxygen isotope paleothermometer is based on many assumptions, and there are other variables that affect the oxygen isotope ratio (Oard, 1984). For instance, Adams, Lee, and Rosen (1990) found abundant fossil evidence for warm sea surface temperatures of 20 to 28°C in the tropics during the Tertiary Period. However, oxygen isotope ratios gave values indicating a temperature of only 18°C. They suggest the oxygen isotope values must be wrong.

To explain the abundant evidence of a mild to warm polar climate, Douglas and Williams (1982) are bold enough to suggest a non-uniformitarian solution to the problem—an axial tilt of the earth less than 15° in the past. However, evolutionists as well as some creationists do not realize that a reduced axial tilt with all other variables remaining constant, causes a colder climate at higher latitudes than today, not a warmer climate.

Eric Barron (1984) modeled a lower axial tilt using both the present ocean temperatures and the presumed warmer ocean temperatures and inferred geography of the Cretaceous and early Tertiary. Although climate simulations have many simplifying assumptions, they often produce a rough indication of climate. Barron found that even in the warmer simulation of the Cretaceous and early Tertiary, temperatures over continental areas at mid and high latitudes would have been much colder than today. An ice age would have developed. This makes sense because higher latitudes would receive less solar radiation during the year with reduced tilt than today. It is the long days of summer that keep the higher latitudes today from accumulating snow and ice over the year.

Climate simulations using the current axial tilt of 23.5° with presumed Cretaceous and/or early Tertiary geography suggest that high latitudes would have been very cold in winter, especially within continental interiors (Sloan and Barron, 1990, 1992). In fact, just changing from present-day to Cretaceous geography resulted in a mean global cooling of about 0.2°C (Walker, 1993)! In an Eocene climate simulation, Sloan and Barron (1992) produced large seasonal temperature extremes in continental interiors of middle and high latitude. Average winter temperatures over much of mid and high latitude North America were colder than -10°C. Sloan and Barron (1990, p. 489) conclude:

Eocene and Cretaceous climate-model experiments demonstrate that regardless of conditions of warm polar oceans, differences in pole-to-equator surface-temperature gradient, or topography, above freezing temperatures in winter for continental interiors at middle to high latitudes cannot be maintained.

As a result of recent climate simulations, geologists and paleoclimatologists are searching for some mechanism to warm the climate during the Cretaceous and early Tertiary. They are contemplating, as one possible solution, an order of magnitude higher concentration of CO₂ for a super greenhouse boost (Walker, 1993). However, Sloan and Barron (1990, 1992) doubt increased CO₂ will have much effect on the climate.

In their simulations of Cretaceous climate, a much higher atmospheric content is already implicitly incorporated in the form of warmer high latitude sea surface temperatures. Unfortunately, increased CO₂ likely would heat the tropics too much (Barron and Washington, 1985; Wing, 1994, p. 2).

So, uniformitarian scientists have a serious problem within their paradigm. The fauna and flora indicate a mild to warm, equable climate in the Cretaceous and early Tertiary at mid and high latitudes. On the other hand, climate simulations for that time indicate cold winters with large seasonal extremes for mid and high latitude continents. This paradox suggests that the uniformitarian paradigm of earth history is seriously inadequate. Michael Benton (1991, p. 28) sums up the conundrum when he asks: "Should we now imagine dinosaurs as thermally insulated warm blooded animals that ploughed through snowdrifts and scraped the ice off the ground to find food?"

Creationist Hypotheses

Can creationists explain the existence of dinosaur fossils at high latitudes of both hemispheres? Since most creationists believe the dinosaur fossils were a result of the Genesis Flood, can that great event explain the paradox of polar dinosaurs? Since any explanation of prehistoric events cannot be scientifically documented, I will suggest three hypotheses based on the pertinent evidence.

The first hypothesis is that dinosaurs simply lived at high latitudes before the Flood and were buried near where they lived. If the fossil flora from high latitude also grew in place, the pre-Flood polar latitudes were much warmer than today.

A uniformly warm earth possibly may be due to a water vapor canopy that some creationists believe was emplaced above the atmosphere on the second day of creation (Genesis 1:7). However, it has been difficult to model the vapor canopy to produce a pleasant pre-Flood climate with enough water for 40 days and 40 nights of rain at the beginning of the Genesis Flood (Rush and Vardiman 1992). (This assumes that moderate to heavy rain for 40 days fell over all or a large part of the earth.) There is also a heat problem as a canopy with abundant precipitable water (or even ice) condenses in the Flood (Kofahl, 1977; Morton, 1986, p. 34-45). A more sophisticated general circulation model of the atmosphere with clouds in the vapor canopy may make the vapor canopy more plausible from a scientific point of view.

Much of the fossil wood found at mid and high latitudes have tree rings, suggesting seasons at these latitudes before the Flood (Jefferson, 1982; Creber and Chaloner, 1985; Wise, 1992; Taylor, Taylor, and Cuneo, 1992). However, the seasonal temperature changes may have been modest, or there may have just been a seasonal change in water supply and not temperature. Or the rings could be due to some other variable, since tree rings can sometimes form in zones of uniform climate. The fossil trees found at mid and high latitudes often lack frost rings, which implies that winter temperatures rarely dropped below freezing. Thus, the dinosaurs could have lived at high latitudes under these conditions. If they were endo-

thermic or some combination between endothermic and ectothermic (cold blooded), they of course could have tolerated more cold than if they were entirely ectothermic.

Winter darkness, itself, probably would pose few problems. Evidence that at least some animals were not bothered by long dark winters is indicated by the hundreds of thousands of woolly mammoths, plus many other animals, that thrived at the high latitudes of Siberia and Alaska during the Ice Age. They apparently were unaffected by prolonged darkness. Even today, deer and elk in Montana sleep during the day and come out to feed at night. They are conditioned to roam around and feed in the dark with no apparent problem.

A second hypothesis that may account for polar dinosaurs in a Flood model is that dinosaur carcasses simply floated to higher latitudes and were buried. This could explain the existence of fossil dinosaurs on isolated land masses surrounded by large expanses of ocean, such as New Zealand and Antarctica. However, we know that some dinosaurs were alive at high latitudes during the Flood, as indicated by fossil footprints in sedimentary rocks from Spitsbergen and the North Slope of Alaska (Colbert, 1964, Parrish et al., 1987).

In this second hypothesis, warm-climate trees and plants could also have floated to higher latitudes from lower latitudes. In this case, the polar latitudes need not have had a mild or warm, equable climate before the Flood, since the dinosaurs and trees did not originally inhabit those latitudes. The often excellent preservation of leaves, cones, and fruits at high latitudes, would seem to argue against a floating hypothesis. However, the excellent preservation could be due to many of the trees floating upright while being carried to polar latitudes. With time, the leaves, cones, and fruits would fall off and become entombed in the sediments. They would be much fresher than if they were transported in water for many days before being deposited.

The high latitude dinosaur footprints suggest a third hypothesis, which has other supporting data. This hypothesis suggests that some dinosaurs were either swept alive to higher latitudes by powerful Flood currents or walked to high latitudes from mid latitudes on exposed sediments during the Flood. In either situation, newly exposed sediments must have existed at least at high latitudes during the Flood.

Exposed Land During the Genesis Flood

The dinosaur footprints at high latitudes are in sediments most creationists believe were laid down in the Genesis Flood. This suggests that Flood sediments became temporarily exposed during the Flood. The third hypothesis suggested in the previous section will be developed, incorporating other, more recent observation of dinosaur tracks, eggs, and newly hatched babies from mid latitudes of western North America as additional support.

