

CRSQ

CREATION RESEARCH SOCIETY QUARTERLY



Volume 38

March 2002

Number 4

CREATION RESEARCH SOCIETY QUARTERLY

Volume 38

March 2002

Number 4

Articles

- | | |
|--|-----|
| La Brea Tar Pits: An Introductory History
(1769–1969)
William Weston | 174 |
| Why Mutations are Lethal to Darwinism
Jerry Bergman | 181 |
| Vision
Don B. DeYoung | 190 |
| The Crucial Importance of Epistemology and
Correctly Defining Science for the Cause of
Creation and Intelligent Design
Robert E. Kofahl | 193 |

Notes from the Panorama of Science

- | | |
|---|-----|
| Extraterrestrial Bombardment of the Inner Solar
System: A Review With Questions and
Comments Based On New Information
Carl R. Froede Jr. | 209 |
| Aerodynamics of Wind Pollination in Living and
Fossil Plants
Colin Brown | 212 |
| Evidence for, Conflict over, and Confidence in
Creationist Models of Earth History
John K. Reed | 213 |

Editorial Staff

Emmett L. Williams	Editor
George F. Howe	Biology Editor
John K. Reed	Geology Editor
Eugene F. Chaffin	Physics Editor
Don B. DeYoung	Book Review Editor
Lane P. Lester	Managing Editor

Board of Directors

Don B. DeYoung, President	
Eugene F. Chaffin, Vice-President	
David A. Kaufmann, Secretary	
Theodore Aufdemberge, Financial Secretary	
Robert E. Gentet, Treasurer	
Glen W. Wolfrom, Membership Secretary	
Eugene F. Chaffin	Wayne Frair
Robert E. Goette	George F. Howe
D. Russell Humphreys	Lane P. Lester
Gary H. Locklair	Michael Oard
Emmett L. Williams	

Departments

- | | |
|---|-----|
| Editor's Comments | 173 |
| In Memoriam: Thomas G. Barnes | 173 |
| Book Reviews | |
| <i>Beowulf</i> by Seamus Heaney | 198 |
| <i>Quest for Truth: Scientific Progress and Religious
 Beliefs</i> by Mano Singham | 203 |
| <i>Seeing Red: Redshifts, Cosmology and Academic
 Science</i> by Halton Arp | 206 |
| <i>Genesis, Creation, and Creationism</i> by Lloyd R. Bailey | 215 |
| <i>The World of Chemistry</i> by John Tiner | 216 |
| <i>Lights Out: Sleep, Sugar, and Survival</i> by R.S. Wiley
and Bent Formby | 229 |
| Erratum | 192 |
| Author and Title Index for Volume 37: 2000–2001
Lazella M. Lawson | 199 |
| Minutes of the 2001 Creation Research Society
Board of Directors Meeting | 205 |
| Letters to the Editor | 217 |
| Membership/Subscription Application | 231 |
| Order Blank for Past Issues | 232 |

Front Cover

Cover design by Michael Erkel
Photograph is from a stock collection
and is unidentified.

The *Creation Research Society Quarterly* is published by the Creation Research Society, P. O. Box 8263, St. Joseph, MO 64508, and it is indexed in the *Christian Periodical Index* and the *Zoological Record*.

Send papers on all subjects to the Editor: Emmett L. Williams, P.O. Box 2006, Alpharetta, GA 30023.

Send book reviews to the Book Review Editor: Don B. DeYoung, 200 Seminary Dr., Winona Lake IN 46590.

Copyright © 2000 by Creation Research Society. All rights to the articles published in the *Creation Research Society Quarterly* are reserved to the Creation Research Society. Permission to reprint material in any form, including the Internet, must be obtained from the Editor.

ISSN 0092-9166

Published with Corel Ventura and Adobe Acrobat
Printed in the United States of America

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

Editor's Comments

Our articles in this issue vary from astronomy to biology to geology and paleontology, then two selections on a proper creationist philosophy of science are presented. The president of the Society, Don DeYoung, in his usual lucid style, discusses vision from the creative design perspective. He very kindly references the works of H. S. Hamilton, who wrote on this subject for the *Quarterly* about 10–15 years ago. Specifically DeYoung examines the eyes of trilobites, a parasitic insect, dinosaurs and humans,

William Weston begins a series on the La Brea Tar Pits from a catastrophic viewpoint. His article covers the history of the site up through 1969. There are some twists and turns in the historical road which will be revealed in future parts of the series. Jerry Bergman shows that mutations are destructive to so-called evolutionary improvements in living organisms. This important subject needs repeating often since so much is made of “helpful” mutations. Robert Kofahl and John Reed delve into the philosophy of science. Kofahl explains a proper definition of science from a creationist and intelligent design standpoint. He notes that secularists are guilty of distorting the definition of science which the media allows and encourages them to do. Various creationist models of earth his-

tory are briefly outlined by Reed. Catastrophic plate tectonics is carefully examined as a possible creationist earth history model.

Carl Froede, Jr. provides information on extraterrestrial bombardment of the inner solar system and offers a young-earth interpretation. There are some sharp exchanges in the letters to the editor which will likely continue into future issues. I urge you to consider contributing an article, note, letter, or book review for the *Quarterly* or *Creation Matters*. Our editors would enjoy hearing from you. Lane Lester's graphic design is always excellent, and his efforts are appreciated. Don DeYoung, George Howe, Gene Chaffin, and John Reed do their part to make the *Quarterly* what it is by working with authors and reviewers. There will be some shifting of editorial tasks, but I will continue as a style editor and George Howe will become the chief editor or acting editor for about a year. Glen Wolfrom, editor of *Creation Matters*, always welcomes manuscripts. From the very technical to popular writings, we need your input.

Emmett L. Williams
Editor

In Memoriam: Thomas G. Barnes

One of the great pleasures of being associated with the Board of Directors of the Creation Research Society is to become acquainted and work with men of excellent Christian character and superb scientific credentials. Tom Barnes was such a man. He was the type of person you liked as soon as you met him. He was strong and forceful, but very kind and generous.

Professor Barnes was Chairman of the textbook committee of the Society and supervised the writing of the Society's high school textbook, *Biology: A Search for Order in Complexity*. The book was an immediate success and was one of the first texts to question evolutionary presuppositions and suggest creation as a viable alternate. Tom also was the first creationist to point out the rapid decay of the earth's magnetic field and its young-earth implications (CRSQ 8:24–29; 9:47–50). He served as President of the Society for four years beginning in 1973.

Dr. Barnes received an A.B. degree at Hardin-Simmons University in 1933 and a M.S. degree in 1936 from Brown University, studying under R. B. Lindsay. He was awarded the D. Sc. degree in 1950 by Hardin-Simmons University. He was a professor of physics at the University of Texas at El Paso for 43 years and was Director of the Schellenger Research Laboratories at UTEP from its conception in 1953 to 1965. First-rate work was done on atmospheric physics, rocketry and acoustics in this laboratory under the

supervision of Professor Barnes. Because of his organizational and leadership abilities along with his dedication to scientific creationism, Tom served as the first Director of the Institute for Creation Research Graduate School from 1981 until his retirement in 1984.

Tom, during his professional career, helped develop an electronic range finding device, accomplished much original research concerning seismic energy sources and jointly worked on a vector cardiograph which was the first three-dimensional computer display to study the human heart.

He was author and coauthor of many scientific papers. His textbook, *The Foundations of Electricity and Magnetism* was used in many colleges and universities. He was the author of five books including the above textbook and his last book was *Science and Biblical Faith* which is still in print. After he retired professionally, he produced many scientific papers published in the *Quarterly* utilizing classical physics rather than modern physics to deal with certain physical phenomena. He was made a Fellow of the Society in 1983.

Dr. Barnes died at the age of 90 and is survived by his wife of 62 years Libby, four children, nine grandchildren and 11 great grandchildren. He was a marvelous leader in his profession as well as in modern creationism. Above all, he was a Christian gentleman.

Emmett L. Williams

La Brea Tar Pits: An Introductory History (1769–1969)

William Weston*

Abstract

In the first two decades of the twentieth century, hundreds of thousands of fossils were excavated from the Rancho La Brea Tar Pits. Prior to that time, these pits were unknown. When Spanish settlers first arrived in the area of Los Angeles in the eighteenth century, they found a number of tar springs located in the middle of a large plain at the foot of the Santa Monica Mountains. Surrounding the springs was a scattering of animal bones visibly embedded within a layer of asphalt. It was not until the mid 1870's that people began to realize the remote antiquity of these bones. Soon after exploratory excavations began in the early 1900s, scientists were finding tar pits containing large numbers of fossils.

The conventional explanation for the occurrence of these fossils is that thirsty birds and mammals, deceived by water-filled pools of tar, had blundered into these viscous traps and died in them. Although widely accepted, the entrapment theory has failed to give convincing answers to some key evidentiary questions, including the physical characteristics of tar pits, the fragmentation and chaotic intermingling of the bones, and the numerical preponderance of the carnivores. Since these issues cannot be adequately resolved by the entrapment theory, then a new explanation is needed. The evidence seems to be pointing toward the possibility of a single catastrophic flood as the agent for fossil deposition at the La Brea Tar Pits.

Introduction

The Rancho La Brea Tar Pits in Los Angeles, California are widely regarded as one of the richest sources of mammal fossils in the world. Approximately 60 species have been identified, including saber-tooth cat, bear, lion, wolf, camel, bison, and mastodon. Also found were seventeen human bones, including a pelvis and a skull, as well as a number of artifacts such as milling stones and bone hairpins. The conventional explanation for the abundance and diversity of this fossil material is that successive animal entrapment episodes had created an ever-growing mass of bones at the bottom of tar pools. An unwary horse, for example, might step into a seemingly benign pool of water to get a drink. Becoming ensnared in the tar underneath the watery surface, its distress cries would draw hungry carnivores, such as wolves, seeking an easy meal. These carnivores would themselves slip and fall into the pool, becoming, like their prey, inescapably trapped. Although this theory is useful for interpreting some of the data, it does have serious weaknesses. This article points out the inadequacies of the entrapment theory and shows why an alternative explanation is needed.

Tar Springs and Tar Pits

When Spanish settlers first moved into the area of Los Angeles during the eighteenth century, they saw an alluvial, grass-covered plain about 45 miles in circumference at the foot of the Santa Monica Mountains. In the middle of this plain was an area of about 20 acres where tar flowed out of numerous vents and made black puddles amidst the sandy dirt and tufts of grass. Thick and viscous, the emerging tar formed volcano-shaped mounds that generally measured several inches above the surrounding level of the ground. The tar was a useful substance to Indians in the region, who used it to caulk their canoes, waterproof their baskets, and attach wooden handles to stone blades.

The first record of these tar springs was made in 1769 during a Spanish survey expedition led by Gaspar de Portola. On August 1, the expedition reached an Indian village called Yang-na, the site of the future town of Los Angeles. Two days later, one of the Franciscan friars accompanying the expedition, Father Juan Crespi, noted in his diary that they saw "extensive swamps of bitumen" in an area about seven miles west of the village (Stock and Harris, 1992, p. 2). A more lengthy description was given by a traveler named Jose Longinos Martinez in 1792 (quoted in Stock and Harris, 1992, p. 2).

Near the Pueblo de Los Angeles there are more than twenty springs of liquid petroleum, pitch, etc.

*William Weston, B.A., 10291 D'Este Dr., Anaheim, CA 92804, email: wsweston@juno.com

Received 26 June 2001; Revised 26 September 2001

Farther to the west of said town . . . there is a great lake of pitch, with many pools in which bubbles or blisters are constantly forming and exploding. They are shaped like conical bells and, when they burst at their apex, they make a little report. I examined the holes left by the bubbles, but when they explode they are followed by others in succession and gave one no opportunity to examine the cavity.

In 1828, an ex-Portuguese sailor named Antonio de Rocha became the owner of the tar springs through a land grant of one square league, or 4,439 acres, given to him by the Mexican government. Since the Spanish word for tar is “brea,” the Rocha estate became known as Rancho La Brea. One of the conditions of the grant was that Rocha allow local inhabitants to come to the ranch and obtain as much tar as they needed. Generally, the tar was used to waterproof the roofs of adobe houses.

The first geologist to examine these springs was William P. Blake, who visited the area in 1853. The following is a description of a tar spring he saw (quoted in Merriam, 1912).

This spring was nothing more than an overflow of the bitumen from a small aperture in the ground around which it had spread on all sides, so that it covered a circular space about 30 feet in diameter. The accumulated bitumen had hardened by exposure and its outer portions were mingled with sand, so that it was not easy to determine its precise limits. It formed a smooth hard surface like a pavement, but toward the center it was quite soft and semifluid, like melted pitch.

The “accumulated bitumen” mentioned by Blake is an extensive field of asphalt, about one to two feet in depth, mostly covered by alluvial topsoil. Extending beyond the observable outpourings of the springs, it has been estimated that this field of solidified petroleum is somewhere between 160 to 600 acres. Although this layer is as hard as road pavement, it nevertheless develops fractures, which allow upsurging flows of oil to escape to the surface. In 1865 another geologist named J. D. Whitney visited the springs and wrote a description of what he saw (quoted in Merriam, 1912).

Over a space of 15 or 20 acres the bituminous material, which, when seen by us, in the winter, had exactly the consistency and color of tar was oozing out of the ground at numerous points. It hardens on exposure to the air and becomes mixed with sand and dust blown into it, and is then known as “brea.” The holes through which the bitumen comes to the surface are not large, few being more than 3 or 4 inches in diameter. On removing the tarry substance from the holes, by repeatedly inserting a stick, the empty cavity was very slowly filled up again. . . . A very large amount of the hardened asphaltum, mixed with sand

and the bones of cattle and birds have become entangled in it, lies scattered over the plain.

Whitney’s belief that the bones were the remains of recently trapped animals had some validity, for the carcasses of birds, rabbits, squirrels, and other small animals have sometimes been found lying partially submerged in the tar. From time to time, these sticky puddles would immobilize wandering cows and horses. If no one came to rescue them, they would die from thirst or hunger.

The first scientist to realize that there were bones of remote antiquity in this area was a geologist from Massachusetts named William Denton (Merriam, 1912). In 1875 he came to Southern California to inspect oil prospects. At that time, the land comprising the tar springs was owned by Henry Hancock, a Los Angeles surveyor and lawyer, who acquired the property from the Rocha family several years before. Hancock started an asphalt quarry business and employed a work force of 25 Chinese laborers. The asphaltum was processed and sent to San Francisco, where it was used to pave roads. It was also used as a preservative for railroad ties and water pipes. The old quarry can still be seen at the park, now filled in with water and fenced off. Large bubbles of gas burst every minute or so on the oily surface of the pond. In the late 1960’s, several life-size fiberglass mammoths were placed around the shore, and a sinking mammoth was tethered to the bottom. Although this dramatic tableau creates the fearsome impression that the pond is a voracious maw of death, it is really just a harmless pool of scummy, malodorous water.

When Denton visited the ranch, he and Hancock talked about fossils. Denton was shown a canine tooth that was found in the quarry. It was nine and a half inches in length and the breadth of the crown was three and a half inches wide. Denton had previously seen a similar tooth from a *Machairodus*, a European saber-tooth cat, but the La Brea canine was substantially larger. He took the tooth and some other animal bones back to Massachusetts and wrote a report of his findings. In spite of the author’s enthusiasm, the report failed to generate interest within the scientific community.

It was not until 1901 that anyone took a sustained professional interest in the fossils. While visiting the ranch to check out the prospects for oil production, geologist William W. Orcutt saw a curious mosaic of bones in a section of asphalt that was exposed after the drilling of a water well. Despite the lack of proper tools, Orcutt removed a patch of material from the asphalt and examined it. It was a piece of armored hide from an extinct ground sloth. Excited by this find, he obtained permission from the Hancock family to prospect for more fossils. Finding them was not hard, but extracting these fragile specimens from the rock-like asphalt matrix was a painstaking, laborious process. Often a whole day was spent retrieving a single bone. His patience paid off, and after four years, he possessed an enviable col-

lection of fossils, including the only complete skull of a saber-tooth cat in the world (Orcutt, 1954).