Some dinosaurs probably could swim or float well (Coombs, 1980), and could probably have survived in the warm Flood waters for a period of time. Possible evidence that dinosaurs floated for awhile during the

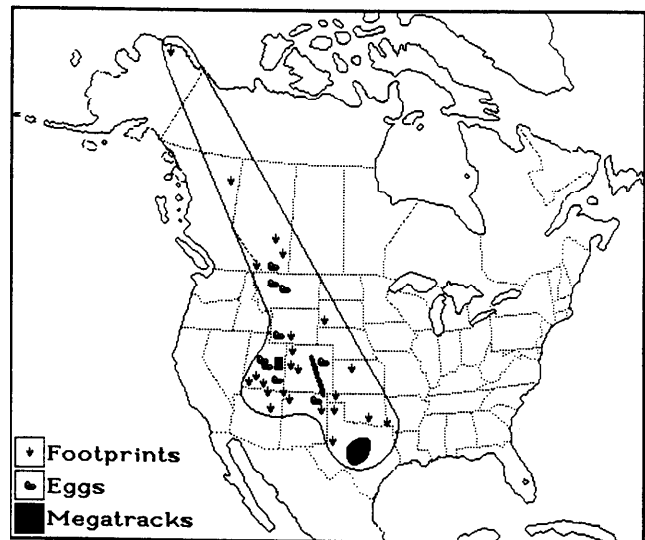


Figure 2. Location of the postulated strip of land generally parallel to the crest of the Rocky Mountains. Three megatrack sites are indicated in central Texas, east central Utah, and eastern Colorado.

Flood is the predominance of adult and older juvenile dinosaurs and their footprints in the rocks (Horner, 1979, p. 296; Coombs, 1991, p. 39). You would expect babies and young juvenile dinosaurs to succumb to the initial onslaught of the Flood.

Any land animal floating at sea would be desperately looking for land. The third hypothesis suggests that live dinosaurs embarked on exposed Flood sediments at high latitudes and made footprints. Exposed Flood sediments imply either that the land rose tectonically or else the sea level in a region dropped during the Flood. The exposure of land in either case would be aided if the area first collected a thick layer of sediment.

The continuity equation in fluid dynamics states that for an incompressible fluid the mass that flows into a closed volume must be balanced by the mass that flows out of the system. However, the earth is not a closed system because the volume can change due to a mineral phase change or a change in porosity. These possible changes in volume could either increase or decrease the volume of a rock and sediment unit during the Flood. Regardless, these effects should be small compared to rapid tectonic motions. Therefore, areas of the earth that sink tectonically or isostatically must generally be balanced by uplifted areas.

Western North America contains a thick sequence of sedimentary rocks interspersed with igneous intrusions. It is possible that when this thick sequence of sediments was deposited the additional weight pushed the crust downward. The depressed crust was then balanced by uplift on its eastern edge, so that a linear strip of land became exposed. I surmise that this band stretched from Arizona, New Mexico, and Texas northward through Montana and Alberta and into the Yukon Territory and northern Alaska (Figure 2). This strip of land could have already received a thick blanket of sediment before it arose. It, therefore, would not have to rise as far. The strip need not be continuously exposed but a series of islands or shoals. There also could have been vertical oscillations of this strip so

that sedimentation continued on portions of it. There likely were gigantic tsunami waves that occasionally swept over portions of this strip.

Alternatively, sea level could have dropped in regions during the Flood. Evidence for this possibility has recently been provided by the work of Baumgardner and Barnette (1994). Numerical simulation of the shallow water equations on a spherical, rotating earth that was completely flooded resulted in powerful currents and areas of lower sea level. Starting at rest, the currents and lower sea level developed rapidly over shallow continents. The shallow land masses had to be at least 2,500 kilometers in diameter and less than 1,500 meters deep. Cyclonic gyres, similar to large-scale atmospheric low pressure systems, commonly formed with water speeds of 40 to 80 meters/sec. In the center of these gyres, sea level dropped on the order of 500 to 1,000 meters and persisted for many days. This scenario could also expose newly-deposited Flood sediments. The powerful currents would rapidly sweep dinosaurs to high latitudes.

Regardless of how the exposed strip of land formed, thousands of floating dinosaurs would likely embark onto it. Dinosaurs could have directly landed on this strip at high latitudes, or else they could have landed at mid latitudes and walked to high latitudes. (It is also possible that many dinosaurs fled to higher ground at the beginning of the Flood and, as their refuges became inundated, fled to this newly arisen strip of land.)

Once on this strip of land, they would have run to and fro trying to escape the encroaching Flood waters, forming many footprints. Millions of dinosaur footprints have recently been discovered on this strip of land (Gillette and Lockley, 1989; Lockley, 1991), which lends support to the subaerial exposure of sediments during the Flood.

On this hypothetical strip of land extensive trackways, sometimes oriented in a single direction, are found in central Texas, eastern Utah, northeastern New Mexico, and Colorado. These megatrack sites have been nicknamed dinosaur freeways. Sometimes the tracks are imprinted on more than one bedding plane in an area. Tracks are also found in Oklahoma, Kansas, northern Arizona, Wyoming, western South Dakota, southern and central Alberta, and southeast and northeast British Columbia (Currie, 1989; Weishampel, 1991). As already mentioned, tracks are found in northern Alaska. These track and megatrackways are illustrated on Figure 2. Abundant dinosaur bones are also found on this strip of land.

Deep fossiliferous Flood sediments underlie the tracks. In other words, the dinosaurs were walking on thousands of meters of freshly deposited Flood sediment. John Morris (1980, p. 179-185) recognized that the dinosaurs in the Paluxy River area of Texas walked on nearly 3,000 meters of Flood sediment. The phenomenon of dinosaurs walking on newly arisen fossiliferous sediments would have been repeated in other parts of the world where dinosaur tracks are found.

The fact that many track and megatrack sites show prints of the same type of dinosaur suggests that these tracks were not made under ordinary circumstances. Very few tracks of dinosaurs sharply turning right or left have been found (Lockley, 1991, p. 66, 69). Practically all trackways are straight or close to it, and

many tracksites show a preferred direction of travel. Could these dinosaur footprints have been made, not in normal foraging for food in their environment, but from trying to escape the Flood on briefly-exposed land? There is also a lack of baby and juvenile tracks (Lockley, 1991, p. 32), which may indicate the preferential escape of grown dinosaurs during the initial onslaught of the Flood. Tracks from stegosaurs, ankylosaurs, and ceratopsians are missing (Lockley, 1991, p. 57). These dinosaurs were probably poor swimmers because of the position of thick plates or bones on their bodies.

It is interesting that many of the dinosaur tracks found in Utah and Colorado are from ancient "desert" sands, according to the standard geological paradigm. In reference to one set of tracks, Lockley (1991, p. 153) states:

The tracks occur at the top of the Middle Jurassic Entrada Formation. The main body of this formation represents an ancient sand sea of the type associated with the Sahara desert today.

Furthermore, the tracks in this particular area are all from the three-toed theropods. So, dinosaurs, including meat eaters, are now said to have lived or traveled in the desert!

It seems to me that investigators should instead question whether the cross-bedded sandstones from the Colorado Plateau were really from ancient deserts. A few uniformitarian scientists have questioned whether these large cross-bedded sandstones were ancient deserts (see Lockley, Loope, and Brand, 1992, p. 666). There is recent evidence that these sandstones were laid down in water (Brand and Tang, 1991; Lockley, Loope, and Brand, 1992). Dinosaur tracks on extensive cross-bedded sandstones fit the model of powerful Flood currents adjacent to lowered sea level (Baumgardner and Barnette, 1994). Slight changes in the configuration of the circular ocean gyres could lay down repeating cross-bedded sandstones, which are intermingled with fine-grained sediments, and expose them for the dinosaurs to walk over. This would account for the dinosaur footprints found at different stratigraphic levels in a region.

The presence of abundant dinosaur footprints in "deserts" brings up the uniformitarian question of how the tracks could be preserved in shifting sand, or in any environment for that matter. Lockley (1991, p. 132) mentions the debates these new discoveries have provoked:

Debates over sediment saturation levels have also figured prominently in discussion of how tracks are preserved in desert dune environments. Because dry sand is loose, several researchers claim that it is hard to form crisp tracks unless the substrate has been moistened by rain or dew. Some authors have even claimed the tracks in sand dunes must have been made underwater.

Besides tracks, further evidence for a strip of land parallel to the Front Range of the Rockies is provided by dinosaur nests, eggs, embryonic dinosaurs, and even newly hatched babies that are increasingly being discovered. These sites are shown in Figure 2. They have been found in New Mexico, Utah, Colorado, Wyoming,



Figure 3. Picture of the top of “Egg Mountain,” 100 kilometers northwest of Great Falls, Montana, where the first North American dinosaur nests and eggs were found. The mound is composed of three meters of green mudstone where multiple nests of *Orodromeus makelai* have been unearthed in five horizons. The people on top of the mound are looking at a newly discovered clutch burrowed in “caliche” two meters from where a meat eating *Troodon* nest was previously excavated.

Montana, and southern Alberta (Hirsch, 1989; Weishampel, 1991; Hoppe, 1992).

The best location for finding eggs and babies is 60 miles northwest of Great Falls, Montana. Figure 3 is a picture of “Egg Mountain” where dinosaur nests, eggs, embryos, and babies have been discovered. The mound seen at the top of Egg Mountain in Figure 3 contained multiple egg clutches, but few nests, of *Orodromeus makelai*, a small hypsilophodontid dinosaur. These clutches were spread out in five horizons within the three meter thick layer of green mudstone. Figure 4 is a picture of the bottom half of a reconstructed egg clutch from Egg Mountain. The eggs were laid in a spiral pattern with the pointed end down. This seems to be a common pattern in *Orodromeus makelai* egg clutches. In the Egg Mountain vicinity, 25 clutches of *Orodromeus makelai* containing around 400 eggs have been discovered. A little to the north, 45 nests or clutches of *Maiasaura peeblesorum*, a large hadrosaur or duck-billed dinosaur, have been exposed. More egg clutches are being found each year.

As thousands of dinosaurs landed on this newly arisen strip of land, many females were undoubtedly pregnant. They would anxiously lay their eggs, either in a makeshift nest or in the mud. The fact that many dinosaur eggs are unusually thin and pathological (Hirsch, 1989) possibly indicates the dinosaurs laid their eggs under unusual and stressful conditions. Another indication of unusual conditions for laying eggs is the discovery of a meat eating *Troodon* egg clutch found 2 meters away in the same layer on Egg Mountain from a clutch of plant-eating *Orodromeus makelai* eggs.

A single egg unearthed at Cleveland-Lloyd Dinosaur Quarry in east-central Utah adds even more evidence for stressful egg-laying conditions (Hirsch et al., 1989). This egg was found among a dinosaur graveyard of 12,000 disarticulated bones. The unusual feature of this egg is that it had a double shell, a sign that the egg was not yet laid and the mother held the egg an unusually long time.

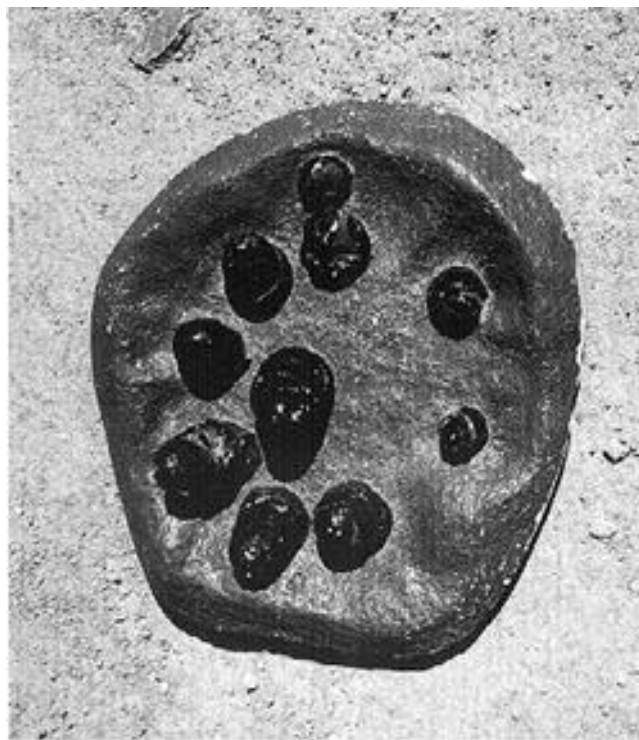


Figure 4. The underside of a reconstructed *Orodromeus makelai* egg clutch found at Egg Mountain. Notice that the eggs were laid in a spiral pattern with the pointed end of the egg downward.

Roy Holt (1994) has noticed that dinosaur eggs from Montana were laid with their pointed end down. This is the normal position in water or in water-saturated sediment. The developing babies or their mother should have knocked the eggs over long before they hatched. Could this be an indication of the lack of dry habitat for laying eggs and for the rapid burial of most of these eggs soon after being laid?

Many fossilized dinosaur nests and clutches just contain broken shells. A few contain unhatched eggs, sometimes with embryos inside (Homer and Weishampel, 1988). One nest in Montana has eggs in the process of hatching, just before the nest was covered by sediment. A few eggs did hatch before burial. Baby duck-billed dinosaurs up to a meter long have been found in or scattered around one nest. Babies only a few days old, associated with nests and eggs, have just recently been discovered near Canon City, Colorado.

Was there enough time during the Flood for dinosaur eggs to hatch and the babies to grow a little? It is not clear from Genesis whether every air breathing animal died in 40 days or 150 days. Because of dinosaur tracks on thousands of meters of Flood sediments and baby dinosaurs hatched from eggs, I favor 150 days before all air breathing animals on land died. Harold Coffin (1983, p. 27) writes that the Genesis account does not exclude such a possibility.

Although Genesis 7:17-24 seems like a chronological sequence in which all animals died after 40 days, a closer look at Genesis 7 shows that it is not strictly chronological. For instance, in verse 12, it states the rain fell 40 days and 40 nights. Then in verse 13, it says: “On that very day Noah and his sons, Shem, Ham, and Japheth, together with his wife and the wives of his

three sons, entered the ark." Verse 21, which states that every living thing that moved on the earth perished, could really be a summary verse for verse 24: "The waters flooded the earth for a hundred and fifty days."

Before the strip of land became exposed, thousands of meters of sediment could have been deposited in a short time, possibly as short as a few weeks or a month. Hundreds of thousands of dinosaurs embarking on this strip of land could form millions of footprints in a short time, especially if they spent much of their time escaping locally rising water. It should not take much time for the pregnant dinosaurs to lay eggs. The dinosaur eggs would need time to hatch and the babies time to grow. This need not take a large amount of time either, contrary to what some believe (Morton, 1982, p. 108). It also need not indicate a long period of post-Flood catastrophism (Mehlert, 1986, p. 107).

Dinosaur-fossil expert Jack Horner believes the baby duck-billed dinosaurs could have grown from half a meter long at birth to one meter long in just one month (Linder, 1989). He bases his belief on the unique bone structure of the dinosaurs. The bones have a characteristic texture with many Haversian canals for the rapid flow of blood (Horner and Gorman, 1988; Monastersky, 1994). They also have no growth rings, which are usually indicative of ectotherms (Horner and Gorman, 1988). These features indicate rapid growth of bone. The bones are unlike anything alive today, but are the most similar to extant warm-blooded animals. Scientists are still debating the warm blooded versus cold blooded theories of dinosaurs (Monastersky, 1994; Morell, 1994). So, at least small parts of the postulated strip of land must have been exposed for several months during the early stages of the Flood.

After the dinosaurs made many tracks and laid eggs, the final catastrophe swept over the land, burying the remaining dinosaurs, the nests, and the babies in more Flood sediments. Rising water levels would be due either to the strip of land tectonically sinking, or the cyclonic gyres in the shallow ocean shifting or decaying (Baumgardner and Barnette, 1994). As a result, powerful currents would have swept over the land.