In the latter part of 1905, Dr. John C. Merriam, vertebrate paleontologist of the University of California, Berkeley, learned about Orcutt's collection and began a correspondence with him. After seeing some of the fossils, Merriam agreed that they were significant. Representing the university, he obtained a permit from the Hancock family to conduct a scientific exploration on the ranch.

At this point the historical record becomes a little obscure. Someone, we do not know who, made a momentous discovery. About two hundred yards northwest of the quarry was a pocket of densely packed animal and bird bones, broken twigs, and a few large branches of trees (Stoner, 1913). It was located in an area where, several decades previously (according to field excavation notes), Hancock's laborers had used dynamite to break through the hard bituminous layer to see if there was any commercial grade asphaltum underneath. What made this pocket so desirable, from a fossil extraction point of view, was its soft matrix of tar and sand. It was a relatively easy task to remove the bones, piece by piece, clean them off with kerosene, and analyze them. This discovery, which was later given the name University of California Locality 2050 (Figure 1), brought to light for the first time the paleontological phenomenon that has since been termed "the La Brea Tar Pits."

The pit at UC Loc. 2050 was shaped roughly like a bottle. The topmost part of the pocket, or the neck of the bottle, was about five feet wide. Below the neck, the pocket extended outward with increasing depth until at ten to twelve feet it was about eight feet wide. The last remaining bones of the pocket were at a depth of 17 feet. The boundary forming the contour of the bottle had a lumpy irregularity as the pressurized tar had pushed its way unevenly into the surrounding green and brown clays.

In 1912, another excavation site, UC Loc. 2051 (Figures 1-4), was started about 70 feet southeast from the first one. This site was notable for having not one, but three,

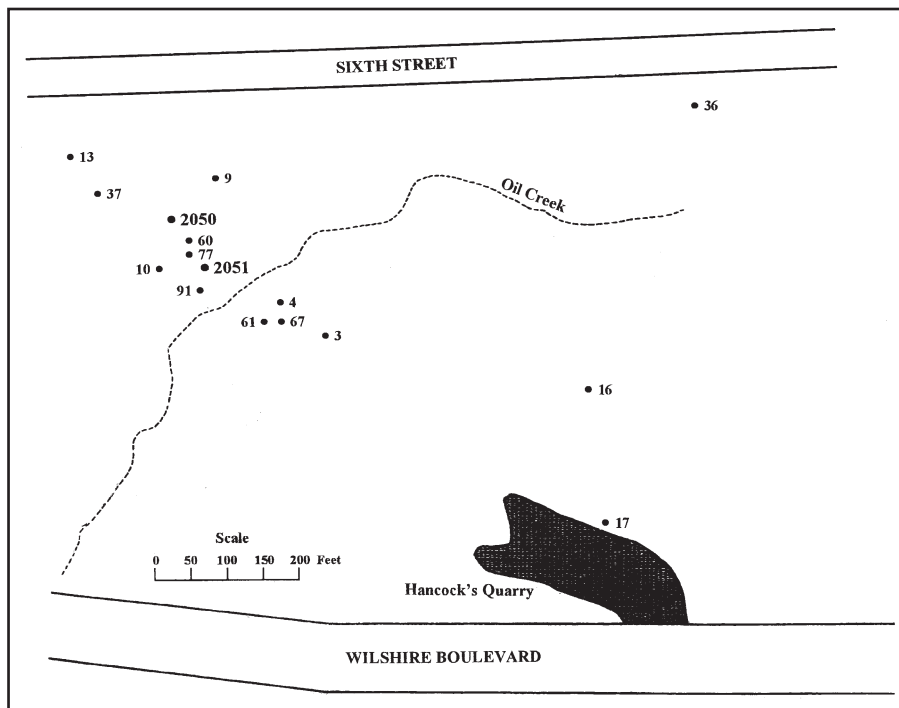


Figure 1. Map of the La Brea Tar Pits. The first discovered fossil-bearing tar pit was the one designated by the University of California as 2050. In 1912 the university began excavating a nearby pit designated as 2051. The other numbered locations were fossil-bearing pits found by the County of Los Angeles during the period of 1913 to 1915. The eight major pits are the ones numbered 3, 4, 13, 16, 60, 61, 67, and 77.

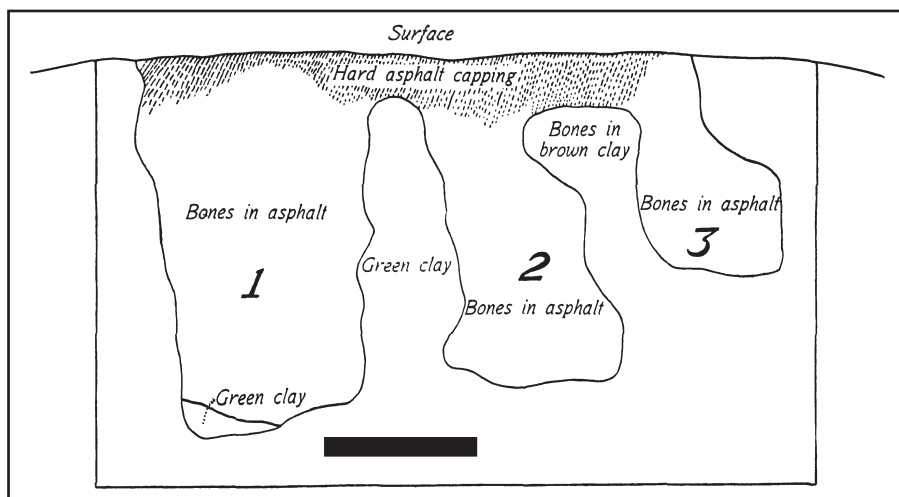


Figure 2. Cross-section of Locality 2051 showing bone pockets. Solid bar = 10 feet. (Stoner, 1913).

pockets of bone material (Figure 2). The first of these pockets was about 15 feet wide and about 22 feet deep. From this exposure, university excavators moved eastward to find two smaller diameter pockets, one being 21 feet deep and the other 14 feet deep. As in the case of 2050, the bones of 2051 were packed in soft tar and sealed off by the surface layer of asphalt. According to Stoner, "the most interesting observation . . . is that the bones accumulated in



Figure 3. General view of Locality 2051 showing pocket 3 in the foreground and pocket 2 behind pocket 3 (Stoner, 1913).

holes of such small size, and that the deposits were built up to such a thickness." Further on he says,

... the pools were evidently large enough to catch one or two tigers, several wolves and an ungulate at the same time, the latter serving as prey for the carnivores. This association is quite clearly shown in some places, and at one point in particular there were eight wolf skulls and many wolf bones mixed with the bones and skull of a large bison.

As excavators removed the contents of these four pits, they noticed that the tar had preserved the bones to a remarkable degree. Even such delicate features as the courses for nerves and blood vessels were discernable. Also found were various kinds of insects in all their minute detail, including wings and antennae. The pupae of blowflies could still be seen attached to bone marrow cavities. This was a tremendous boon for scientists, who were piecing together the life of animals and insects in the remote past.

The superior grade of preservation that characterized the individual specimens stood in stark contrast to the ravaged appearance of the fossil material as a whole. A majority of the bones were damaged in some way: sharp-edged broken ends, splinters, cracks, impact depressions, deep grooves, broken-off chips, and/or heavy abrasions. Even the bodies of the insects had gone through some inexorable process of dismemberment. If excavators found several insect parts still hanging together, they considered themselves lucky (Pierce, 1946). In addition, the bones were in an entangled mass, closely pressed together, and interlocked in all possible ways. After separating out the bones, scientists could only guess how the parts of individual animals matched up to one another. They also came to realize that the pits were missing a lot of skeletal parts that they had originally expected to find. For example, after six years of digging, less than a dozen parts of the *Megalonyx*, an extinct ground sloth, were collected, including a left hu-



Figure 4. Locality 2051 showing mass of bones in pocket 2 (Stoner, 1913).

merus, a left calcaneum, a single metapodial of the posterior foot and various elements of both anterior and posterior feet (Stock, 1913).

This chaotic intermingling of damaged and broken fossils seemed to suggest that some monstrous catastrophe had overtaken these creatures of the remote past. Of course, this interpretation was unacceptable to scientists committed to the uniformitarian philosophy. What was needed was a paradigm that could fit these fossils within the realm of mainstream science, even if it had to ignore numerous clues that indicated otherwise. It was under these circumstances that the animal entrapment theory was born. In October 1908, *Sunset* magazine printed an article by Dr. Merriam entitled "Death Trap of the Ages." The subheading read "Sabre-tooth tigers, giant sloths, mammoths, monster wolves, extinct camels, held fast in a huge tar pool near Los Angeles." Included inside the article was a picture of the water-filled quarry. Underneath the picture was a misleading caption identifying the quarry as the "death trap of the ages."

In 1913 Mr. G. Allan Hancock gave the County of Los Angeles the exclusive privilege of doing excavations on his ranch. For the next two years, county excavators dug test holes all around the 23-acre estate in a haphazard search for soft-matrix, fossil-bearing tar pits. Hampering this effort was the surface layer of asphalt. The excavators attacked it with picks, shovels, hammers, wedges, and even dynamite. Since the location of these soft-matrix pits was unknown, they had to make a lot of educated guesses. They dug up the vents of active and inactive tar springs and dug trenches through outcroppings of bituminous material. A tunnel underneath the asphalt had to be abandoned, because the alluvial clay and sand had a tendency to cave in (according to field excavation notes).

Out of a total of 96 test pits, eight had significant amounts of well-preserved bone material, and seven more had inferior material of lesser quantities. Like the bones of

the university pits, few of the bones in the county pits had escaped damage. Some had deteriorated because of their proximity to water-saturated stumps and branches. At Pit 4 (Figure 1), one of the eight major pits, an excavator made the following note: "The disposition of this brush and associated material as well as markings on the brush itself, indicate that this stuff was all washed in."

The eight major fossil-bearing pits were of various sizes. On average, they were cone-shaped, about 15 feet in diameter at the top and tapering down 25 feet to a vent several inches wide. The vent coursed downward through about one hundred feet of Pleistocene gravel, sand, and clay (Figure 5). These sediments form the outwash plain between the Santa Monica Mountains and the Pacific Ocean. Below this strata, the tar pit vent continues down through another layer of gravel, sand, and fine-grained marine sediments to oil reservoirs about 2,000 to 6,000 feet below the surface of the earth. This oil-bearing second layer is called Upper Miocene, and it forms the basin of the Los Angeles region (Quinn, 1992; Stock and Harris, 1992, p. 10). According to Wyman (1926, p. 9), the pits were originally created by blowouts of natural gas. Heavy subterranean fracturing by earth tremors allowed pressurized gas to escape upward and penetrate the surface alluvial layer at numerous points. Liquid petroleum followed the gas, which filled in these blown out holes.

One of the more unusual pockets was Pit 16 (Figure 1). Only four feet wide with vertical sides, the pit went down 21 feet before it tapered three more feet to the typical three-inch-wide chimney. Somehow numerous animals including dire wolves, saber-tooth cats, coyotes, camels, bison, horses, and even the bulky mastodon had managed to squeeze themselves into a hole not much wider than a bathtub. Although Pit 16 was notable for being one of the eight major pits containing copious amounts of fossils, it is still hard to imagine it as one of the "death traps of the ages."

Besides the constricted size of the pits, an additional difficulty for the entrapment theory is the transitory character of the tar itself. According to radiocarbon dates done at Pit 9 (Stock and Harris, 1992, p. 9), the bones in the lower part of the pit were 38,000 years old and the bones in the upper part were 13,500 years old. Consequently, the tar in the pit had to remain in a semi-liquefied state for about 24,000 years. This conclusion contradicts what is known about the process of petroleum encrustation. When crude oil emerges from the ground, it begins to thicken as its more volatile constituents evaporate. Sunlight, heat, and oxida-

tion are all factors in the hardening process (Barth, 1962, pp. 220, 593). Given this observable property of oil congealation, the existence of open pits of tar that could trap animals over a period of thousands of years must be regarded as highly improbable.

Anomalies of the Tar Pits

A mystery that has continued to baffle scientists since the discovery of the tar pits was the numerical preponderance of carnivores. Recent studies of wolf-to-deer populations in Ontario (Canada) and Minnesota (Mech, 1970, pp. 274) and lion-to-herbivore populations in Africa (Guggisberg, 1963, pp. 151–153) show that the ratio is typically 100 to 150 herbivores for every carnivore. What excavators at the La Brea Tar Pits found was an inverse ratio. Using a common skeletal part as a basis (for example, skulls in fairly good condition), distribution surveys consistently showed that carnivores outnumbered herbivores by a ratio of at least seven to one. The lopsided imbalance can be seen in the bar graph of the ten most common mammals (Figure 6). The right four bars show that carnivores represent 85% of the total number of individual animals. The oddity of seeing so many meat-eaters among the mammals is reflected in surveys of the avian population, as seen in the bar graph of Figure 7. The flesh-eating birds are about 70% of the total number of individuals. The uncontested leader is the eagle. It is puzzling why eagles would be the most vulnerable to entrapment. Not only are they quite rare when compared to such teeming populations as pigeons and doves, but they are also larger and more muscular and thus more likely to escape.

Perhaps, as some might suggest, a carnivore was more susceptible to entrapment, because it could not resist the sight of ensnared prey flopping helplessly in the tar. Thus a

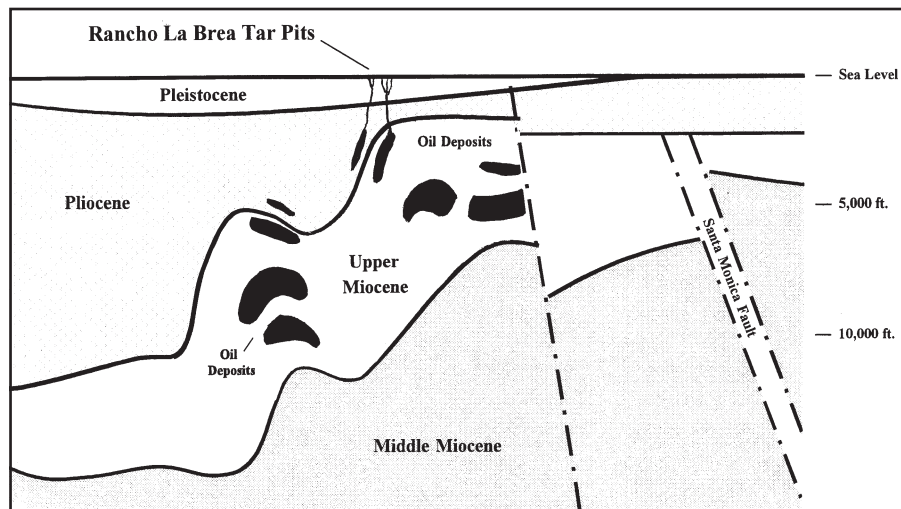


Figure 5. Postulated stratigraphic column of La Brea Tar Pits (Source: Quinn, 1992; credited to Dr. Tom Wright)

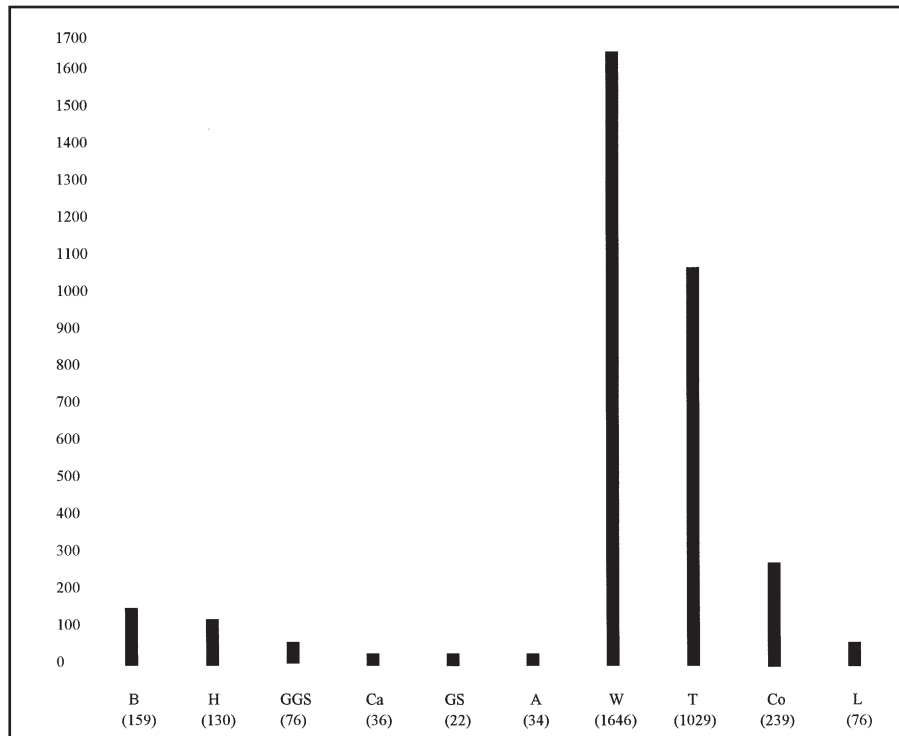


Figure 6. Mammal Distribution Graph. B = Bison, H = Horse, GGS = Giant Ground Sloth, Ca = Camel, GS = Ground Sloth, A = Antelope, W = Wolf, T = Tiger, Co = Coyote, L = Lion. The number in parentheses is the total number of individuals for a given species as found in all pits (Source: Marcus, 1960).

single captive bird or animal could lure many predators to their deaths. This line of reasoning loses its force when one compares the La Brea statistics with those of a modern tar pit. In 1934 A. E. Borell, a wildlife specialist employed by the Grand Canyon National Park Service in Arizona, noted that birds were getting caught in a tar pit that had been left by a road construction crew several years before. Borell found carcasses in all stages of decomposition from skeletons to those that had recently died. An examination of the contents of the pit revealed that there were 123 individual birds of 13 different species. Six of these birds were hawks. Borell made a repeat visit thirty days later and found that eight more birds had died in the tar pit, none of which were hawks. Thus the ratio of 131 to 6, or about 22 to 1, reflects the expected balance in nature (Borell, 1936). This evidence shows that there are no specific phenomena that would augment a tar pit's allurements to any particular kind of creature.