That powerful currents buried the dinosaurs is likely from the many dinosaur graveyards found on this strip of land. One of the most impressive dinosaur graveyards is found just northeast of the Egg Mountain area (Varricchio and Horner, 1993). This graveyard is a thin layer of mudstone, about two kilometers east-west, 1/2 kilometer north-south, and one meter thick that is conservatively estimated to contain 10,000 duck-billed dinosaurs (Horner and Gorman, 1988). What is especially interesting is that all the dinosaurs are older juveniles and adults, while around the nests there are no adults fossilized. The bones in the above dinosaur graveyard are disarticulated with the same pattern of breakage and wear. Fractures are at a 90° angle and not at a 45° angle, like in a green-stick fracture. The bones have not been chewed by predators and are oriented east-west. An east or northeasterly paleocurrent direction predominates in the sediments just east of the Rocky Mountains in Montana.

Horner is puzzled by the meaning of this dinosaur graveyard. He suggests a gigantic flood: "This was no ordinary spring flood from one of the streams in the

area, but a catastrophic inundation" (Horner and Gorman, 1988, p. 131). Rocks found within the bone bed attest to the powerful currents or slurries that buried these dinosaurs. However, before final burial, investigators suggest the dinosaurs first died by volcanic ash suffocation and were partially fossilized before the final flood. The evidence for partial fossilization comes from the fracture pattern of the bones and the presence of altered volcanic ash in the mudstone, which is not unusual for sediments east of the Rocky Mountains.

Seven other dinosaur graveyards of lesser extent between Great Falls and the Canadian border also contain dinosaurs predominantly of the same species and age (Rogers, 1990; Varricchio and Horner, 1993). In these graveyards, the bones vary from disarticulated to partially articulated. Many of these bonebeds are problematic to uniformitarian scientists because a local catastrophe should bury animals of many different ages (Rogers, 1990). Another dinosaur graveyard containing an estimated 10,000 duck-billed dinosaurs was just recently discovered near Newcastle, Wyoming. No details have been published as far as I know.

Why would one type of dinosaur be found in a graveyard? Could this be a clue that the catastrophe that buried them was very unusual? It is a common tendency for animals under stress to herd. Elk in Montana herd during Arctic cold spells. When the weather warms up, they tend to separate. If this is a general tendency with animals, you would expect animals of the same kind to herd during the gigantic catastrophe of the Genesis Flood.

As the final burial of the exposed strip of land became imminent, the dinosaurs would try to run away. They would abandon their nests and babies. This would account for the strange observation of nesting sites with only baby dinosaur fossils while the dinosaur graveyards are composed of adults and older juveniles. It would not be indicative of a special mothering strategy in dinosaurs as evolutionists theorize (Horner and Gorman, 1988; Coombs, 1991).

Also of interest is the fact that fossils of young hadrosaur juveniles, between a month and about one year old, are completely missing from the Egg Mountain area. Varricchio and Horner (1993, p. 1003) report: "To date, no isolated or assemblages of predominantly small animals have been found for *M. peeblesorum*." This seems to be a pattern elsewhere. The absence of young juveniles in the dinosaur graveyards not associated with nests is consistent with the idea that the very young animals perished in the initial Flood onslaught.

So, a strip of exposed land generally paralleling the continental divide from New Mexico into Alaska seems like a good solution for dinosaur distribution in western North America during the Flood. This could allow dinosaurs to either embark on this strip at high latitudes or else walk from middle latitudes up into higher latitudes. Since this strip could have been exposed for several months, a variety of dinosaur activity would have occurred. This strip of land would explain millions of dinosaur foot prints, including the footprints in northern Alaska, and the dinosaur nests and eggs being discovered every year on this strip of land. There is also evidence that meat eating dinosaurs were hunting or scavenging other dinosaurs. Three dinosaur grave-

yards in Montana that contain the bones of plant-eating dinosaurs also contain abundant dinosaur teeth from meat-eating dinosaurs (Rogers, 1990, p. 403). This dinosaur activity could have occurred during the first 150 days of the Genesis Flood.

Summary and Discussion

Dinosaur fossils have recently been recovered from polar and presumed polar locations from both the Northern and Southern Hemispheres. Footprints are known from two high latitude sites: Spitsbergen and the North Slope of Alaska. Along with the dinosaurs, floral and other faunal remains indicate a much warmer climate than today at mid and high latitudes. Much of the focus of attention lately has been on dinosaurs and other remains from southern Victoria, Australia, which was presumed to be at high paleolatitude during the early Cretaceous.

Climate simulations are becoming more sophisticated. These models consistently indicate that very cold winter temperatures would have occurred on mid and high latitude continents, even with presumed Cretaceous geography and warm polar ocean temperatures. The contradiction between the abundant fossil evidence for warmth and the climate simulations shows that there is something seriously wrong with the uniformitarian paradigm.

Three hypotheses were presented to account for polar dinosaurs within the context of the Genesis Flood. One hypothesis is that dinosaurs simply lived at high latitudes in a warmer pre-Flood climate. When the Flood came, they were buried near where they lived. A second hypothesis suggests that dinosaur carcasses floated to high latitudes on powerful Flood currents before they were buried. The footprints in northern Alaska and Spitsbergen, however, suggest a third possibility: that live dinosaurs either floated to exposed land at high latitude or else walked from mid to high latitudes on an exposed strip of land during the Flood. It is possible all three hypotheses could be correct.

Based on the location of millions of dinosaur footprints and nests containing dinosaur eggs, this strip of land was estimated to have been exposed parallel to the crest of the Rocky Mountains, from New Mexico northward through Montana and Alberta to northern Alaska (Figure 2). Thousands of meters of Flood sediment had already accumulated in this area, and sedimentation likely continued on parts of the strip.

There are a number of unusual features associated with the dinosaur footprints and eggs that suggest escape from Flood waters on this strip of land. The tracks are usually of the same type of dinosaur, some trackways point in the same direction, and there are very few cases of turning dinosaurs. Many dinosaur eggs are very thin and pathological, indicating possible stressful or unusual conditions. Some baby dinosaurs grew from about half a meter long to one meter long. This could have occurred in as little as a month. Then the final inundation covered nests and dinosaurs. Many of the dinosaurs were herded into the same species. That is why many of these dinosaurs ended in dinosaur graveyards of mostly the same species and age.

There likely is enough time within the first 150 days of the Flood for the activity of dinosaurs on this strip

of land. A long period of time or a period of post-Flood catastrophism is not required.

The timing of the above events would occur in the inundatory stage of the Flood according to a new Biblical geological model developed by Tasman Walker of Australia (1994). Footprints are one of Walker's criteria for the inundatory stage, the end of which occurred when the whole earth was completely covered and all air-breathing animals died. Walker was concerned whether the inundatory stage was the first 60 days or the first 150 days. The results of this research indicate the time for the inundatory stage was 150 days. I believe creationists will find his Biblical geological model useful for future geological research.

The results of this research also have implications for the interpretation of other geological features. For instance, if land was exposed for any length of time during the Flood, it is then possible to have subaerial mudcracks, raindrop impressions, subaerial volcanic ash, and other delicate subaerial features preserved in Flood sediments.

Another implication is that Jurassic and Cretaceous strata that contain dinosaur footprints and nests are not from the late stages of the Flood, which would be the recessive stage in Walker's (1994) classification. These strata would be deposits from the first 150 days or the inundatory stage. This means that the Flood does not follow the exact sequence of the geological column, as some creationists seem to believe, because the late Mesozoic is usually placed at the end of the Flood, or even after.

This raises the question of how, if at all, the "geological column" fits into a Flood depositional model. The geological column has been pieced together from many parts of the world by index fossils, based on the theory of evolution (Berry, 1968). If creationists believe that the geological column is an exact Flood depositional sequence, we would have to believe that each index fossil was deposited *worldwide at the same time* during the Flood year. We would have to believe that a particular type of trilobite, for instance, was deposited during week three, while a particular type of brachiopod was laid down during week seven. Why could not the trilobite be deposited in week seven in one part of the world and the brachiopod in week three in another part of the world during the Flood? Or why could not the trilobite be deposited in week three in one part of the earth and during week 20 in another part? The exact order of index fossils seems like an unnecessary constraint to a Flood model.

It still may be that the geological column represent a *general* order of Flood deposition, due to such mechanisms as ecological zonation, hydrological sorting, the differential ability of organisms to escape the encroaching Flood waters, tectonically associated biological provinces (Woodmorappe, 1983), etc. How the "geological column" relates to the Flood needs to be rigorously demonstrated.

For a Flood model, it seems more logical to think in terms of Flood stages for particular localities or regions. Walker's (1994) Biblical geological model is a logical step in that direction. If most of the sedimentary rocks are laid down by a global flood, then the strata from a region should match a Flood sequence in a more

straightforward manner. (We probably would need to be aware of the geological periods for purposes of communication with uniformitarian scientists.)

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PANORAMA NOTES

Reprinted CRSQ Volume 20

Introduction

The *Creation Research Society Quarterly* has been published since 1964 (31 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 1-19 and have appeared in the previous 19 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. This particular volume was the last one that Harold Armstrong served as editor in a term that lasted 10 years. Harold was a talented Board Member and a dedicated creationist. See Howe (1985, p. 57).

Biological Sciences

Comparative Anatomy

The pentadactyl plan (the arrangement of limbs with five digits) in vertebrate animals was examined by Brown (1983a, pp. 3-7). The author concluded that this anatomical arrangement is best viewed from the perspective of design rather than descent from a common ancestor. Several other inferior possible limb systems were illustrated and discussed as a means of showing the advantages of the pentadactyl plan. Davidheiser (1983, p. 15) briefly outlined the problems involved assuming the evolutionary postulate of similarity proves relationship when viewing the aortic arch of mammals.

Creation Model

In a detailed book review of *Darwinism Defended: A Guide to the Evolution Controversies* by Michael Ruse the reviewer (Bluth, 1983a, pp. 16-22) debunked the positions taken by the evolutionist. The topics presented in the review were population genetics, random mutations, natural selection, variation, breeding experiments, genetic potential, paleontology, gradualism vs. punctuated equilibria, ammonite evolution, *Archaeopteryx*, Cambrian explosion of life, second law of thermodynamics and biology, horse evolution, Galapagos finches and radiometric dating. Bluth noted that Ruse was not familiar with the creationist literature, a common problem of anticreationists. Smith (1983, pp. 28-30) tested his general principle of creation comparing the DNA content of organisms with their taxonomic classification. He suggested that there appears to be a trend that higher organisms contain an increased information content genetically which supports his general principle.

In a linkological study of the common frog [*Rana temporaria*] (Duffett, 1984, pp. 199-211), the author

stated that the evidence indicates that the creatures were designed and have not evolved. Fossils of supposed ancient adult frogs resemble modern adult frogs. It was concluded that adult frogs were created first, not spawn or tadpoles.

Predation, Animals and Diet

Two articles dealt with possible animal kingdom vegetarianism either before the Fall or the Flood (Lambert, 1983, p. 88; Brown, 1983b, pp. 186-188). Lambert suggested that the harshness of the post-Flood ecosystem was responsible for a change in diet. Brown elaborated on the adaptability of animals when faced with dietary changes. Several examples were offered.

Mimicry

Lammerts (1983a, pp. 42-44) discussed mimicry using specific examples. He challenged creationists to develop concepts to "explain" the phenomena as he offered several possibilities himself. Several areas for creationist research were suggested.

Bristlecone Pines

Since bristlecone pine growth rings have been employed to develop chronologies extending into the past several thousand years, many creationists have speculated on the possibility of multiple growth rings per year. World famous plant breeder and founder of the Creation Research Society, Walter Lammerts, performed experiments of this nature. His results were reported in the Quarterly (Lammerts, 1983b, pp. 108-115). Multiple growth rings were obtained in some seedlings of bristlecone pines under certain conditions of growth and stress. The author related his findings to possible post-Flood environmental conditions. This is an excellent article illustrating how creationist research can offer plausible solutions within a young earth model.

Archaeology

von Fange (1984, pp. 219-226) wrote on the archaeology of words and the alphabet. There may be a connection between the alphabet and the calendar and that the arrangement of letters may have resulted from astronomical observations. It was thought that the study of words indicates the level of sophistication of ancient societies and later deterioration of their culture. No evidence of the evolutionary development of languages was found.

The Study of Man and "Ape Men"

David Kaufmann (1983, pp. 24-28) employed the first and second laws of thermodynamics in relation to human growth and development. He countered the claims of evolutionists concerning supposed increasing

complexity in humans as a result of natural processes. McLeod (1983, pp. 75-79) wrote about the human brain and why it is so large and complex. His study included a comparison of man's brain to that of some animals and to the alleged evolutionary ancestors of man. In a similar vein, Duffett (1983, pp. 96-104) explored the varying cranial capacities of Australopithecine skull specimens. He claimed that the cranial size of Australopithecines is within the range of great apes and do not deserve the title, "Near-men."

Geology and Paleontology

Convection currents within the earth's mantle were offered as a possible mechanism for continental drift (Bluth, 1983b, pp. 131-132, 193). In an extensive article, Woodmorappe (1983, pp. 133-185) first discussed the stratigraphic separation of fossils. He stated that "479 juxtapositional determinations have shown that only small percentages of index fossils are juxtaposed with each other" (p. 133). Secondly, he examined several Flood mechanisms as related to the position of fossils in the stratigraphic record. He developed the concept of tectonically-associated biological provinces to explain stratigraphic differentiation of fossils.

Morton (1984a, pp. 212-219) speculated that there is too much carbon in the form of coal, oil and gas to maintain a belief in a young earth. Later Woodmorappe (1986, pp. 205-218) effectively countered Morton's claims and showed that the antediluvian biosphere had the capacity to supply the entire fossil record. In a note, Morton (1984b, pp. 229-230) suggested that oil and gas in the earth's crust is not as old as is claimed by uniformitarian scientists. Tinkle (1983, pp. 94-95) exposed the circularity of the arguments or evolution from the fossil record.

Mathematics and Statistics

A statistical analysis was conducted on the life span of the Genesis patriarchs (Seaver, 1983, pp. 80-87). One conclusion of the study was that, "... it is statistically unlikely that there are gaps in the genealogies in Genesis chapter 11" (p. 80). Herrmann (1984, pp. 226-229) discussed the use of applied mathematical logic to illustrate the rationality of Divine creation and the continuing sustaining of the created universe.

Physics and Meteorology

Dillow (1983, pp. 7-14), continuing his work on the vapor canopy model for the antediluvian earth, examined the vertical temperatures distribution within the canopy. Also he discussed convective stability, oceanic heat transport, cloud formation and nighttime visibility in his treatise. An exchange on a possible changing speed of light was conducted by Morton, Slusher, Bartman and Barnes (1983, pp. 63-65), Akridge (1983, pp. 65-66) and Setterfield (1983, pp. 66-68). The creation of the earth's magnetic field was explored by Russell Humphreys (1983, pp. 89-94). The author claimed to have found evidence for the following concepts in his study:

The exponential decay of the earth's magnetic field

A young earth

An all-water original earth

The scientific reliability of Scripture

DeYoung (1983, p. 188) briefly presented data against reversals of the earth's magnetic field. He noted several natural events that caused magnetic anomalies.

Morton, Slusher and Mandock (1983, pp. 105-108) wrote an article on the age of meteor craters. A portion of the abstract is quoted:

The currently accepted uniformitarian views on the origin and age of lunar features are contradicted by the facts of the rheology of materials. In view of the nature of the material at the surface of the moon, the craters... could not be older than a few thousand to a few million years.