Another statistical anomaly is the predominance of land birds over water birds. The total percentage of water birds is only 8%. This low percentage has puzzled scientists, since wading birds such as ducks, geese, and coots have a profile of characteristics that make them the most likely candidates for entrapment (Miller, 1910; Howard, 1955, pp. 38–39). Yet, as it turned out, the largest category of victims among the non-predacious types was the turkey, a land-roving bird.

One more anomaly that should be mentioned is the absence of soft tissues from both mammals and birds. Neither skin, hair, feathers, scales, claws, beaks, talons, or any internal organs have ever been found in any of the tar pits. This absence is remarkable since, as previously mentioned, the parts of insects had been preserved.

The La Brea Tar Pits from 1915 to 1969

As the fossils were being taken out of the pits, county excavators packed them in crates and carted them over to the Museum of History, Science and Art, which later became the Natural History Museum of Los Angeles. The last of the excavations ended in December 1915. For many years afterward, this huge collection of over 700,000 specimens kept scientists busy making inventories and churning out monographs on new species of birds and mammals. This descriptive phase was largely completed

by the late 1950s. In spite of the great quantity of papers written, only a few addressed the mechanism of the entrapment theory in a meaningful way. It has only been in recent years that attempts have been made to refine the entrapment theory to make it more conformable to the reality of the evidence.

In 1969, Pit 91 (Figure 1) was re-opened for renewed excavations. This task of collecting more data has been continuing every summer to the present time. It is more thorough in its recovery of fossils than the old excavations of 1905–1915. Special attention is being paid to smaller life forms such as diatoms, pollen, seeds, snails, mollusks, and ostracods. Every cubic centimeter is carefully sifted and examined for the slightest particles of fossil content. As each piece is removed, its position and orientation is recorded in field excavation notes.

In a future article, I will summarize the results of excavation work done since 1969. I will also discuss the modified direction that scientists are taking in their thinking about the tar pits. Yet in spite of the theoretical adjustments and the vast quantities of data being collected, the problems facing uniformitarians are no closer to being resolved than when the entrapment theory was first publicized in 1908. A non-uniformitarian interpretation based on the idea of a major flood may be the only viable way of making sense of the fossils recovered from the La Brea Tar Pits.

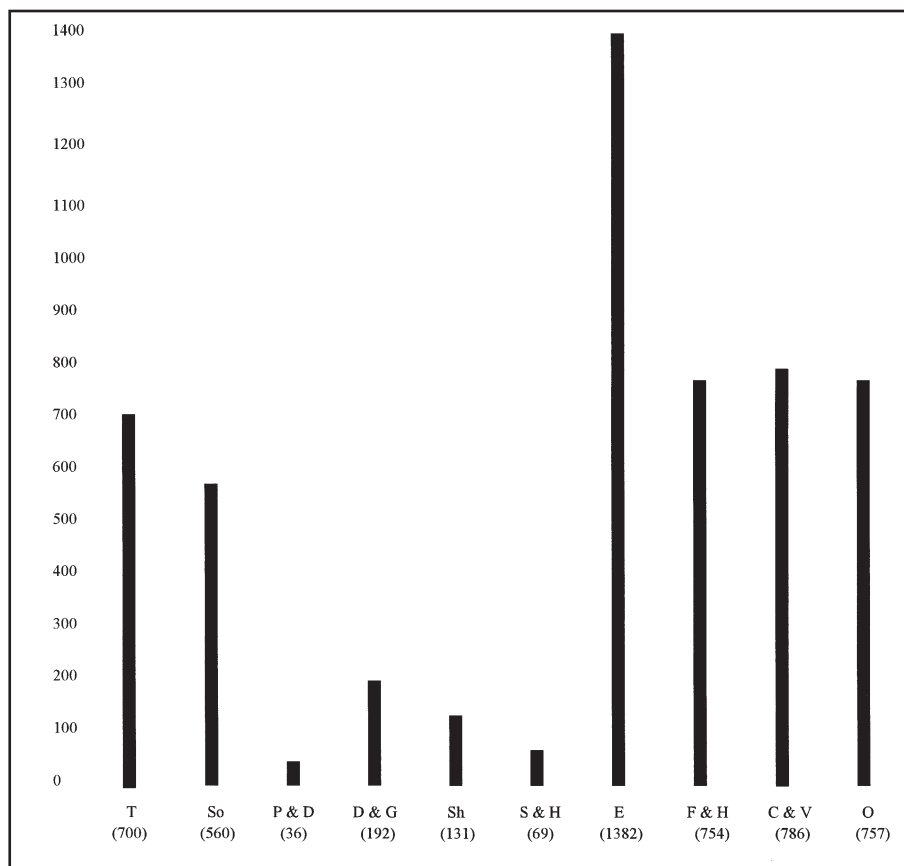


Figure 7. Bird Distribution Graph. T = Turkey; So = Songbirds; P & D = Pigeons and Doves; D & G = Ducks and Geese; Sh = Shorebirds; S & H = Storks and Herons; E = Eagles (960 golden eagles, 170 bald eagles, the remainder are 5 other species); F & H = Falcons and Hawks; C & V = Condors and Vultures (105 teratons, 225 condors, only a few turkey vultures); O = Owls. The number in parentheses is the total number of individuals for a given species as found in thirteen pits (Source: Howard, 1962).

References

- Barth, E. J. 1962. *Asphalt, science and technology*. Gordon and Breach, New York.
- Borell, A. E. 1936. A modern tar pit. *Auk*, 53:298–300.
- Field notes of excavations, kept by the George C. Page Museum in Hancock Park, Los Angeles, CA.
- Guggisberg, C. A. W. 1963. *Simba, the life of a lion*. Chilton Books, Philadelphia, PA.
- Howard, H. 1955. *Fossil birds, with especial reference to the birds of Rancho La Brea*. Science Series No. 17, Los Angeles County Museum, Los Angeles, CA.
- . 1962. A comparison of avian assemblages from individual pits at Rancho La Brea, California. *Contributions in Science*, 58:1–23 (published by the Los Angeles County Museum).
- Marcus, L. 1960. A census of the abundant large Pleistocene mammals from Rancho La Brea. *Contributions in Science*, 38:1–11 (published by the Los Angeles County Museum).
- Mech, L. D. 1970. *The wolf: the ecology and behavior of an endangered species*. Natural History Press, New York.
- Merriam, J. C. 1912. The fauna of Rancho La Brea. Pt. 2, Canidae. *Memoirs of the University of California* 1912, 1(2):201–213.
- Miller, L. H. 1910. Wading birds from the Quaternary asphalt beds of Rancho La Brea. *Bulletin of Southern California Academy of Sciences*, 5(30):439.
- Orcutt, M. L. 1954. The discovery in 1901 of the La Brea fossil beds. *Historical Society of Southern California Quarterly*, 36(4):338–341.
- Pierce, W. Dwight. 1946. Fossil arthropods of California. *Bulletin of Southern California Academy of Sciences*, 46(3):136–137.
- Quinn, J. P. 1992. The geologic setting of Rancho La Brea. *Terra*, 31(1):38–41.
- Stock, C. 1913. *Nothrotherium* and *Megalonyx* from the Pleistocene of Southern California. *University of California Publications, Bulletin of the Department of Geology*, 7(17):343–358.
- Stock, C. and Harris, J. M. 1992. *Rancho La Brea: A record of Pleistocene Life in California*, seventh edition. Natural History Museum of Los Angeles, Los Angeles, CA.
- Stoner, R. C. 1913. Recent observations on mode of accumulation of the Pleistocene bone deposits of Rancho La Brea. *University of California Publications, Bulletin of the Department of Geology*, 7(20):387–396.
- Wyman, L. E. 1926. *Notes on the Pleistocene fossils obtained from Rancho La Brea asphalt pits*. Los Angeles Museum of History, Science, and Art.

It is considered likely that all the animal hyla became distinct before or during the Cambrian, for they all appear fully formed without intermediates connecting one phylum to another.

Douglas Futuyma, *Evolutionary Biology*, second edition, 1986, p. 325

Why Mutations are Lethal to Darwinism

Jerry Bergman*

Abstract

The primary means by which evolution is believed to occur are mutations, independent assortment of genes, gene shuffling and natural selection. Mutations are non-directed DNA changes that can be expressed in the offspring's phenotype and passed on to the organism's progeny. Unrepaired mutational genetic changes are relatively rare, however, occurring only about once per billion DNA bases. For natural selection to operate, there would need to be

biological variants from which to select, and these differences must ultimately be provided only by mutations in the macroevolutionary scenario. A review of many types of mutations, however, indicates that they cannot provide the raw material necessary for natural selection for various reasons. Consequently, evolutionary naturalism still lacks a mechanism to produce new information and biological novelty.

Introduction

Modern Darwinists teach that a continuing series of small heritable genetic changes called mutations gradually produced by means of natural selection the estimated ten million species alive today from comparatively "simple" protocells. Mutations normally are defined as non-directed random changes in the DNA base pairs that are passed on to a plant or animal's offspring. *Genotype* (the information on the DNA) changes may or may not be expressed in the *phenotype* (the organism's physical characteristics). Mutations are extremely important to evolutionary naturalism because according to this world view the ultimate diversity of all of life forms depends on mutations favored by natural selection (Bergman, 1992). As Gamlin and Vines note, "the original source of all variation for evolution to select from is mutation . . . [and] mutations are essentially random in nature and most are either neutral or harmful in their effects" (1991, p. 25). In short, modern Darwinism teaches that mutations are life's diversifying agents, the raw material from which natural selection has led to specialization throughout the entire biosphere. It is well to note, however, that although mutations can lead to heterogenicity at existing loci, the creation of gene loci themselves cannot be explained by mutations and is, to all intents and purposes, unknown.

The view that mutations are the ultimate source of evolution was first proposed in detail by Hugo DeVries and has been extensively studied ever since (DeVries, 1910). The topic of mutations is of major concern in medicine

because mutations are a major cause of disease and therefore "a better understanding of the characteristics of deleterious mutations is ... imperative" (Peck and Eyre-Walker, 1997, p. 136).

For many years, creation scientists have been proclaiming the fact that mutations cannot serve as a mechanism for neo-Darwinian evolution because almost all expressed mutations are deleterious, and those that can be beneficial in unique situations virtually always render the animal less fit in the wild (Lammerts, 1971; Tinkle, 1967). Lammerts, in a study of neutron radiation induced mutations, concluded that "all of the mutations were defective variations" (1971, p. 278). The vast majority of all non-neutral mutations are harmful in most environments, partly because they usually result in loss of information.

The two types of heritable changes that can occur in the DNA nucleotide sequence include a normal shuffling of genes (such as by sexual reproduction or genetic crossing over) and copying mistakes. Copying mistakes are alleged to account for most evolutionary changes because normal gene shuffling can only rearrange existing information (Spetner, 1997). Only those expressed mutations, or those that affect the organism's health or viability, can be selected for. Aside from loss mutations and the few situations discussed below, no *documented* case of a mistake or error type of mutation that has produced a phenotypic change that is beneficial in the wild exists, although some mutations are beneficial for humans such as seedless fruit, cattle lacking horns, or beans with strings (Tinkle, 1967, p. 68). Mutations are hypothesized ultimately to account for all life's diversity, but we have no *evidence* of any clearly beneficial mutations except possibly

*Jerry Bergman, Ph.D., Biology Department, Northwest State College, Archbold, OH 43502-9517

Received 8 January 2001; Revised 26 September 2001

in a few unique situations such as a heterozygous sickle cell anemia mutation may protect persons against malaria.

The “rate and magnitude of deleterious mutations have substantial implications for conservation genetics and therefore, for preserving the diversity of life on earth” (Peck and Eyre-Walker 1997). In the medical field, non-neutral mutations are assumed to be harmful without exception. Some add the caveat: given enough mutations, one is bound to be helpful, at least in some situations (Price, 1996). Although the vast majority of mutations is known to be negative or harmless, evolutionary naturalists assume that enough rare positive mutations *must* have occurred in the past to have evolved all life forms.

The reason mutations are accepted as the source of variation is because only naturalism is acceptable as an explanation in contemporary orthodox science, and the best naturalistic explanation must be accepted until replaced by a superior naturalistic explanation (Bergman, 1992). Darwinists reason that this helpful character of some mutations must be true because life exists, and aside from normal variations such as those produced in sexual reproduction, the mutation theory is considered the only viable naturalistic explanation for diversification at existing gene loci. Mutations are the “driving force of evolution” and if the “DNA archive was absolutely constant and unchangeable, evolution would be impossible” (Sedivy and Joyner, 1992, p. 13). Evolutionists assume that if the mutation rate is slow enough, macroevolution can occur and life will not become extinct. But if too many mutations are produced, they believe extinction will occur (Nussenzweig, 1998). Furthermore, many mutations would have to occur almost simultaneously before a major change such as bipedal locomotion could evolve from quadrupedal locomotion.

The Cause of Mutations

The primary building blocks of proteins are the 20 amino acids that are assembled into proteins according to the DNA genetic blueprint. A group of 3 DNA bases called a *codon* codes for each amino acid. Since the DNA code uses 4 bases (adenine thymine, cytosine, guanine), 64 (4^3) possible codes exist, more than enough to code for the 20 common amino acids used in most forms of life. Even for a very small peptide consisting of only 20 amino acids, fully 20^{20} (200 pentillion) kinds of polypeptides are possible. This enormous level of variety is necessary to code the 150,000 types of proteins now estimated to be required for human life, and also for the hundreds of thousands of proteins necessary for other life forms.

The correct amino acid sequence is ordinarily critical for most of the protein chain, but proteins with a few incorrectly placed amino acids can sometimes still function, although often not as well (Friedberg, Walker and Siede, 1995). Conversely, many single changes can be critical or lethal. An example is sickle cell anemia in which there is one single incorrect amino acid out of 300. The replacement of glutamine with valine produces red blood cells that tend to deform (called sickled cells) in certain environments. In the homozygous sickle cell condition the blood functions poorly under certain circumstances, causing anemia, severe pain, and even strokes in children (Feigle, Hill and Boschmann, 1991). Many other mutations prevent the production of functional enzymes. The consequent lack of a necessary component in the cell causes dysfunction or disease.

It is not always possible to determine the exact cause of each specific mutation (Clark and Wall, 1996 p. 147). Mutations are classified as either *random*, meaning they stem spontaneously from an unknown cause; or as *caused*, indicating that they were induced by a known agent called a mutagen. The potential causative agents of spontaneous mutations include cosmic rays (which are part of background radiation) and gene processing interference. The potential cause of induced mutations include carcinogens and mutagens such as those in cigarette smoke.

To distinguish between *spontaneous* and *induced* mutations requires a great deal of research. First, the researcher must isolate mutants from the culture which contains both mutated and normal cells. Knowing if the mutation is spontaneous or induced is important in certain areas, such as controlling bacterial infections. The use of penicillin provides an example: penicillin kills nonresistant bacteria, thus selecting for the resistant “mutant” strain. Why this occurs needs to be understood in our fight against disease. In many cases, changes labeled as mutations are not mutations proper because they do not involve actual DNA base changes in a particular “gene” but are the result of gene transfer or recombination.

Another example is the changes that are often improperly called “mutations” is the primary mechanism that the immune system of many organisms use to develop antibody diversity. A wide variety of antibodies is needed to respond to the billions of possible antigens, and there are not enough genes in the entire cell to produce the required diversity. The antibody diversity system was designed to achieve this requirement. The antibody gene system is actually quite complex and assembles gene products in a variety of ways so that a wide variety of antibodies is produced. This whole mechanism of antibody production by way of gene product recombination or shuffling is more accurately classed as a complex system which produces antibody diversity.

Normal Variations

It is difficult to prove that a biological trait or variation is due to a mutation. A primary concern in understanding mutations is the fact that changes in DNA base order can be produced by many factors other than genetic code changes. Changes caused by the independent assortment of alleles during sexual reproduction, chromosomal crossover, and other normal means of producing organized genomic variety are not mutations as normally defined.

For example, hairiness in tomatoes is often assumed to result from a mutation, but may be caused by a normal gene shuffling. Some genes can produce two or more different proteins by alternative splicing of the mRNA transcript. This allows one gene to produce two or more forms of a protein for different developmental stages or for use in different cell types (Watson, et al. 1992, pp. 135, 140). Much normal variety exists in life: humans alone possess an estimated 10 million normal variations called *polymorphisms*, meaning humans vary at about 1 per 500 base pairs (Jorde, Carey and White, 1997). Over 100 normal blood groups alone are now known to exist.

So called *amber mutants* provide an excellent example of what is often labeled a mutation but are more accurately described as genetic control mechanisms. An amber mutant bacteriophage will grow *only* in a bacterium termed a “permissive host” which contain a suppressor gene that can bypass the so-called mutation. The mutation involves a single-base substitution that alters the amino acid coding triplet to become a stop codon (UAG). It is read as stop under “non-permissive” conditions, terminating the protein coding before the entire gene is read. The so-called permissive phage host bacteria can “suppress” the mutation by producing a tRNA species which translates the UAG stop codon as an amino acid, so that it no longer functions as a stop codon. The specific amino acid coded depends upon the permissive host class in which the bacteriophage resides. This structurally complex and unique system possessed by the host allows the bacteriophage to produce the protein needed for its survival (Adams, et al., 1992, p. 79).

Mutation Hot Spots

A major problem for evolution is that, although many different mutation sites are possible for most genes, mutations are much more common in certain gene areas called mutation hot-spots. Although for some genes such as the beta-globin gene over 100 types of mutations have been reported, mutations for most genes tend to occur in the same base pairs (Jorde et al., 1997).

As a result, the same mutations occur over and over in the same locations, meaning the potential for improvement is close to zero. For some illnesses, many or even

most new cases result from new mutations: for achondroplasia fully 80% of all cases diagnosed are caused by new mutations, for neurofibromatosis type I about 50%, and for Marfan syndrome 30%. These mutations tend to be in the same area, or even on the same base, of the gene affected. The situation is similar to a typist repeating the same type errors over and over and over because each base pair does not have an equal likelihood of a mutation. Some mutations are so common that scientists have given them whimsical names as *stuck*, *radish*, and *shot-full-of-holes*. Few if any of these mutations provide new material needed for evolution by natural selection.

Back Mutations

Because mutations also tend to occur in hot-spots, a great likelihood exists that a back mutation repair will occur, i.e. another mutation will repair the damage by changing the base back to the original form. Even the most common mutations can and commonly will back mutate, and genes that are “highly susceptible to mutation” must also be “highly susceptible” to back mutations (Beisner, 1987, p. iv). Wilson and Balding (1998) even conclude that back mutations are evidently so common that it is difficult to use mutational data to estimate populational histories and evolutionary processes. Thus, back mutations would tend to dilute any positive effect that certain mutations would be hoped to have in evolution.

The One-Directional Nature of Mutations

Most mutations usually cause changes *in one direction* only, resulting in *not* increased diversity as evolution requires, but a *reduction* of diversity. For an analogy, assume that typewriter mistakes tended to produce one letter most often. Then the possibility of a mistake improving the text is considerably *less* than chance. Thus typing letters by chance would be more likely to produce an improvement in the paper. An example is deamination of cytosine to thymine, which causes the compliment base to be converted from G to A. This change results in fewer and fewer G bases and more and more A base pairs in the genome, reducing information instead of increasing it. If G to A mutations were more likely to occur in a set such as AGA-TCGCGAT, the code would eventually become AAATCACAAT.

The best known example of a mutation that tends to go in one direction is the two-base dinucleotide sequence CG. Methylated genes are particularly prone to mutations, specifically deamination, and this causes changes in *one* direction only. In mammals, close to 80% of CG dinucleotides are methylated, meaning a methyl group is

bonded to the cytosine base. The compound this mutation produces, 5-methylcytosine, causes cytosine to lose an amino group, converting it to thymine. This mutation would tend to convert the cytosine to thymine, causing thymines to become more common and always resulting in a loss of information.

This change results in no small difference. The CG dinucleotide mutation rate is fully 12 or more times higher than other dinucleotide sequences, and CG dinucleotide mutations have been identified in a large number of important human diseases (Jorde et al., 1997 pp. 39–40). This tendency would constantly result in a greater number of thymines and would in the long run always be degenerative.

The Rate of Mutations

Each chromosome contains the units of heredity, the genes, which are now estimated at 150,000 in humans and an average of 5,000 to 8,000 genes on each chromosome for mammals. Over 3 billion base pairs are required to form the entire human gene code, and bacteria contain about 5,000 genes or 4.7 million base pairs. The background mutation rate ranges from 1 per thousand to 1 per billion cell divisions—and it is usually about one mistake per billion bases (Cain et al. 1999).

Much genetic research has been completed on bacteria, relatively simple organisms compared to humans, but still enormously complex. Microorganisms are also extremely useful in the study of mutations because of their short generation time and the low cost of maintaining large populations for research. Comparisons of normal and “mutant” organisms can easily be done and this is an important method to study metabolic pathways.

The number of mutations in humans is estimated to be about two per gamete (Mader, 1998, p. 307). Many of these mutations are lethal and result in a miscarriage or a spontaneous abortion, and consequently they are eliminated from the gene pool. Some genes, though, are far more prone to mutate than others, and many of these mutations produce well known deleterious or lethal effects. Given these data and an estimated 150,000 human genes, the average person would carry only about two to eight harmful genetic mutations, most of which are not expressed because their other allele is normal (Gonick and Wheelis, 1991, p. 80). This number does not include somatic mutations, which are those that occur in individual body cells and are not involved in either sexual reproduction or evolution.

One reason that the number of mutations is comparatively minute is that at least eight known repair mechanisms lower the rate of expressed mutations by an enormous amount. Numerous enzymes hover in and

around the chromosome like worker bees and help to unwind, wind, repair, transcribe, replicate, and replace defective parts of DNA. These repair systems correct about 99.9% of all initial errors (Jorde et al., 1997). After repair, a rate estimated at 10^{-7} mutations per gene is common in sexually reproducing organisms (Mader, 1998). Therefore, even if .0001% of all mutations were beneficial (a high estimate), the total number of beneficial mutations in a population would be extremely small, especially in relatively small animal populations such as exist for most mammals and almost all primates.

For a large population, the total number of non-lethal mutations is so small that the potential of mutations to produce both new information and beneficial effects is close to nonexistent. A critical argument against the mutation theory is the conclusion that at most “on average, only one in 500 base pairs will differ from person to person.” Thus, at the genetic level the exons (protein coding DNA) are over 99.99% identical in humans (Jaroff, 1991, p. 23). This means that during the one-million years speculated to have elapsed since our common ancestor evolved, virtually no significant changes in the gene pool could have occurred.

The Effects of Mutations

In studying human diseases, researchers have located thousands of the mutations responsible for a particular disease. Over 800 different mutations have been located in the cystic fibrosis genes alone—yet, not *one* of these known mistakes has been shown to be beneficial (Mak et al., 1999). None of the millions of different mutations that has been identified have been proven to be beneficial except a few that are useful only in extremely limited and unusual circumstances. The most well known example is sickle cell anemia, a disease that affects about one out of 625 Blacks (.0016%). Even mutations that are beneficial in very limited situations are rare, and can sometimes cause problems even if the mutation is heterozygous (Jaroff, 1991, p. 8). The homozygous sickle cell anemia gene condition causes a serious illness in all cases, and even the heterozygous form causes health problems and in some circumstances sometimes death.

Cystic fibrosis is caused by a mutation in the gene that processes the chloride ion. A faulty sweat and mucous gland mechanism results that causes excess chloride loss in sweat. More serious is the production of an abnormally thick sticky mucus that tends to trap and hold bacteria in the bronchial tubes, causing major respiratory problems and infections. About 70% of cystic fibrosis cases are caused by the loss of just three base pairs that results in the loss of a single amino acid—phenylalanine—from the protein that the gene produces (Jaroff, 1991, p. 36). In addi-

tion to this mutation hot spot, many other rare mutation types that can cause cystic fibrosis have now been located. All of those render the critical proteins either less functional or even non-functional.

The Neutrality of Most Mutations

Changes in the third and sometimes the second codon, for example, often do not alter the protein produced. If several codes are used for an amino acid, a number of changes in the code, especially in the last base, will not change the amino acid that is coded. For example, leucine is coded by CUU, CUC, CUA, CUG, UUA, and UUG. Thus, the same amino acid will be coded for the CU code regardless of what base is last in the codon. Consequently, a large number of single point mutations will have no effect on the protein coded. This system is said to be *degenerate*, meaning it can “degenerate” from the original code and still code for the correct amino acid sequence (Jorde et al., 1997). Only if an amino acid with a very different side chain is inserted, such as valine replacing glutamate, is the protein rendered nonfunctional. Mutations can also be neutral if the substitute is an amino acid with a similar side chain, such as the replacement of leucine by isoleucine or aspartate by glutamate. In these cases the proteins function is often not affected or is affected only slightly.

Many mutations produce barely perceptible, often inconsequential, changes. One such mutation affects human eye development so that the eyes are a millimeter or so farther apart than normal. Some mutations cause a defective enzyme that is relatively unimportant or can be dealt with by diet or lifestyle changes. Leu and Dill (1990) claim that one reason most mutations are neutral and do not result in phenotypic changes is that many biomolecules seem to be relatively insensitive to many single substitutions, especially those in the amino acid chain ends or terminal portions. These terminal base pairs serve as spacers, for protection, or are cut out during processing. Mutations often cannot damage these areas but cannot improve them either. Some organisms are protected from mutation-caused damage due to over design or built-in protection mechanisms such as the genetic repair mechanisms. None of the mutations discussed above are known to result in adding information to the genome. If most mutations are neutral regarding selection, the neo-Darwinian theory is in jeopardy because mistakes accumulate which are not selected against but that in time, according to some evidence, adversely effect the organism's health.

A mutation in a somatic cell of an adult is often of little consequence because most of the cells around it are normal. Some somatic mutations may result in cancer or other problems, but they cannot provide the variety needed for evolution to work because they are not inher-

ited. The many lethal mutations which often cause spontaneous abortions, estimated to be as many as one-third of all human conceptions, are also not passed on.

The Recessive Character of Non-Neutral Mutations

Mutations often produce defective proteins, but a mutation usually affects only one gene and humans have two sets of chromosomes. In the case of mutant recessive genes, the “insurance gene” can still produce the correct functioning protein. For this reason, only when both alleles are recessive mutated genes is the organism usually adversely affected, such as the sickle cell anemia mutation. The organism with one mutation may have less of the normal protein, but still can often function satisfactorily. A major exception to this occurs with the sex linked genes that are located on the X chromosome which have no corresponding locus on the Y chromosome. Consequently, recessive genes located on the X chromosome, such as color blindness and hemophilia, are often expressed in males, but rarely in females.

A major reason why improvements from mutations are highly unlikely and why mutations present little hope in producing evolutionary innovations is that most mutations are recessive and therefore must exist in pairs to be expressed. The presence of a recessive mutant allele in the homozygous condition is an extremely unlikely possibility except in consanguinous marriages:

When an allele of a gene is mutated to the new allele, it tends to be recessive and its effects are normally masked by its partner allele. Only in the homozygous condition can such mutant genes be expressed. Thus a population carries a reservoir of mutant recessive genes, some of which are lethal when homozygous but which are rarely present in the homozygous condition. Inbreeding encourages the formation of homozygotes and increases the probability of recessive mutants being expressed in the phenotype (Hickman, Roberts and Larson, 1997 p. 79).

Both beneficial and deleterious recessive mutations are more likely to be expressed in consanguinous marriages. This is one reason why marriage to close relatives is illegal or discouraged in many countries, and may be one of the reasons it was forbidden in the Bible. Serious health problems result in animals produced by the inbreeding practiced to produce thoroughbreds: a mutt or mongrel is often the healthiest animal. While discussing recessive alleles, it is important to note that in the case of dominant mutant genes, a defect in only one gene will often produce major problems. The result is production of a protein that does not fold properly, and for this reason is cut up by the cells' proteolytic system. Lack of a functional protein can cause

an illness, or a defective protein can be poisonous to one or more cellular systems. Furthermore, mutations that affect only one gene may cause mispairing during meiosis and may well be lethal.

The Demise of Even Helpful Mutations

Most mutations, even if they have positive selective values, will eventually be eradicated by random effects that have close to an equal probability of killing individuals carrying the beneficial mutation or any other member of the population (Spetner, 1997). Positive single mutations have only a small chance of survival: even if a single mutant appeared, it would likely vanish through random effects such as floods, disease, or predators much like the descendants of the animal without the mutant. Its positive selective value would do little to help it survive these random effects that work to destroy it.

Consequently, a tendency exists for one new offspring per member of the population to survive long enough to reproduce. Organisms generally give birth to many more than one offspring. Frogs can lay hundreds of eggs several times during their lifetime, a herring will lay about 50,000 eggs per year, an oyster can produce 100 million eggs in its lifetime, and a lower plant can produce a trillion spores (Spetner, 1997). Some cannot reproduce and others that can reproduce might not do so because of being eaten by predators or dying in a catastrophe such as a drought, flood or fire. Often, they die not through any fault in their own but through random events (Raup, 1991).

An optimistic calculation suggests that an animal in a stable population produces an average of five offspring in its lifetime, an average of only one out of five will survive to reproduce. Therefore, the chances are only one out of five, or 20 percent, that a particular animal will survive long enough to reproduce. Furthermore, whether or not a family member survives is largely a matter of luck (Raup, 1991). A mutant with a selective value 0.1 percent higher than its siblings means that its chances of surviving is 20.02 percent instead of 20 percent (Spetner, 1997). A single mutant with a survival value of 0.1 percent better than its siblings in the first generation has a likelihood of survival of 0.2002 compared to 0.2000, and of surviving 2 generations 0.1347, and the chance that it would survive each succeeding generation is even less. For this reason, the chances of survival the first few generations are affected very little by the mutant's selective value. Furthermore, four significant figures are required to see the difference between the mutant and the rest of the population.