Philosophy

"The presence of the world, sun and stars is not self-explanatory" proclaimed McGhee (1983, p. 23) as he examined nature from a teleological standpoint. The implications of Goedel's theorem, the second law of thermodynamics and language were carefully investigated by Ancil (1983, pp. 30-39). Based on this study, the author concluded that human reasoning is limited and "... can be validated only by reference to a higher Reason" (p. 30). Thus scientific endeavor is subject to limitations also. Likewise this human limitation causes all self-explanatory systems offered by atheistic evolutionists to be irrational. Bergman (1983, pp. 39-41) explained what science is and what it is not. Also the limitations of science were delineated. Feist (1983, pp. 116-120) delved into the meaning of Bible-science and its propositions. Many other topics were explored in the notes, book reviews and letters to the editor in this volume of the Quarterly.

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INDEX TO VOLUME 31 OF THE CREATION RESEARCH SOCIETY QUARTERLY

GEORGE F. HOWE*

- A**
- Anatomical Evidence for Creation: Design in The Human Body, 35
 Armitage, Mark
 Those Who Live in Glass Houses Stow No Thrones, 167
- B**
- Bergman, Jerry
 A Review of Exobiogenesis Theories, 204
 The Creation Account-The Evidence from What Is Not There, 174
 The Human Mind and Language, 91
 The Professor Dean Kenyon Case, 186
 The Wisdom of Saving Wisdom Teeth, 74
 Boulders/Bangs Canyon-a Valley of . . . , 99
- C**
- Carlsbad "Signs Off," 34
 Chaffin, Eugene F.
 Pine Creek Gorge, The Grand Canyon of Pennsylvania: An Introductory Creationist Study, 44
 Virginia Triassic Basins, Dinosaur Footprints, and Catastrophism, 125
 Cooke, R.
 A Simple Expression for Atmospheric CO₂ Pressure as A Function of Sea pH, 234
 CO₂ Pressure as A Function of Sea pH/A Simple Expression for Atmospheric . . . , 234
 Cowart, Jack H.
 The Use of Trace Fossils in Refining Depositional Environments and Their Application to The Creationist Model, 117
 CRSQ Volume 16/Reprinted . . . , 22
 CRSQ Volume 17/Reprinted . . . , 89
 CRSQ Volume 18/Reprinted . . . , 193
 CRSQ Volume 19/Reprinted . . . , 234
 Crater/Age of The Arizona Meteor . . . , 153
 Creation Account-The Evidence from What Is Not There/The . . . , 174
- D**
- DeYoung, Don B.
 Age of The Arizona Meteor Crater, 153
 Dedication to Wayne Frair, 7
 Darwin on The English Victorian Writer, Thomas Henry Huxley/The Effect of Charles . . . , 42
- E**
- Dinosaur Footprints, and Catastrophism/Virginia Triassic Basins . . . , 125
- F**
- Exobiogenesis Theories/A Review of . . . , 204
- G**
- Floods and Rapid Canyon Formation/The 1993 Midwest . . . , 109
 Fossil Wood of Big Bend National Park, Brewster County, Texas: Part IV-Wood Structure, Nodules, Paleosols, and Climate, 225
 Fossils in Refining Depositional Environments and Their Application to The Creationist Model/The Use of Trace . . . , 117
 Frair/Dedication to Wayne . . . , 7
 Froede, Carl R., Jr.
 A Post-Flood (Early Ice Age?) Paleo-environment in Mississippi, 182
 Karst Development in The Clayton Formation, Fort Gaines, Georgia, 189
 Rock Mills or Something Else? (Boquillas Canyon, Big Bend National Park, Texas), 236
 Sequence Stratigraphy and Creation Geology, 138
 Stone Mountain, Georgia: a Creation Geologist's Perspective, 214
 The Use of Trace Fossils in Refining Depositional Environments Their Application to The Creationist Model, 117
- H**
- Genetics: Enemy of Evolution, insert between 226 and 227
 Glass Houses Stow No Thrones/Those Who Live in . . . , 167
 Goette, Robert M.
 Pine Creek Gorge, The Grand Canyon of Pennsylvania: an Introductory Creationist Study, 44
- I**
- Haymond Interbeds, Marathon Basin, Texas/The Evolution of Geological Origins Theories: Part I-The 25
 Hermann, Robert
 Incompleteness, Creation-Science and Man Made Machines, 148
 Holroyd, Edmond W., III
 Bangs Canyon-A Valley of Boulders, 99

*George F. Howe, Ph.D., is Associate Editor of the CRSQ. Thanks are expressed to Phyllis Hughes for help in preparing this index.

Howe, George F.

Fossil Wood of Big Bend National Park, Brewster County, Texas: Part IV—Wood Structure, Nodules, Paleosols, and Climate, 225

Index to Volume 30 of The Creation Research Society Quarterly, 31

The Evolution of Geological Origins Theories: Part I — The Haymond Interbeds, Marathon Basin, Texas, 25

I

Ice during The Ice Age/Much Thinner Laurentide . . . , 181

Incompleteness, Creation-Science and Man Made Machines, 148

Index to Volume 30/Keyword . . . , 171

Index to Volume 30 of The Creation Research Society Quarterly, 31

K

Karst Development in The Clayton Formation, Fort Gaines, Georgia 189

Kaufmann, David A.

Anatomical Evidence for Creation: Design in The Human Body, 35

Minutes of 1994 Creation Research Society Board of Directors Meeting, 170

Physiological Evidence for Creation, 239

Kenyon Case/The Professor Dean . . . , 186

L

Lester, Lane P.

Genetics: Enemy of Evolution, insert between 226 and 227

The History of Life, 95

Your Voice Was Heard, 98

Life/The History of . . . , 95

Long, Jay E.

The Effect of Charles Darwin on The English Victorian Writer, Thomas Henry Huxley, 42

Lumsden, Richard D.

Not So Blind A Watchmaker, 13

M

Matzko, George T.

Fossil Wood of Big Bend National Park, Brewster County, Texas: Part IV—Wood Structure, Nodules, Paleosols, and Climate, 225

Meyer, John R.

Pine-Creek Gorge, The Grand Canyon of Pennsylvania: An Introductory Creationist Study, 44

Resources for Research and Publication—Lab Director's Report, 223

The Role of Research in The Creationist Movement—Lab Director's Report, 159

Van Andel Research Center Director's Column, 92

Mills or Something Else? (Boquillas Canyon, Big Bend National Park, Texas)/Rock. . . , 236

Mind and Language/The Human . . . , 91

Minutes of 1994 Creation Research Society Board of Directors Meeting 170

O

Oard, Michael J.

Much Thinner Laurentide Ice during The Ice Age, 181

P

Paleoenvironment in Mississippi/A Post-Flood (Early Ice Age?) . . . , 182

Physiological Evidence for Creation, 239

Pine Creek Gorge, The Grand Canyon of Pennsylvania: An Introductory Creationist Study, 44

R

Research and Publication—Lab Director's Report/Resources for . . . , 233

Research in The Creationist Movement—Lab Director's Report/The Role of . . . , 159

S

Sediments/Rapid Deposition of Thin Laminae . . . , 91

Stark, William G.

Fossil Wood of Big Bend National Park, Brewster County, Texas: Part IV—Wood Structure, Nodules, Paleosols, and Climate, 225

Stone Mountain, Georgia: A Creation Geologist's Perspective, 214

Stratigraphy and Creation Geology/Sequence . . . , 138

T

Teeth/The Wisdom of Saving Wisdom . . . , 74

U

Universe/Polytropic Model of The . . . , 78

V

Van Andel Research Center Director's Column, 92

Voice Was Heard/Your . . . , 98

W

Watchmaker/Not So Blind A . . . , 13

West, J. K.

Polytropic Model of The Universe, 78

White, Richard R.

Fossil Wood of Big Bend National Park, Brewster County, Texas: Part IV—Wood Structure, Nodules, Paleosols, and Climate, 225

Williams, Emmett L.