As a result, virtually all positive mutations are unlikely to play a role in evolution and a positive mutation normally can play a role in evolution *only* if many of that type occur simultaneously, which has close to a zero probability of oc-

curing. Simpson (1969) and others have concluded that a single mutation has little chance of staying in a population. If the chance of one mutant surviving is 0.002, a gene mutation with a selective value of 0.1% will have only one chance in about 500 of surviving the random effects that tend to wipe it out (Spetner, 1997). If 500 mutations with a selective value of 0.1% existed, the chance that at least one would survive would still be only about .6. If 1000, their chances would be about .87, and only when there were about 2500 would their chance of surviving be more than 99%. For this reason, positive mutations will take over the population only if many of them occur simultaneously, otherwise they will likely disappear (Spetner, 1997).

The key to Darwin's theory is that "slight modifications, which in any way favoured the individuals of any species, by better adapting them to their altered conditions, would tend to be preserved" (1872, pp. 82–84). The facts contradict Darwin's belief that natural selection will preserve even the slightest variation and increase in number until it takes over the population. Most larger mammals and many other animals produce relatively few offspring in their lifetime. Consequently, for most animals, relatively few exist to produce mutations, yet the variety of extant species types is now estimated to number in the multi-millions. Given this fact, if macroevolution were possible, it would be extremely slow—and multi-millions of years would be required for even minor species changes (Howe and Davis, 1971).

The fact that many genetic code sequences are shared by humans with many lower organisms, some of which are virtually identical, yet alleged to be many millions of evolutionary years apart, is also problematic for Darwinism. This is a problem because why stasis existed in these genes while other loci presumably underwent extensive changes often cannot be explained. For example, many human genes are so similar to yeast genes that "human DNA can be substituted for the equivalent yeast gene—and it works just as well" as far as we can determine (Pines, 2001, p. 10). Yet evolutionists claim the two are separated by "over at least a billion years of evolution." And the finding that many human and yeast genes are identical, or very similar, is put in proper perspective when it is noted that many human genes consist of thousands of base pairs. It will not suffice to ignore the problem by claiming, as certain Darwin apologists do, that these similar sequences were simply "conserved" by selection across many eons of evolutionary time while other genes evolved. The "conserved" label does not explain the problem, but only identifies it.

For example, one of the larger genes, the gene for human growth hormone, is 150,000 base pairs in length (Jaroff, 1991, p. 52). A defect in the gene that causes neurofibromatosis occurs in a series of small exons spread over at least a 200,000 base pair section of chromosome number 17 (Jaroff, 1991, p. 60). Many of the code differ-

ences result in small but necessary differences between organisms, although some make no difference. Even assuming that evolution is valid, these relatively small changes in the genes also would reveal the extremely slow rate of change that mutations cause.

The Reasons Why Non-Neutral Mutations Are Usually Fatal

Negative mutations produce quite a different effect from neutral/beneficial mutations. A major problem for the mutation theory is the fact that gene functions are highly inter-related and damage to one gene usually has effects on *many* systems. Most genes are *pleiotropic*, meaning that they have multiple effects, and if both are damaged, adverse effects can result in many different organs and functions (Jorde et al., 1997 p. 72). One reason why genes are pleiotropic is that they produce enzymes that are part of shared biochemical pathways. As a result, when pleiotropic genes mutate, many problems result. This is why genetic disorders typically cause “complex, multiorgan, and systemic conditions” (Jorde et al., 1997 p. 232). Even if a mutation is clearly beneficial in some way, many mutations will have major adverse affects on the organism due to the pleiotropic effect.

Given a sequence of several hundred amino acids, a single mutation can result in a misshaped protein that may render the entire protein non-functional. A defective protein can also often cause the entire structure that the protein is part of to be defective, and as a result produce disease. A typographical error in *any* one word in a sentence will likely render the entire sentence incorrect—an analogy that is limited because a sentence may function with certain typographical errors if readers can discern its meaning by the use of intelligence. With proteins, one incorrect amino acid can result in an error in a protein that can produce a useless protein. If the protein is an enzyme, it can adversely affect all of the structures that the enzyme works on. As a result a single or only a few changes in the DNA code often can have drastic effects.

Mutations Cause Devolution

“Devolution” is the corruption of the genome. The accumulation of mutations has caused the defective gene load gradually to increase until now an estimated 5,000 mutation-caused diseases exist in humans (Cotran, 1999). Some mutations are much more frequent than others, with certain mutations having evidently occurred only once or a few times in history. It is for this reason that certain mutations are often found only in specific populations and can sometimes be traced back to their source. Sickle-cell anemia has

been putatively traced to an African who lived in Sudan, East Africa, and from there spread “along with slash-and-burn agriculture” (Weiss and Mann, 1990, p. 491).

We would also expect that the farther back we go in history, the *fewer* the number of disease causing mutations would have been in the human gene pool. This is clear evidence for devolution because the farther back in history, the more perfect our genome would have been. An estimated 80 to 85 percent of mutations are familial, and the rest are acquired *de novo* by the affected individuals (Cotran, 1999). As the mutation load increases, more and more mutation-caused diseases enter the human gene pool. Spetner noted that:

all mutations studied destroy information. None of them can serve as an example of a mutation that can lead to the large changes of macroevolution. The neo-Darwinians would like us to believe that large evolutionary changes can result from a series of small events if there are enough of them. But if these events all lose information they can't be the steps in the kind of evolution the NDT [Neo-Darwinian Theory] is supposed to explain, no matter how many mutations there are. Whoever thinks macroevolution can be made by mutations that lose information is like the merchant who lost a little money on every sale but thought he could make it up on volume (Spetner, 1997, p. 160).

Spetner's conclusion is also supported by the fact that genetic repair systems insure that most all mutations will be corrected. Primarily those genes that have mutation hot spots will produce unrepaired mutations, and it is these hot-spot mutations that cause devolution. The major way that this problem can be dealt with is by the use of genetic engineering to develop gene therapy methods to circumvent mutations. For hemophilia, for example, temporary relief can be obtained by injecting patients with factor VIII protein, the clotting mechanism that their blood lacks. But any permanent correction will require the deliver of working copies of the genome into the patient's genes by the use of retroviruses as vectors (Adams, Knowler, and Leader, 1992).

The evidence produced from tracing mutations back in time reveals that, although some have occurred repeatedly, such as Duchenne muscular dystrophy, certain other gene mutations evidently are relatively uncommon, such as Tay-Sachs disease (*amaurotic familial idiocy*) or sickle cell anemia (Livingstone, 1976). Mutations are common in the case of Duchenne Muscular dystrophy because the DMD gene is the largest known human gene. It is 2.4 million DNA base pairs long and produces 14 Kb of mRNA which manufactures a protein chain that consists of 3685 amino acid residues! The larger the gene, the greater the likelihood of a mutation because larger targets are more likely to be damaged by cosmic rays, and the more the bases, the greater the likelihood that any one will be dam-

aged by any type of mutation. The gene codes for *dystrophin*, which is involved in maintaining the integrity of the cells' cytoskeleton (Jorde et al., 1997).

Conclusions

There exists a huge number of possible gene sets in the over a million known species, and there also exists a high level of trait variation *within* each species. No historical evidence exists, however, to support the contention that mutations have produced a new order, a new family, a single major biological innovation (such as a wing), or even a single useful gene (Rust, 1992; Spetner, 1997).

Recombination and other natural means of producing variety have evidently produced most if not all of the "new" characteristics observed, such as the minor variations common in existing genotypes (Cain et al., 1999). This is not Darwinian evolution, but merely the formation of new traits from novel combinations of genes that already exist in the family gene pool. Only qualities which already exist in the gene pool can be "developed" or altered by selective breeding.

Major variations within the animal and plant world can be accomplished only by intelligent selection. But even then, when left to themselves, the selected traits that humans produce from deliberate animal interbreeding are usually lost in the wild state. Their progeny soon revert back to the original wild type as in the case of wild dogs. The gap between different major groups of animals has not been narrowed by breeding as Darwin wrongly predicted it would be.

One may conclude from the empirical evidence that the primary effect of mutations is to weaken and kill because few if any mutations are clearly beneficial. Although there are many varieties of life that can interbreed with similar organisms to produce virile offspring, various gene mechanisms and natural selection often destroy any varieties that stray too far from the norm, insuring that each group continues to bring forth only "after its kind," as the Bible states. Natural selection operates as a conserving mechanism which *reduces* the mutation load, and research has found that mutations are established in a breeding population at a very slow rate (Howe and Davis, 1971, pp. 37, 40–44). Nor can mutations account for the origin of the gene loci themselves. The answer lies in what is vividly seen everywhere in our physical world: the Creator's design and intelligence.

Acknowledgments

I want to thank Bert Thompson, Ph.D., David Demick, M.D., Robert Kofahl, Ph.D., Wayne Frair, Ph.D., John

Woodmorappe, M.A., George F. Howe, Ph.D., and two anonymous reviewers for their comments on earlier drafts of this article.

References

- CRSQ: *Creation Research Society Quarterly*.
 JAMA: *Journal of the American Medical Association*.
 Adams, Roger P.L., John L. Knowler, and David Leader. 1992. *The biochemistry of nucleic acids*. Chapman and Hall, New York.
 Beisner, E. Calvin. 1987. Mutation fixation: A dead end for macro-evolution. Institute for Creation Research: *Impact*, No. 166.
 Bergman, Jerry. 1992. Some biological problems with the natural selection theory. *CRSQ* 29(3):146–158.
 Black, J. 1999. *Microbiology; principles and explorations*. Prentice-Hall, Upper Saddle River, NY.
 Cain, Michael, Hans Damman, Robert Lue, and Carol Yoon. 1999. *Discover biology*. Sinaur, New York.
 Clark, M.S. and W. J. Wall. 1996. *Chromosomes; the complex code*. Chapman and Hall, London.
 Cotran, Ramzi. 1999. *Robbins pathologic basis of disease*. Saunders, Philadelphia, PA.
 Darwin, Charles. 1872. *The descent of man and selection in relation to sex*. Modern Library Reprint, Murry, London.
 DeVries, Hugo. 1910. *The mutation theory*. Open Court, London.
 Feigle, Dorothy, John W. Hill and Erwin Boschmann. 1991. *Foundations of life*. Macmillan, New York.
 Friedberg, Errol, Graham Walker, and Wolfram Siede. 1995. *DNA repair and mutagenesis*. American Society of Microbiology Press, Washington, D.C.
 Gamlin, Linda and Gayle Vines. 1991. *The evolution of life*. Oxford University Press, New York.
 Gonick, Larry and Mark Wheelis. 1991. *Genetics*. Harper, New York.
 Gould, Stephen. 1989. *Wonderful life*. Norton, New York.
 Hickman, Cleve, Larry Roberts, and Allan Larson. 1997. *Biology of animals*. WCB/McGraw Hill, New York.
 Howe, George F. and P. William Davis. 1971. Natural selection reexamined. *CRSQ* 8(1):30–43.
 Jaroff, Leon. 1991. *The new genetics*. Whittle Direct Books, New York.
 Jorde, Lynn, John Carey, and Raymond White. 1997. *Medical genetics*. Mosby, St. Louis.
 Lammerts, Walter (editor). 1971. Planned induction of commercially desirable variation of roses by neutron radiation. *Scientific Studies in Special Creation*, pp. 269–284. Creation Research Society Books, St. Joseph, MO.
 Lester, Lane P. 1995. Genetics: enemy of evolution. *CRSQ* 31(4):Copy 'n' Share.

- Leu, K.C. and K.A. Dill. 1990. Theory for protein mutability and biogenesis. *Proceedings of the National Academy of Science* 87:638–642.
- Livingstone, Frank B. 1976. Hemoglobin history in West Africa. *Human Biology* 48:487–500.
- Mader, Sylvia S. 1998. *Biology*. W.C. Brown, Dubuque, IA.
- Mak, V., J. Zielenski, L.C. Tsui, P. Durie, A. Zine, S. Martin, T.B. Longley, and K.A. Jarvi. 1999. Proportion of cystic fibrosis gene mutations not detected by routine testing in men with obstructive azoospermia. *JAMA* 281(23):2217–2224.
- Nussenzweig, M.C. 1998. Immune receptor editing: revise and select. *Cell* 95(7):875–878.
- Peck, Joel and Adam Eyre-Walker. 1997. The muddle about mutations. *Nature* 387: 135–136.
- Pines, Maya. 2001. A robot that tracks all the genes in a cell reveals key patterns. *The genes we share with yeast, flies, worms and mice*. Howard Hughes Medical Institute, Chevy Chase, MD.
- Price, Peter W. 1996. *Biological evolution*. Saunders, New York.
- Raup, David. 1991. *Extinction; bad genes or bad luck?* Norton, New York.
- Rust, Peter. 1992. How has life and its diversity been produced? *Perspectives on Science and Christian Faith* 49(2):80–94.
- Sedivy, John and Alexandra Joyner. 1992. *Gene targeting*. W.H. Freeman, New York.
- Sharon, Jacqueline. 1998. *Basic Immunology*. Williams and Wilkins, Baltimore.
- Sharp, Doug. 1977. Interdependence in macromolecule synthesis: evidence for design. *CRSQ* 14(1):54–60.
- Simpson, George Gaylord. 1969. *The major features of evolution*. Columbia University Press, New York.
- Spetner, Lee. 1997. *Not by chance!* Judaica Press, New York.
- Tinkle, William J. 1967. *Heredity: a study in science and the bible*. St. Thomas Press, Houston, TX.
- Watson, James D., Michael Gilman, Jan Witkowski, and Mark Zoller. 1992. *Recombinant DNA*. (second edition). Scientific American Books, New York.
- Weiss, Mark L. and Alan E. Mann. 1990. *Human biology and behavior*. Scott Foresman/Little Brown, Glenview, IL.
- Wilson, I.J. and D.J. Balding. 1998. Genealogical inference from microsatellite data. *Genetics* 150(1):499–510.

Scientists Speak About the Origin of Insects

Today two-thirds of all species on the earth are flying insects, and their ways of life and ecological niches are almost incomprehensibly diverse.

James H. Marden, *The Sciences* Nov/Dec 1995, p. 26

The fossil record does not give any information on the origin of insects.

The New Encyclopedia Britannica, Vol. 19, 15th edition, 1986, p. 804

Certain modern species are reasonably similar, in their anatomy, to fossils of winged insects dating back 325 million years. The problem is, wings appear in the fossil record already fully formed.

James H. Marden, *ibid.* p. 27

What could be more familiar than the hover and dart of a fruit fly, going about its business? And what could be more mysterious? Thirty-odd muscle pairs, in coordinated motion, flap the wings up and down 200 times a second—rapidly enough to sing a baritone G below middle C. Biologists have tried for decades to sort out the complexities of insect flight. The wing hinge, where the wing joins the thorax of the insect, is, in the words of Michael H. Dickinson, a neuroethologist at the University of Chicago, “the most morphologically complex joint in the animal kingdom.”

Mary B. Aberlin, *The Sciences*, Nov/Dec 1995, p. 13

So miraculous a thing is insect flight that nearly all insect biologists believe it could have evolved only once.

James H. Marden, *ibid.* p. 28

Vision

Don B. DeYoung*

Abstract

For mankind as well as for the animal world, eyesight is a compelling testimony to creative design. Continuing research reveals the complexity of vi-

sion for every creature, whether living in the past or present. This article reviews recent studies of eyesight in people, trilobites, parasites, and dinosaurs.

Human Eyesight

This Quarterly has a rich tradition of articles about animal and human vision, especially by author H.S. Hamilton (1985; 1986; 1987a, b, c; 1991; 1993). To continue this theme, there has been much recent discussion about the light-sensitive portion of our eye, the retina. Naive critics have declared that our eye is poorly designed because its rods and cones are oriented *away* from incoming light (Dawkins, 1996). In rebuttal, technical reasons for this designed arrangement have been thoroughly presented by creationists (Gillen et al., 1999). Those who ridicule design in nature, whether it be human eyesight or the panda's unique thumb (Gould, 1980), reveal their own limited understanding of physiology. Critics of intelligent design in nature might well be challenged not only to suggest improvements, but also to build working models that can successfully replace the original visual equipment for a lifetime. It will be a long wait before this happens! Two additional design features of the human eye will be presented here.

Kobayashi and Kobshima (1997) have discussed the white area called the sclera or sclerotic coat that surrounds the colored iris. A survey shows that no animal among the 100 primate species shows the light-dark (sclera/iris) eye color contrast found in humans. The unusual "whites" of human eyes have no obvious natural selection survival value. In fact, in evolutionary thinking, the white sclera would appear to be detrimental since it raises visibility to possible predators. On the plus side, however, this unique eye feature allows us a great range of communication involving eye movement. Our eyes display emotions and much other information to others. This ability of human eye expression surely is a gift from the Creator (Samples, 2000). The white sclera is one of many distinctives that set people entirely apart from the animal world.

Another feature of the human eye is its rapid healing ability. Eye patients experience rapid improvement and recovery from surgery. Many corrective procedures have been developed in recent years:

- 1948 Keratomileusis
- 1963 Radial keratectomy (RK)
- 1975 Photorefractive keratectomy (PRK)
- 1989 Automated lamellar keratoplasty (ALK)
- 1992 Laser *in situ* keratomileusis (LASIK)

The aspects of each surgery and recovery listed support creation. The LASIK procedure will be further described as an example. In this operation a surface flap is cut and pulled away from the cornea. A laser then vaporizes tissue to reshape the cornea, after which the corneal flap is returned for healing. The affected cornea surface tissue is called epithelium. It quickly heals from the laser process, usually within 3-5 days. There have been isolated problems with LASIK, but it has provided a near-miracle of improved vision for millions of patients worldwide. The Creator made the eye with a rich supply of blood vessels and a vigorous healing mechanism in place. Long before modern eye surgery, William Paley wrote about the design of human vision, "Were there no example in the world of contrivance [design], except the eye, it would be alone sufficient to support the conclusion which we draw from it" (Paley, 1802, p.60).

Trilobites

Trilobite fossils were first scientifically studied three centuries ago (Taylor, 2000). Since then, entire books have been dedicated to this extinct marine arthropod (Levi-Setti, 1993; Fortney, 2000). Of special interest is the trilobite eye, a wonder of design, having a compound lens consisting of hundreds of facets called *ommatidia*. Each tiny lens is made of transparent, crystalline calcite, CaCO_3 . The clear form of calcite, also called Iceland spar, has the un-

*Don B. DeYoung, Grace College, 200 Seminary Drive, Winona Lake, IN 46590, DBDeYoung@Grace.edu
Received 27 November 2000; Revised 17 May 2001

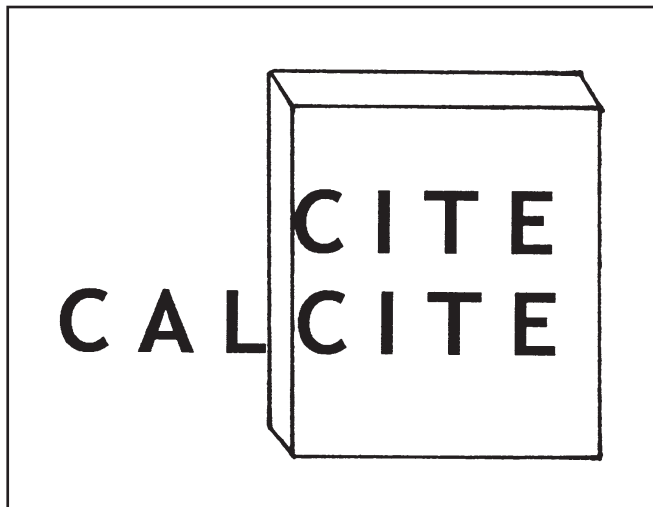


Figure 1. An illustration of the birefringence of calcite. Light passing through the crystal divides into two separate paths, causing a double image.

usual optical property called birefringence or double refraction. Light passing through the crystal usually divides into two distinct paths with perpendicular polarizations. A view through clear calcite therefore appears double (Figure 1). However, the trilobite did not have double or blurred vision. Instead, there is one particular optical axis through calcite where the two light paths overlap and stay together. The calcite eye lens of the trilobite were exactly aligned along this optical axis, for clear vision.

One species of trilobite called *Phacops* formed eye lenses that were spherical in shape. Such lenses usually distort images, a situation called *spherical aberration*, a common problem in optics. But in the *Phacops* this distortion was corrected by magnesium atoms that were incorporated into portions of the calcite lens. This impurity altered light refraction within the lens just enough to cancel out the aberration totally, another example of intelligent design (Taylor, 2000; Wise 1989).

Clearly, trilobites were expertly designed for clear vision in their habitat beneath shallow seas. Yet this creature supposedly lived during the Paleozoic era, 250-570 million years ago. The trilobites are considered to have been an index fossil, part of the "Cambrian explosion" of life. This theoretical ancient time span is assumed to have elapsed before the dinosaurs came into being, a time when life is thought to have been simple and primitive. The trilobite optical system, however, was far from simple. In fact its eyes were more "advanced" than human eyesight.

Xenos Peckii

Buschbeck, Ehmer, and Hoy (1999) report an unusual discovery regarding a tiny parasitic insect that lives inside the bodies of paper wasps. The females are sightless, while the

males have compound eyes somewhat similar to many other insects. The male *Xenos peckii*, however, is highly unusual in that each of its many tiny lenses is a complete eye. That is, each of its 50 or more "eyelets" has its own independent retina and set of receptors. This allows the insect's brain to combine several overlapping fields of vision. When light passes through a convex eye lens, whether that of a person or an animal, the image is inverted on the retina. The brain then reinverts this image. But this leads to a special challenge for *Xenos peckii*. As Figure 2 shows, inverting the entire final mosaic image does not suffice. The combined image from multiple lenses would be scrambled. Instead, the separate images must be reinverted before they are added together. In other words, "points in optical space [need to be] adjacent in their neural representation" (Buschbeck, et al., 1999, p. 1179). However this occurs, the result is an exceptionally high resolution of detail. In contrast, the compound lenses of most insects utilize a single common retina. Then, each lens focuses light on just a few receptors, each with a field of view of only about one-degree.

The conclusion is that while most insects can detect motion but little detail, *Xenos peckii* clearly sees both motion and detail. Scientists are puzzled by the "advanced" optics of this insect (Jaroff, 1999). The male *Xenos peckii* lives only about six hours after taking flight from its wasp host. Its good eyesight may be what enables it to find a female before expiring, along with the scent of pheromone. Incidentally, the trilobite, discussed earlier, also was provided with a similar system of multiple complete eyes.

Dinosaurs

In the past it was often assumed that dinosaurs had poor vision. After all, they were considered to be simple, prehistoric animals. *Tyrannosaurus rex*, for example, was thought to lack depth perception. The work of computer scientist Kent Stevens has radically changed this false assumption (Coates, 1998; DeYoung, 2000). Stevens placed glass eyes within the eye sockets of dinosaur models and then mea-

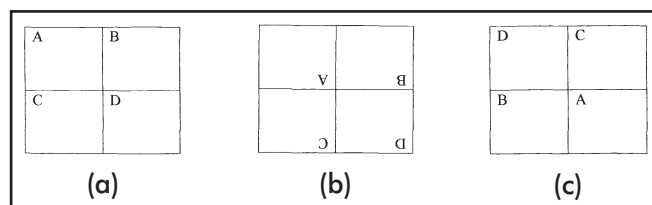


Figure 2. (a) The small squares represent the individual fields of vision of the *Xenos* eyelets. (b) Each *Xenos* lens inverts the image on its retina. (c) If the *Xenos* brain invets the mosaic as a whole, the image is distorted. Instead, the images must be separately inverted by the brain to produce the original field.

sured their possible range of view. The *T. rex* was found to have about 50 degrees of binocular vision in the forward region where its two eyes overlapped. This overlap would have permitted excellent stereo or three-dimensional vision for the dinosaur. For comparison, an alligator has only 20 degrees of overlap, while a house cat has about 130 degrees.

The optical studies also show that visually, *T. rex* did not have to rely on the movement of subjects in order to detect them. In the *Jurassic Park* movie (1993), the characters avoid detection by *T. rex* simply by not moving, a notion now considered incorrect. Tyrannosaur vision was probably very acute, like many animals today. Another dinosaur skull studied by Stevens, that of the *Carcharodontosaurus*, had eyes with very little overlap and therefore less depth perception. Like many animals today, dinosaurs probably displayed great variety in their vision. Each was superbly engineered for its particular lifestyle. The enlarged eyes of many dinosaur species suggest that they could see colors, as do many mammals, birds, crocodiles, and fish today.

Conclusion

We have considered briefly the eyesight of humans, trilobites, *Xenos peckii*, and dinosaurs. Each mechanism is uniquely designed for successful vision. In the animal world there are more than 40 distinct types of eye structure. Evolutionary theory must assume that each of these cases formed separately, and by chance. Instead, however, eyesight declares the Creator's care for His creatures. Psalm 94:9 asks, "Does he who implanted the ear not hear? Does he who formed the eye not see?" Eyesight affirms a positive answer to this question.

References

- CRSQ: *Creation Research Society Quarterly*
- Buschbeck, Elke, Birgit Ehmer, and Ron Hoy. 1999. Chunk versus point sampling: visual imaging in a small insect. *Science* 286(5442): 1178-1180.
- Coates, Karen. 1998. Through dinosaurs eyes. *Earth* 7(3): 24-31.
- Dawkins, R. 1996. *The blind watchmaker*. W.W. Norton. New York.
- DeYoung, Don. 2000. *Dinosaurs and creation*. Baker Books, Grand Rapids.
- Fortney, Richard. 2000. *Trilobite!* Harper Collins, New York.
- Gillen, Alan L., Frank J. Sherwin III, and Alan C. Knowles. 1999. *The human body: An intelligent design*. Creation Research Society Books, St. Joseph, MO.
- Gould, Stephen Jay. 1980. *The panda's thumb: Reflections in natural history*. W.W. Norton, New York.
- Hamilton, H.S. 1985. The retina of the eye-an evolutionary road block CRSQ. 22:59-64.
- . 1986. The jumping spider's wondrous eyes. CRSQ. 23:62-64.
- . 1987a. The snake's spectacular spectacle CRSQ. 23:177-178.
- . 1987b. Convergent evolution-do the octopus and human eyes qualify? CRSQ 24:82-85.
- . 1987c. The watchmaker surfaces again. CRSQ. 24:144-145.
- . 1988. The eye of the air-breathing vertebrate: Did it emerge from the sea? CRSQ. 25:117-120.
- . 1991. The eye: by chance or intelligence. CRSQ. 27:141-144.
- . 1993. The evolution of the eye-fact or fiction? CRSQ. 29:195-196.
- Jaroff, Leon. 1999. The fly with 100 eyes. *Time* 154 (20): 96.
- Kobayashi, Hiromi and Shiro Kobshima. 1997. Unique morphology of the human eye. *Nature* 387(6635): 767-768.
- Paley, William. 1802. *Natural theology in The works of William Paley*, 7 vols., R. Lynam (editor). W. Baynes, London.
- Riccardo, Levi-Setti. 1993. *Trilobites* University of Chicago Press, Chicago.
- Samples, Kenneth R., editor. 2000. By the whites of our eyes. *Facts for Faith* 1(2): 24. This publication is from the Hugh Ross *Reasons to Believe* ministry.
- Taylor, Michael. 2000. Look back in wonder. *New Scientist* 167(2248): 48-49.
- Wise, Kurt. 1989. My favorite evidence for creation. *Creation Ex Nihilo* 11(4): 29.

Erratum

CRSQ 38(3), December 2001, page 159. In the Panorama Note, "The Growth Rate of *Muhlenbergia torreyi* (Ring Muhly Grass) Colonies in Central Arizona" by George F. Howe and John R. Meyer, Figure 1 was printed upside down. The corrected photograph is at the right.

Figure 1. Colony number 8 of *Muhlenbergia torreyi* after two growing seasons. Note how the arc has grown 7 cm in what is a SSW direction (to the left and down), leaving the rebar peg behind. Small white dot to the left of the peg is an artifact.



The Crucial Importance of Epistemology and Correctly Defining Science for the Cause of Creation and Intelligent Design

Robert E. Kofahl*

Abstract

In the creation/evolution debate much misunderstanding and error arise from differing definitions of science and conflicting epistemologies. Creationists rightly hold secularists guilty of distorting the definition of science by injecting it with their epistemology and their assumption of a closed materialistic universe. Conversely, some Christians would inject their belief in God and His miracu-

lous works into scientific hypotheses, calling it "theistic science." Some in the Intelligent Design (ID) movement develop this further, classifying intelligent design as a scientific concept. The application of philosopher of science Karl Popper's "criterion of demarcation" and the process of "conjectures and refutations" is proposed to correct these errors.

Two Competing Epistemologies for Science Defined and Contrasted

A disturbing aspect of current discussion of Creation versus Evolution in general and Intelligent Design (ID) in particular is the apparent unwillingness of Christians to recognize and candidly profess their commitment to an epistemology that is radically contrary to that embraced by their secularist opponents. The epistemology of Christians is grounded in their faith in the Scriptures of the Old and New Testaments and in their divine Lord and Savior, Jesus Christ, who is the center of the biblical revelation. Thus, we Christians are not commanded to believe in divine special creation of all things in the beginning because we are persuaded by scientific evidence and logic. No, we are surrendered to Jesus Christ as "Lord of all" (Acts 10:36), under whose feet the Father put all things and made Him "head over all things to the church" (Ephesians 1:22). Jesus, God the Son, is sovereign Creator, Ruler, and Sustainer of the universe and all its creatures (Hebrews 1:2-3). He commands us to believe the writings of His prophet, Moses (John 5:45-47). What did Moses write about first of all? He wrote about God's creating all things by the word of His power, in the space of six days, and all very good (Genesis 1). Consequently, we Christians are to walk by faith, not by sight (2 Corinthians 5:7). Thus in this life we will never possess sufficient scientific knowledge to be able to say, I can prove my faith by science, apart from my faith in the Lord Jesus Christ. "By faith we understand that the worlds were framed by the word of God, so that the things which

are seen were not made of things which are visible" (Hebrews 1:3). Furthermore, is not intelligent design advocated by the Apostle Paul in Romans 1:19-20? And if we Christians are to have an impact for the glory of God upon the lost souls who dominate the scholarly and scientific Establishment, as well as upon those ordinary citizens whom they influence so powerfully, should we not strive to be candid as well as wise and gracious concerning what we really are? (Matthew 5:13-16)

The Christian and secular epistemologies for science are defined and contrasted as follows:

- Secularist epistemology: There is but one channel to valid knowledge of the natural order that science examines, the human enterprise called empirical science. This epistemology is a logical application of the positivist philosophy of Auguste Comte.
- Christian epistemology: There are at least two channels to valid knowledge of the natural order, empirical science and divine special revelation in the Scriptures of the Old and New Testaments.

Charles Darwin, in 1838, less than two years after his five-year voyage around the world on the H.M.S. Beagle, while he was immersed in his secret brainstorming to devise a scientific explanation for evolution, read a review of Auguste Comte's *Cours de philosophie positive*. He immediately embraced Comte's positivism as the base for his own philosophy of science (Darwin, 1987). A major tenet of positivism is that the only source of valid knowledge is observation through the natural senses. The modern secularist epistemology of science, defined above, follows logically from Comte's positivism. This is because both are

*Robert E. Kofahl, Ph.D., 1322 E. Wilson Avenue, Glendale, CA 91206

Received 1 December 2000; Revised 26 May 2001

grounded in the assumption of a purely naturalistic view of the world and man's relation to it, and the instruments of science are extensions of our natural senses.

Attempts to Inject Faith into the Definition of Empirical Science

What I have called "the original sin in the garden of science," was perpetrated by secularist scientists who, over a century ago, began injecting into the definition of science their philosophical/religious/irreligious assumption of a closed, uncreated materialistic universe (Kofahl, 1989). However, science with its tools and method cannot prove this assumption to be fact. Consequently, it has no place in either the definition of science or the rules of its method. Nevertheless, in 1984 the National Academy of Sciences published an official document that advocates this philosophically biased definition of science:

However, the goal of science is to seek naturalistic explanations for phenomena—and the origins of life, the earth, and the universe are, to scientists, such phenomena—within the framework of natural laws and principles and the operational rule of testability (National Academy of Sciences, 1984).