Fossil Wood of Big Bend National Park, Brewster County, Texas: Part IV—Wood Structure, Nodules, Paleosols, and Climate, 225

Pine Creek Gorge, The Grand Canyon of Pennsylvania: An Introductory Creationist Study, 44

Rapid Deposition of Thin Laminae Sediments, 91

Reprinted CRSQ Volume 16, 22

Reprinted CRSQ Volume 17, 89

Reprinted CRSQ Volume 18, 193

Reprinted CRSQ Volume 19, 234

The Evolution of Geological Origins Theories: Part I — The Haymond Interbeds, Marathon Basin, Texas, 25

Wolfrom, Glen W.

Carlsbad "Signs Off," 34

Keyword Index to Volume 30, 171

The 1993 Midwest Floods and Rapid Canyon Formation, 109

Reviews of Books, Etc.

Big Bang and Stephen Hawking/God, The. . . , by Don B. DeYoung, 43

Bones of Contention: Controversies in The Search for Human Origins, by Jerry Bergman, 93

Catastrophe Reference Database, by Emmett L. Williams and Glen Wolfrom, 247
 Creation and Time, by Don B. DeYoung, 248
 Creation Hypothesis/The . . . , by Don B. DeYoung, 252
 Creator and The Cosmos/The . . . , by Don B. DeYoung, 164
 Creator/Remember Thy . . . , by Don B. DeYoung, 34
 Darwinism, by Don B. DeYoung, 93
 Demonstrations Illustrating Scriptural Truths/Science and The Bible: 30 . . . , by Emmett L. Williams, 164
 Earth/A New Look at an Old. . . , by Don B. DeYoung, 94
 Earth, Columbus and Modern Historians/Inventing The Flat . . . , by Don B. DeYoung, 77
 Earth/Hydritic . . . , by David J. Tyler, 251
 Earth without Worshiping Nature/How to Rescue The by Kevin Colling, 247
 Evolution versus Message Theory/The Biotic Message: by Paul Bartz, 165
 Evolution versus Message Theory/The Biotic Message: by Wayne Frair, 161
 Faith: a Science Documentary/Science and Biblical by Emmett L. Williams, 62
 Faraday: Sandemanian and Scientist/Michael . . . , by Danny R. Faulkner, 253
 Flood/An Evening at Oxford: Evidence for Noah's by Carl R. Froede, Jr., 166
 Grand Canyon: Monument to Catastrophe, by Emmett L. Williams, 160
 Neo-Darwinian Evolutionary Theory/The Scientific Alternative to . . . , by Lloyd To, 250
 Noah's Ark/The Discovery of. . . , by Don B. DeYoung, 88
 Origins/The Myth of Natural . . . , by George F. Howe, 166
 Pandas and People: The Central Question of Biological Origins/Of . . . , by Wayne Frair, 59
 Prophecies of Daniel, and The Apocalypse of St. John/Observations upon the . . . , by Eugene F. Chaffin, 252
 Races/The Origin of The . . . , by Robert L. Powell, 254
 Technopoly: The Surrender of Culture to Technology, by Jerry Bergman, 249

Letters to The Editor

Aguja and Javelina Formations—Lithostratigraphic Disagreements, by Emmett L. Williams, 8
 Auldane/Reply to . . . , by Marvin L. Lubenow, 10
 Chronology/Response to Dr. Wood on . . . , by Gerald E. Aardsma, 137
 CompuServe Debates, by Lucky W. Leavell, Jr., 74
 Creation Research Index/Announcing The . . . , by R. D. Holt, 137
 "Creation Science?"/What is . . . , by Bolton Davidheiser, 8
 CRS Run? or What Does The Board of Directors Really Do?/What Makes. . . , by David A. Kaufmann, 73
 Creationism/Ham Radio . . . , by Howard Dunlap, 135
 Dinosaurs and Birds/The Hip Bones of . . . , by Bolton Davidheiser, 8
 Dinosaur Extinction/Asteroid Hypothesis for . . . , by Jeremy Auldane, 11
 Dinosaur Extinction/Response to Comments on The Asteroid Hypothesis for . . . , by Michael J. Oard, 12
 Ecosystems Evolve? and King of Creation BBS/Can . . . , by Erick J. Blievernicht, 72
 Eve Hypothesis Again/The African . . . , by Todd C. Wood, 203
 "Eve Theory" Comments, by Jeremy Auldane, 10
 Human Fossils, by Marvin L. Lubenow, 70
 Iridium in The Geologic Column, by Carl Froede, Jr., 136
 Luther on Truth versus Evolutionism, by Carl Hoffmeyer, 135
 Mudcracks"/Comments on "Underwater . . . , by Michael J. Oard, 71
 Natural Selection/Failure of . . . , by Jeffrey West, 9
 (Photosynthesis) Put Together by Light, by Allan deGruyter, 201
 Petrification of Wood/Solubility of Silicate Minerals and The . . . , by Emmett L. Williams, 9
 Space/Expansion of . . . , by Jeffrey M. Groah, 10
 Vacations/Creation . . . , by Dave and Mary Jo Nutting, 202
 Woman/The Creation of . . . , by Roger L. Byler, 201

BOOK REVIEWS

Creation Scientists Answer Their Critics by Duane T. Gish. 1993. Institute for Creation Research. El Cajon, CA 451 pages. \$16.95.

Reviewed by Emmett L. Williams*

Many creation scientists, particularly Duane Gish and Henry Morris, have been subject to vicious attacks from hard-core evolutionists. Often these attacks are *ad hominem* in nature and center on such untrue comments as creationists quote evolutionists out of context or misquote evolutionists. These tar brush implications are that creationists are basically dishonest, incompetent scientists or just plain liars. Although some evolutionists try to answer creationist arguments, many of them resort to name-calling and avoid scientific issues whenever possible. Dr. Gish examines several of these

anticreationist efforts and provides effective answers to their charges.

A brief history of the modern creationist challenge to the dogma of evolution is given. The reaction of evolutionists to the work of scientific creationists is noted. Gish (p. 19) claims:

Evolutionists have reacted vigorously, even viciously, to these threats to their monopolistic control of science and education. They apparently are determined to use whatever means they feel are necessary to blunt and eventually to destroy the efforts of creation scientists to make known the empty rhetoric that makes up evolutionary stories and the nature of the scientific evidence that supports creation. . . .

Creation scientists are accused of promoting religion, not science. Gish examines this claim and concludes

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that both evolutionary and creationist conjectures on origins should be excluded from the empirical sciences. He notes that evolutionism is as equally religious as creationism. The proponents of evolution may claim that their pronouncements are science, but such is not the case as documented by the author in chapter three. In turn, they often ignore the scientific arguments used by creation scientists.

The scientific integrity of many evolutionists who actively oppose creation science is discussed in chapter four. Gish (p. 107) concludes:

It is unfair, unethical, and demeaning to science as a profession for evolutionists to incessantly charge creation scientists with quoting out of context, misquoting, distorting science, and telling outright falsehoods. These tactics are simply an admission of weakness on the part of evolutionists and their inability to refute scientific challenges to their sagging theory. If the facts are on their side, they should simply state the facts, and the facts would speak for themselves.

Since the fossil record occupies an important place in the creation/evolution debate, Gish devotes a chapter to the subject and points out that it offers compelling evidence in favor of the creation model. Punctuated equilibria, supposed transitional forms, the extent of the fossil record, and the Cambrian "explosion of life" are some of the topics discussed. The author notes that "The gap between single-celled, microscopic organisms and the complex invertebrates is both immense and unchallengeable" (p. 126). Then he states that this gap "... establishes that evolution has not occurred" (p. 127). He examines the claims of evolutionists about transitional forms and destroys their arguments.