Roughly since the time of Charles Darwin this has become the reigning view of science, effectively shutting the mouths of Christians in science and virtually all other fields of scholarly endeavor. It seriously restricts their freedom to practice science or scholarship in a manner commensurate with their biblical Christian faith. The secularist enthusiasts who dominate science attempt to punish and banish anybody who refuses to embrace their "original sin," which was their injecting their materialistic philosophy into the definition of science.

Several well-meant but flawed attempts have been made by Christians to counter the secularist distortion of the definition of science. One creationist tactic aimed at science teaching in public schools made use of the concept of "abrupt appearance" of new kinds of animals and plants in the fossil record. The idea was that, by using this term and teaching students about the gaps in the fossil record, the students would then be free to draw their own conclusions as to whether or not "abrupt appearance" of new types in the fossil record points to evolution or to special divine creation. In two notorious trials, one of which went from Louisiana all the way to the U.S. Supreme Court, the creationist case went down to judicial defeat.

A more recent tactic used by creationists to regain some influence for Christians in the scientific enterprise involves justifying the injection of God and divine miraculous activity into scientific hypotheses and theories. This approach was initiated by J. P. Moreland in his book, *Christianity and the Nature of Science* (1989). More re-

cently he gave the name "theistic science" to this approach to scientific research (Moreland, 1994).

A required preparation for the promotion of the concept of "theistic science" is necessarily the overthrow of Karl Popper's "criterion of demarcation." This is the requirement that all hypotheses of empirical science must be so constructed that they are subject to falsification on the basis of suitable empirical data (Popper, 1965, pp. 31–37). The need to dispose of Popper arises from the fact that, if Popper is right, any reference to God or divine activity inside of a hypothesis renders it non-falsifiable, and therefore non-scientific. This follows from the fact that God and His divine miraculous operations in nature cannot be observed, measured, manipulated or tested by the tools and procedures of science. Thus there is no way empirically to falsify an assertion about God or His operations. Consequently, any hypothesis that references God or His miraculous works of creation is to that degree rendered non-scientific.

The Problem of Induction Solved through Deductive Logic

British philosopher Francis Bacon in 1620 "characterized well-conducted empirical science as the advance by induction from 'senses and particulars' to 'the highest generalities' about 'the inner and further recesses of nature'" (Miller, 1994, p. 97). Bacon felt that careful observations of nature would lead to intuitive perception of the essence or true nature of the thing observed (Popper, 1965, p. 12). In 1739 English philosopher David Hume effectively demolished induction (Miller, 1994, p. 52). However, he unfortunately extended his skepticism to reject reason itself. In the 20th century Austrian philosopher Karl Popper solved the problem of induction by showing how deductive logic lies at the heart of the method of empirical science (Popper, 1959, pp. 40–48; 1965, 33–59). His criterion of demarcation between empirical science and other forms of knowledge is the requirement that a hypothesis or theory of science must be so constructed that it is subject to possible rejection on the basis of suitable new empirical data. Therefore, progress in scientific knowledge occurs through a process of clearing away errors and putting forward new testable hypotheses. Popper called this the method of "conjectures and refutations."

Objections by a number philosophers of science to Popper's criterion of demarcation have been around for quite a few years, but they have been successfully rebutted (Miller, 1994, pp. 1–49). Although gainsayers still exist, it appears that today the large majority of practicing scientists support Popper's criterion of demarcation between empirical science and other forms of knowledge. I issue a challenge to anybody to find a practicing research scientist who

agrees that a hypothesis constructed so that it cannot be subjected to empirical falsification can properly be classified as a hypothesis of empirical science. In this regard it is significant that, following the death of Karl Popper in 1994, the journal *Nature* published two memorial notes honoring the great man. The view was expressed that Popper's contributions to science are permanent. Let us add the observation that the valuable contributions of Polanyi and Kuhn to understanding the human, philosophical, and social aspects of the scientific enterprise in no way invalidate Karl Popper's emphasis on the criterion of demarcation. Furthermore, I maintain that Popper's criterion of demarcation between empirical science and other forms of knowledge does not contradict our Christian commitment to the verbal plenary inspiration and subsequent inerrancy of the Scriptures. And as we suggested above, it is because of this commitment that we believe in divine special creation.

David Miller, Professor of Philosophy at the University of Warwick in the United Kingdom, is a specialist with international reputation in the field of the philosophy of science. Long a friend and associate of Popper, Miller powerfully supports, on occasion criticizes, and extends Popper's work (Miller, 1999a; 1999b). Thus Popper continues to be a fundamental influence in the practice of science. A five-day international Congress is being organized by the Karl Popper Institut in Vienna. It will be devoted to Popper's work in over a dozen different fields of knowledge (Karl Popper Institut, 2001).

The arguments of the advocates of theistic science against Popper are neither persuasive nor final. So the criterion of demarcation remains as a barrier to the intention to bring God and His divine miracles inside of scientific hypotheses. Indeed, if the secularists are wrong to inject their philosophy into the definition of science³ and they are⁴ how can we Christians defend the injection of our philosophy into the definition of science? No, the correct definition of science is philosophically neutral and therefore excludes both philosophical naturalism and biblical theism from scientific hypotheses. As Nobel Laureate Sir Peter Medawar once said in an interview, "There is nothing more to science than its method. And Popper has explained the method." The case for "theistic science," which has yet to be defined precisely, has failed to achieve acceptance outside of some Christian creationist circles.

The Intelligent Design (ID) Movement

The most recent effort by Christians to influence the course of science is the campaign to promote the concept of Intelligent Design (ID) in nature, which is good, but also to classify Intelligent Design as a scientific principle, which is very questionable. The primary goal of this cam-

paign is laudable and is certainly supported by the Scriptures (Romans 1:19–20). On the other hand, we see some regrettable aspects of this campaign or program. First, there is the tendency to avoid acknowledging the Christian commitment to a peculiar epistemology that runs counter to the secularist epistemology. This shortcoming was mentioned in our opening paragraph above. Then there is the effort to make ID into a principle of empirical science. A number of very capable people are involved in this enterprise, and they have done some excellent work in elucidating and analyzing striking examples of complex biological systems that defy explanation in terms of evolutionary theory. Careful analysis of these systems strongly suggests that they are irreducibly complex. Therefore, their origin could not be by incremental evolution by mutation and natural selection, starting with a hypothetical "simpler proto system" that must possess minimal complexity in order to be functional and thereby subject to natural selection (Behe, 1996, pp. 39–48).

What Is Valid Scientific Reasoning with Respect to ID?

As Helen Fryman reports in the publication *Creation Matters*, William Dembski explained his "Dembski's filter" reasoning for ID with the following words: ". . . roughly speaking the filter asks three questions and in the following order: (1) Does a law explain it [i.e., the origin of some natural information-rich complex system]? (2) Does chance explain it? (3) Does design explain it?" (Fryman, 2000). Dembski reasons that if points (1) and (2) do not provide an explanation, ID can then be seriously considered. But is this scientific reasoning and does it make ID a scientific concept?

Dembski's point (1) should be rephrased, "Is there a testable scientific hypothesis, erected within the framework of established natural laws, that purportedly explains the origin of the complex system under consideration?" At this point the core policy of the scientific method comes into play, namely, rigorous skepticism. In his book, *Critical Rationalism*, David Miller explains why rough treatment should be applied to all hypotheses (1994). Every hypothesis must be subjected to rigorous empirical testing, and this is where evolutionary science fails. For example, it is apparent that no testable theory has ever been published for the evolutionary "creation" of a single new complex biochemical system (Behe, 1996, pp. 165–186). In view of these facts, Dembski's first question is vague and incomplete. Furthermore, the proper way to answer it relies on the validity of Karl Popper's criterion of demarcation, the requirement that scientific hypotheses must be empirically falsifiable.

Dembski's point (2) is, it would seem, properly subsumed under his point (1). In the absence of a bona fide

scientific hypothesis, one can look at the proposed initial conditions for some evolutionary process assumed to have “created” the new complex system, structure or organ under consideration. Even though no testable hypothesis has been proposed, starting with a proposed reaction system with prescribed initial conditions, it is possible to estimate the probability that random natural events could “create” the complex biological product being considered. The information content of the new complex system compared with the information content corresponding to the conditions in the initial system determines the probability of “creation” by chance. All such calculations lead to extremely small probabilities.

Fryman (2000), apparently expressing Dembski’s opinion, asserts that “the ID movement is devoid of theological presuppositions.” Is this really the case? To answer this question, let us first ask if the secularist explanations for origins are “devoid of theological presuppositions.” As we pointed out in the first section of this essay, the “original sin in the garden of science” is the imposition upon science of the theology of either no God or, perhaps, of a cosmic Wimp that could create nothing. Such a God is forced to adopt as His own whatever the mindless atoms in the primeval soup toss out to Him. Thus the secularist approach to origins is not devoid of theological/philosophical presuppositions.

Let it be noted carefully that our treatment of any proposed scientific hypothesis for the evolution of a complex biological system is to be characterized by rigorous skepticism. Also, the spirit behind probability calculations should incorporate that same skepticism. But what about the advocates of ID? They are for the most part evangelical Christians. Can they properly be skeptical about ID? Not according to the scripture portions that were cited in our opening paragraph above. Further, is there really any way to falsify empirically the assertion that a particular complex, information-rich biological system gives evidence for ID? There is not, even though the facts speak strongly to our conscience in favor of ID. In fact their evangelical Christian faith denies to the advocates of ID the right to be skeptical about ID. These facts prove that ID likewise is not devoid of theological presuppositions, nor is it a scientific principle, as J. P. Moreland, William Dembski and others have claimed.

Further explanation of our view of the scientific case for creation and/or intelligent design is probably necessary. Since neither the Agent in creation, God, nor the process is subject to observation, replication, experimental manipulation, and scientific explanation, our case is necessarily negative. We therefore must adduce scientific evidence that weighs against the possibility of a naturalistic origin of the universe and its creatures. We believe that the scientific enterprise, now conducted largely by scientists who are unbelievers, is bringing to light an ever-increasing

body of scientific evidence supportive of our negative case. We should lay the burden for proof on the supporters of the grand Darwinian scenario of origins. One of their responses is to complain that we creationists have only a negative case. We should not argue about this, but rather press upon evolutionists three crucial deficiencies of their case for evolution. They lack (1) the necessary historical (i.e., fossil) evidence of the putative historical process, (2) a testable scientific theory for the spontaneous origin of complex new biological systems, structures and organs, and (3) at least a few examples in nature today of new complex biological systems or structures that are part-way along in their random evolutionary adventure that may or may not culminate in the production of some unknown, unforeseen evolutionary novelty. These three goals are yet to be achieved, although most biology textbooks leave students believing that they have been achieved.

What Is Required to Prove the Case for Creation or for Evolution?

It has been suggested that we make more definite what we consider to be sufficient scientific “proof” of our case for creation and against evolution. However, the goal of the scientific enterprise is not “proof,” but testable naturalistic theoretical explanations of phenomena in the natural world. By this we mean testable scientific theories erected within the framework of established physical laws. It is quite acceptable for scientists who are believers in a closed materialistic universe to frame theories designed to explain the origin of complex biological systems and structures purely in terms of physical laws. But their theories, to be theories of empirical science, must be so framed as to be subject to potential falsification by empirical test. Remember that the central policy of the scientific method is persistent skepticism concerning all theories (Miller, 1994; 1999a; 1999b). We assert that a testable theory of neither abiogenesis nor macroevolution has yet been published. Nevertheless, students at all levels are taught as fact the assumption that microevolution can over time bring about macroevolution. Since microevolution has been observed, it follows that macroevolution also has occurred. And secularist scientists conduct all of their thinking and research to enlarging the body of data that can be adduced in support of their grand assumptions.

Conversely, scientists who believe in divine special creation will in general have other questions for which they are seeking scientific explanations, that is, testable scientific theories. Some scientists who are Christian believers in divine creation may, for example, wish to participate in advancing the knowledge of genetics and of the new field of genomics. They will generally not be interested in attempting to develop theories for the evolutionary origin of

life and of complex new biological systems. The overarching objective of scientific research is the extension and refinement of our knowledge of the natural world. And, of course, Christian scientists also have the supreme motivational goal of bringing glory to God the Creator of all things.

Some Christian believers in divine creation may work to enlarge the body of scientific evidence that can be adduced against the possibility of abiogenesis and the grand Darwinian microbe-to-man scenario. But let it be clear that the discovery of new scientific evidence against abiogenesis and against macroevolution will, from a scientific perspective, not “prove” that abiogenesis and macroevolution are impossible. From the purely human perspective of empirical science, nobody can with certainty know scientists will never be able to explain abiogenesis or macroevolution with testable scientific theories. Nor does scientific evidence adduced against evolution “prove” the case for divine special creation. However, such new information does serve to increase evidence both *against* evolution and *for* the only alternative, divine special creation. We believe that God is graciously making available an increasing body of scientific evidence to encourage us in the walk of faith. His grace is also providing evidence to awaken unbelievers to see their folly in denying the God of Creation and Redemption.

Let us reiterate our assertion that scientific evidence will neither “prove” nor “disprove” either Darwinian microbe-to-man evolution or divine special creation. But every human being is responsible to consider the evidence to which he or she has access, and come to a personal decision for the Creator God. This is what we Christians believe God has told us through the Apostle Paul:

...because what may be known of God is manifest in them, for God has shown it to them. For since the creation of the world His invisible attributes are clearly seen, being understood by the things that are made, even his eternal power and Godhead, so that they are without excuse. (Romans 1:19–20)

Conclusions

We conclude, then, that ID is as obviously grounded in a theological presupposition as Darwinian evolution is grounded in an anti-theological presupposition. Therefore, ID, while we believe it to be the valid view of the real world that science studies, is not a scientific principle. What is ID, then? It is a divinely mandated way of looking at the world, according to the Scriptures that were referenced in our opening paragraph above. The connection of ID with science is the fact that the findings of scientific research provide a wealth of circumstantial evidence supportive of ID, that is, supportive of what we already believe

because God tells us it is right and because correct logic plus millennia of consistent human observation of nature reinforce what He says. The pertinent historical fact is that in all of human history nobody has ever observed a new, information-rich complex system come into being that was not the product of an intelligent human mind. Modern science continually adds information to strengthen our historical case for ID.

In closing, we encourage the participants in the ID movement to continue their good work in driving the available scientific evidence to the hilt, with confidence. However, it is essential that we Christians involved in this witness for the truth of God should function correctly in the scientific enterprise. And let none of us be unwilling to admit before the world that we who name the Name of Christ are motivated by our commitment to the biblical theological view of the world. How Christians and every other kind of believer or unbeliever may properly practice science, in accord with the common sense rules of the correct philosophically neutral definition of science is the subject of a series of two articles published some years ago by this writer (Kofahl, 1986; 1989). Believers and unbelievers of all sorts can practice science correctly and honorably, provided simply that they abide by the rules of the method.

Our approach to the scientific creation/evolution debate rests on a biblical theological foundation. Knowledge gained from the scientific enterprise can be helpful in elucidating some theological issues. The core of the scientific method is, in accord with Popper’s work, that of “conjectures (hypotheses) and refutations (empirical testing of hypotheses)” (Popper, 1959; 1965). By the consistent application of this method, scientists should strive continually to correct and expand our understanding of the natural order. It is the will of God that this knowledge should speak to souls enlightened by the Holy Spirit concerning the eternity, sovereign power, and deity of the God of creation (Romans 1:19–20).