The first and second laws of thermodynamics have been employed by creation scientists to show the bankruptcy of molecules-to-man evolution. The counter-arguments by evolutionists have been absurd in the extreme. The open-closed system smoke screen, crystallization of solids from liquids, growth of living organisms, use of ram pumps (!), "self-organization," pre-existing intelligence and complexity and other so-called objections are debunked by Gish. Evolutionists avoid the conclusion that order and complexity could not have developed naturally (spontaneously) from disorder in a real universe as predicted by the second law. Gish succinctly comments:

It is strange that evolutionists believe that random, blind chance natural processes have managed to create this universe and man, with his incredible brain, in spite of the Second Law, but man, an open system with a steady flow-through of energy, equipped with the most complex machinery in the universe, cannot devise a way to circumvent the Second Law —and live forever!

A chapter entitled "Kitcher Abuses Science" answers the unrealistic arguments of Philip Kitcher, a philosopher and author of *Abusing Science-The Case Against Creationism*. This religious devotee of evolution developed "problem-solving" strategies ("Just So" stories and historical narratives) to defend evolutionary postulations. Gish carefully counters Kitcher's contentions, empty rhetoric and special pleading. The book, *The Monkey Business: A Scientist Looks at Creationism*, by

Niles Eldredge is reviewed. Gish examines Eldredge's claims about predictivity and origins, the fossil record, taxonomy, mechanism of evolution, thermodynamics and design. The evolutionist arguments are refuted and creationist scientific explanations for the various points are presented.

In an extensive chapter entitled "Science Confronts Evolutionists," Gish painstakingly examines many anti-creationist claims from the book *Scientists Confront Creationism* and demolishes them. Many of the discussions entail empirical science vs. origins speculations, probability and the origin of life, chemical evolution, information theory, L-amino acids and their importance in living systems, molecular biology, fossil record, punctuated equilibrium, genetics, taxonomy, spontaneous generation and anthropology. Chapter 10 contains many quotes revealing the religious nature of evolutionary reasoning and the scientific weaknesses of the theory. Two appendices delve further into thermodynamics and its use in the origins debate illustrating the techniques of an anticreationist to discredit creationist scholarship.

This book is a must for those who wish to know the answers to anticreationist attacks on creation science. Duane Gish has written an excellent, well-referenced treatise to serve this purpose.

Creation: Facts of Life by Gary Parker. 1994. Master Books. Colorado Springs, CO. 215 pages. \$9.95. Paperback.

Reviewed by Wayne Frair*

After an intensive struggle, biology professor, Dr. Gary Parker, experienced a dramatic shift in his "faith." He religiously believed in evolution as a "total world and life view" (p. 7), but at the end of a three-year challenging intellectual and spiritual battle he realized that, "In short, *evolution is a faith that the facts have failed. Biblical Christianity is a faith that fits the facts*" (p. 210).

Author Parker, writes authoritatively as one who has had and is having a career in science, (especially biology with cognate in geology) and education. His book which was designed to stimulate thinking is speckled with humor and personal experiences. The writing will be appreciated especially by those who have a love and/or respect for science.

The first chapter, "Evidence for Creation," covers DNA and protein, homology, embryology, and ecology. The second chapter, "Darwin and Biologic Change," deals with design, natural selection, mutations, species and "kinds" The third and last chapter on "The Fossil Evidence" treats plants, animals, humans, and catastrophism. Special attention is given to the Grand Canyon and how it could have been formed as a result of the worldwide Flood in Noah's time. There are three start-of-chapter drawings plus 35 figures with drawings or photographs. Following each chapter are End Notes with references (total of 114). The book has a standard Table of Contents but no index.

Throughout the text the reader experiences the contrast between time, chance, and evolution (chemistry, natural selection, etc.) with plan, purpose, and creation (design, beauty, etc.). Analogies are utilized; for

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example an airplane which consists of non-flying parts is compared to the living cell which is composed of non-living chemicals. Creation is viewed as standing between “the classic extremes of mechanism and vitalism” (p. 32). Because the author himself has stood on both sides regarding issues being discussed he does not come across as narrow minded or bigoted against those who disagree with him. He asks the reader to “think about it” and decide regarding what is most logical among the primarily scientific but also Biblical inferences.

Charles Darwin is presented as a usually cautious and painstaking scientist, but he did not give the world “natural selection” as commonly is believed. Parker points out that Edward Blyth, a creationist, “published the concept of natural selection in the Biblical context of corrupted creation” (p. 75) 24 years before Darwin’s *Origin*. Do creationists believe in natural selection? Yes, says Parker, but it has produced only variation within a kind.

It seems to me that natural selection works only because each kind was created with sufficient variety to multiply and fill the earth in all its ecologic and geographic variety. Without realizing it at the time, Darwin actually discovered important evidence pointing both to God’s *creation* (the variation) and to the *corruption* of creation (struggle and death) (p. 86).

... I think the scientific evidence is quite clear: Evolution demands an increase in the quantity and quality of genetic information, and mutation-selection, *no matter how long you wait*, cannot provide it. But, *both mutation and selection are very real, observable processes going on around us every day. Evolution, no, but mutation-selection, yes!*

They don’t produce evolutionary changes, but mutation and selection do indeed produce changes. Mutations are no real help in explaining the origin of *species*, but they are great for explaining the origin of disease, disease organisms, and birth defects. Natural selection is no real help in explaining the *origin* of really new species, but it’s great for explaining *how* and *where* different specialized sub-types of the various created kinds “multiplied and filled the earth” after death corrupted the creation and, again, after the Flood (pp. 122-123).

... natural selection does *not* explain the *origin* of species or traits, but only their preservation (p. 84).

Parker opines that, “perhaps the biggest problem for evolutionists is the marvelous fit of organisms to their environment” (p. 78).

The major problem is using Darwinian fitness to explain traits with many interdependent parts when none of the separate parts has *any* survival value. There’s certainly no survival value in a small fish

swimming into a large fish’s mouth [now as in cleaning symbiosis] on the hope that the big fish has somehow evolved the desire to let it back out! (p. 79).

Creationists believe that God created perfect complex structures; these, even as Gould has recognized, have “always been one of the strongest evidences for creation” (p. 81).

... evolutionists from Darwin to Lewontin and Gould admit that “perfection of structure” has always been “the chief evidence of a Supreme Designer” (pp. 81, 83).

Creation contains technical material but follows a popular vein. As the writing progresses Parker develops his relatively recent universe model which is creation, corruption, catastrophe and Christ. In Figure 32 (p. 182) he compares the “geologic model” with his own interpretation of fossil groups which is termed *ecological zonation*. He says that “the horizontal rock layers at Grand Canyon were formed rapidly, *not* by a lot of time, but by a *lot of water instead!*” (p. 202).

The overall quality of the writing is represented well by the following paragraph.

Sometimes it’s kind of fun to be a creationist. The “rear-guard” neo-Darwinian evolutionists like to point out the apparent absurdity of hopeful-monster evolution and claim that *evolution could not happen fast*. The punctuational evolutionists point to genetic limits and the fossil evidence to show that *evolution did not happen slowly*. The creationist simply agrees with both sides: Evolution couldn’t happen fast, and it didn’t happen slowly—because evolution can’t and didn’t happen at all! In terms of the kind of variation that *can* and *did* occur, the creation concept seems to be the far more logical inference from our observations (p. 155).

I detected a few matters which should receive attention in the next printing/edition. On p. 28 it is stated that there are 50 proteins in ribosomes. This is a low number. At present at least 55 have been discovered in procaryotes and 82 in eucaryotes. Then there is a word missing at the end of p. 51. There is a mixup of references 26-30 in Chapter 2. On p. 161 the lemur should not be listed as an ape. In the ninth line from the bottom of p. 207 evolutionist should be plural. Many references are older; of the 113 there are 73 during the years 1976-1982, 18 for 1983-1989, and 17 in 1990’s. On p. 162 reference to Oxnard’s California position I believe is no longer correct. Castenedolo is misspelled on p. 166.

The book should be of interest and value to a wide spectrum of readers—to those who are evolutionists, or those who have doubts about the reasonableness of creation and the “kinds” concept from a scientific perspective. The writing flows well, and readily should be understandable even by those without strong scientific backgrounds.

Quote

Psalm 76:4

You are resplendent with light, more majestic than mountains rich with game.

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