References

- CRSQ: *Creation Research Society Quarterly*
 Behe, Michael. 1996. *Darwin’s black box—The biochemical challenge to evolution*. The Free Press, New York.
 Darwin, Charles. 1987. *Charles Darwin’s notebooks, 1836–1844*, pp. 535, 536, 566. Cornell University Press, New York.
 Fryman, Helen. 2000. Quoting William Dembski in: The intelligent design movement. *Creation Matters* 5(2):1, 4–5.
 Karl Popper Institut, 2000. *Karl Popper 2002 Centenary Congress*. July 3–7, 2002. The Congress will be devoted to Popper’s work in over a dozen different fields of knowledge, including scientific method, logic, quan-

- tum mechanics, darwinism, evolutionary epistemology, and the body-mind problem.
- Kofahl, Robert E. 1986. Correctly redefining distorted science: A most essential task. *CSRQ* 23:112–114.
- Kofahl, Robert E. 1989. The hierarchy of conceptual levels for scientific thought and research. *CSRQ* 26(1):12–14.
- Miller, David. 1994. *Critical rationalism—A restatement and defence*. Open Court, Chicago.
- Miller, David. 1999a. Being an absolute skeptic. *Science* 284:1625–1626.
- Miller, David. 1999b. Response. *Science* 285:201–202.
- Moreland, J.P. 1989. *Christianity and the nature of science*. Baker Book House, Grand Rapids, MI.
- Moreland, J.P. 1994. Theistic science and methodological naturalism. In: *The creation hypothesis—scientific evidence for an intelligent designer*, Chapter 1. J.P. Moreland, editor. Intervarsity Press, Downers Grove, IL.
- National Academy of Sciences. 1984. *Science and creationism—View from the National Academy of Sciences*, p. 26. National Academy of Sciences Press. Washington, D.C.
- Popper, Karl R. 1959. *The logic of scientific discovery*. Basic Books, New York.
- . 1965. *Conjectures and refutations—The growth of scientific knowledge*. Basic Books, New York.

Book Review

Beowulf by Seamus Heaney

Farrar, Straus and Giroux, New York, 2000, 3182 lines, \$25

Why should a classic of English literature be of interest to creationists? This book is being reviewed here because of the fact that it is sometimes referenced by creationist authors who attempt to point out that dinosaurs have co-existed with man. The work, written by an eighth-century Anglian poet, does have several references to dragons and other monsters all of which might be dinosaurs, thereby making the poem of possible interest to creationists.

The poem is described on the flyleaf as “the elegiac narrative of the adventures of Beowulf, a Scandinavian hero who saves the Danes from the seemingly invincible monster Grendel and, later, from Grendel’s mother.” Line 712 refers to Grendel as “The bane of the race of men . . .” which seems to indicate he is non-human, yet he is sometimes described in other literature as half man and half fiend. Within the poem some evidence of his nature can be gleaned from the use of “talons,” “claw-scale,” and “spur” as the poet describes the monster’s “hand.” Grendel’s mother is called a “troll-dam,” a term that could indicate a supernatural female demon. Both are described as “fatherless creatures” who dwell among wolves. After Beowulf had fought with Grendel and torn off his arm, Grendel returned to his lair in a mere and there died. “The water was infested with all kinds of reptiles. There were writhing sea-dragons and monsters slouching on slopes by the cliff, serpents and wild things . . .” Thus, although Grendel and his mother may not have been “dragons” the poem does acknowledge their possible existence.

When Beowulf was king over his people and had reigned for fifty years, he faced another monster, one that lived in a cave and guarded a treasure of gold and precious stones. When an intruder stole a gem-studded goblet, “the

dragon began to belch out flames and burn bright homesteads; there was a hot glow that scared everyone, for the vile sky-winger would leave nothing alive in his wake.”

In his translation, Heaney also uses the term “sky-plague.” Cryptozoologists have taken these references of “sky-winger” and “sky-plague” to mean a flying pteranodon. The movement of the dragon is described as “gliding and flexing” and Heaney says its skin was covered with “enamelled scales.” When flames did not deter Beowulf, the dragon sank “sharp fangs” into the neck of his attacker, injecting “deadly poison.” Another bit of description is given in “From head to tail, his entire length was fifty feet.” But Beowulf alone could not kill this one; it took help from his thane, Wiglaf, who plunged a sword “into its belly.”

Was this “dragon” possibly a dinosaur? There is not enough information given to identify it as such and the references to the dragon guarding a horde of gold and precious stones give the story a ring of fantasy. Also, the fire breathing part is suspect. A hot breath is one thing, but a breath that causes houses and forts to be burned to the ground clearly tells the reader that the poem is not meant to be taken literally.

After searching this translation of the poem for some clue that would identify any kind of dinosaur, it must be concluded that there is none. The Englishman who authored the original poem may have seen dinosaurs and pterosaurs, but he did not exhibit any knowledge of it in this writing.

Clifford L. Lillo
22953A Nadine Circle
Torrance, CA 90505

Author and Title Index for Volume 37 2000–2001

Lazella M. Lawson*

This title/author index covers articles, panorama notes and other features. For items with two or more pages, the reference is to the first page only. After the page number, a letter indicates which type of entry is involved: article (A), panorama

note (P), letter to the editor (L), book, magazine article or video review (R), cover photo (CP), or other departments (such as laboratory director's comments, president's remarks, photo essays, etc.) (D).

A

- Abraham Trembley and the Hydra, Arthur Manning, 222 (A)
- Akridge, A. Jerry
Board of Directors Meeting Field Trips, 134 (D)
Letter about Gentet's CCC Model, 202 (L)
- Archaeoraptor liaoningensis* Is Introduced to a Sticky End, Colin Brown, 66 (L)
- Armitage, Mark H.
The Goblet Cell, 248 (P)
Parasitism by Design? The Surface Micromorphology of Flatworms, 105 (D)
Trematode Parasites: Design, 208 (L)
- Armstrong, Carol
The Design Inference: Eliminating Chance Through Small Probabilities, 136, 175 (R)
God at Ground Zero, 135 (R)
How Now Shall We Live?, 252 (R)
Scopes: Creation on Trial, 73 (R)
Show Me God, 122 (R)
- Assessing Creationist Stratigraphy (CRSQ 36:51–60) and the Formation of Clay, Malcolm Bowden, 59, (L)
- Author and Title Index for Volume 36, Lazella Lawson, 195 (D)

B

- Baraminology—Classification of Created Organisms, Wayne Friar, 82 (A)
- Bergman, Jerry
The Life Clock and Paley's Watch: Telomeres, 176 (A)
Ota Benga; The Pygmy in the Zoo, 46 (R)
The Rise and Fall of Haeckel's Biogenetic Law, 110 (A)
What's Darwin Got to Do with It?: A Friendly Conversation About Evolution, 254 (R)

*Lazella M. Lawson, M.S., 21515 Placerita Cyn. Rd. #16, Newhall, CA 91321.

- Bible-Based Flood Geology: Two Different Approaches to Resolving Earth History—A Reply to Tyler and Garner, John Reed and Carl R. Froede Jr., 61 (L)
- Biblical Weather*, Don B. DeYoung, 81 (R)
- Big Bang?/Was There a*, Del Dobberpuhl, 1 (R)
- Board of Directors Meeting Field Trips, Carl R. Froede, Jr. and A. Jerry Akridge, 134 (D)
- Board of Directors Meeting Minutes, David A. Kaufmann, 137 (D)
- Bowden, Malcolm
Assessing Creationist Stratigraphy (CRSQ 36:51–60) and the Formation of Clay, 59, (L)
Comments on Bergman's article on the Piltdown Hoax (CRSQ 36:145–154), 67 (L)
- Brown, Colin
Archaeoraptor liaoningensis Is Introduced to a Sticky End, 66 (L)
The Genesis Kind and *Psarolepsis*, a Fossil Fish, 54, (L)
Obruchevichthys Adds Support For Creation, 256 (L)
Pneumatization found in *Archaeopteryx*, 133 (L)
The Production of Form, *Hox* Genes, and Symmetric Variation, 58 (L)
The Speed of Genetic Variation, 260 (L)
Teeth and Toe Patterns in Marsupials, 133 (L)

C

- Catastrophic Effects of Hurricane Danny on Island and Beach Zone Erosion along the Southeastern End of Dauphin Island, Alabama, Carl R. Froede Jr., 128 (P)
- CCC Model and its Geologic Implications/The, Robert Gentet, 10 (A)
- CCC Model and its Geologic Implications by Robert Gentet/The, Everett Peterson, 261 (L)
- CCC Model: A Reply to Froede; Reed; Akridge; Woodmorappe; Klevberg, Robert E. Gentet, 207 (L)
- CCC Model, Carl R. Froede, Jr., 199 (L)
- CCC Model, John K. Reed, 200 (L)
- CCC Model, Jerry Akridge, 202 (L)

- CCC Model, John Woodmorappe, 203 (L)
 CCC Model, Peter Klevberg, 204 (L)
 Chaffin, Eugene F.
 A Mechanism for Accelerated Radioactive Decay, 3 (A)
 Clays and Basalt Clarify Stratigraphy, Peter Klevberg, 256 (L)
 Clay-size Particles Formed During the Flood: A Reply to Mr. Bowden/Questions about, Carl R. Froede Jr., 257 (L)
 Coal-bearing Strata within an *In-situ* (?) Fossilized Paleo-Fern-Tree Forest: Which Models and Settings Apply?, Carl R. Froede Jr., 123 (P)
 Comments on Bergman's article on the Piltdown Hoax (CRSQ 36:145–154), Malcolm Bowden 67 (L)
 Complexity, Variability Limits, and Holobaramin Boundaries, John L. Estes, 55 (L)
 Cover Designs by Michael Erkel, (CP)
Creation, Time, and Dr. Hugh Ross, Danny Faulkner, 220 (R)
 Critique of the Literary Framework View of the Days of Creation/A, Andrew S. Kulikovsky, 237 (A)

D

- Davidheiser, Bolton
 An Exhortation for the Correct Use of Words, 260 (L)
 The Wisdom of the Bones, 93 (R)
Design Inference: Eliminating Chance Through Small Probabilities/The, Carol Armstrong, 136, 175 (R)
 DeYoung, Don B.
 Biblical Weather, 81 (R)
 Fast Fossils, 210 (R)
 Fossil Facts and Fantasies, 109 (R)
 The Handy Dinosaur Answer Book, 244 (R)
 How Now Shall We Live?, 225 (R)
 Lunar Crater Giordano Bruno, 185 (A)
 Noah's Ark and the Ziusudra Epic, 244 (R)
 Over the Edge, 104 (R)
 Rare Earth, 141 (R)
 Star of Bethlehem, 183 (R)
Dinosaurs and Creation, Dan Schobert, 254 (R)
Dinosaurs and Creation, Tim Young, 221 (R)
 Dobberpuhl, Del
 Was There a Big Bang?, 1 (R)

E

- Editor's Comments, Emmett L. Williams, 1, 81, 141 (D)
 Estes, John L.
 Complexity, Variability Limits, and Holobaramin Boundaries, 55 (L)
 Evolution, Time, and *Brontosaurus?*, Carl R. Froede Jr., 49 (P)

- Exhortation for the Correct Use of Words/An, Bolton Davidheiser, 260 (L)
Explorers of Ararat and the Search for Noah's Ark/The, Clifford L. Lillo, 108 (R)

F

- Fast Fossils*, Don B. DeYoung, 210 (R)
 Faulkner, Danny
 Creation, Time, and Dr. Hugh Ross, 220 (R)
 Faulkner, Seth
 Jonathan Park and the Secret of the Hidden Cave, 262 (R)
Fossil Facts and Fantasies, Don B. DeYoung, 109 (R)
 Fossils and the pre-Flood/Flood Boundary, M. J. Hunter, 208 (L)
 Friar, Wayne
 Baraminology—Classification of Created Organisms, 82 (A)
 Letter about Gentet's CCC Model, 199 (L)
 What's Darwin Got to Do with It?: A Friendly Conversation About Evolution, 158 (R)
 Froede, Carl R.. Jr
 Are Uniformitarians Documenting Earth's Biblical Creation?, 249 (P)
 Bible-Based Flood Geology: Two Different Approaches to Resolving Earth History—A Reply to Tyler and Garner, 61 (L)
 CCC Model, 199 (L)
 Board of Directors Meeting Field Trips, 134 (D)
 The Catastrophic Effects of Hurricane Danny on Island and Beach Zone Erosion along the Southeastern End of Dauphin Island, Alabama, 128 (P)
 Coal-bearing Strata within an *In-situ* (?) Fossilized Paleo-Fern-Tree Forest: Which Models and Settings Apply?, 123 (P)
 Evolution, Time, and *Brontosaurus?*, 49 (P)
 The Key Largo Limestone: Correlating Physical Information to Models, 68 (L)
 Questions about Clay-size Particles Formed During the Flood: A Reply to Mr. Bowden, 257 (L)
 Submarine Volcanism, Part I—Subaqueous Basalt Eruptions and Lava Flows, 22 (A)

G

- Garner, Paul
 The Uniformitarian Column and Flood Geology: A Reply to Froede and Reed (1999, CRSQ 36:51–60), 60 (L)
 Genesis Kind and *Psarolepsis*, a Fossil Fish/The, Colin Brown, 54, (L)

Gentet, Robert

- The CCC Model and its Geologic Implications, 10 (A)
- CCC Model: A Reply to Froede; Reed; Akridge; Woodmorappe; Klevberg, 207 (L)
- Response from Robert Gentet, 261 (L)
- Gentet's CCC Model/Five Letters about, Carl R. Froede Jr., John K. Reed, Jerry Akridge, John Woodmorappe, Peter Klevberg, 199-204 (L)
- Goblet Cell/The, Mark H. Armitage, 248 (P)
- God at Ground Zero*, Carol Armstrong, 135 (R)
- God's Promise to the Chinese*, Clifford L. Lillo, 184 (R)
- Granitic Plutons and the Flood, Emmett L. Williams, 92 (D)

H

- Haeckel's Biogenetic Law/The Rise and Fall of, Jerry Bergman, 110 (A)
- Handy Dinosaur Answer Book/The*, Don B. DeYoung, 244 (R)
- Historiography and Natural History, John K. Reed, 160 (A)
- Honeyman, Jim
 - Do the Microcontinents Between Greenland and the British Isles Fit With Plate Tectonic Theory?, 191 (P)
- How Now Shall We Live?*, Carol Armstrong, 252 (R)
- How Now Shall We Live?*, Don B. DeYoung, 225 (R)
- Howe, George F.
 - The Origin of Flowering Plants, 66 (L)
- Human Body: An Intelligent Design/The*, David A. Kaufmann, 53 (R)
- Hunter, M. J.
 - Fossils and the pre-Flood/Flood Boundary, 208 (L)

I

- In Search of Deep Time—Beyond the Fossil Record to a New History of Life*, David H. Stone, 193 (R)
- Ivanov, Yuri N.
 - Laws of Fertility, Role of Natural Selection, and Destructiveness of Mutations, 153 (A)

J

- Jonathan Park and the Secret of the Hidden Cave*, Seth Faulkner, 262 (R)

K

- Karkow, William
 - Molecular Biology of the Cell, 192 (R)

Kaufmann, David A.

- Board of Directors Meeting Minutes, 137 (D)
- The Human Body: An Intelligent Design*, 53 (R)
- Key Largo Limestone: Correlating Physical Information to Models/The, Carl R. Froede Jr., 68 (L)
- Key Largo Limestone/More Musings on the, Peter Klevberg, 258 (L)
- Keyword Index for Volume 36, Emmett L. Williams, 74 (D)
- Klevberg, Peter
 - Clays and Basalt Clarify Stratigraphy, 256 (L)
 - Letter about Gentet's CCC Model, 204 (L)
 - More Musings on the Key Largo Limestone, 258 (L)
 - The Philosophy of Sequence Stratigraphy, Part II—Application to Stratigraphy, 36 (A)
 - The Philosophy of Sequence Stratigraphy, Part III—Application to Sequence Stratigraphy, 94 (A)
- Kulikovsky, Andrew S.
 - A Critique of the Literary Framework View of the Days of Creation, 237 (A)

L

- Laws of Fertility, Role of Natural Selection, and Destructiveness of Mutations, Yuri N. Ivanov, 153 (A)
- Lawson, Lazella
 - Author and Title Index for Volume 36, 195 (D)
- Lewis, Paul W.
 - Mitchell Caverns: Evidence of Climate Change, 235 (D)
- Lillo, Clifford L.
 - The Explorers of Ararat and the Search for Noah's Ark*, 108 (R)
 - God's Promise to the Chinese*, 184 (R)
 - Noah's Flood*, 253 (R)
 - Refuting Evolution*, 35 (R)
 - Ride to Glory*, 226 (R)
- Lumsden, Richard D.
 - Parasitism by Design? The Surface Micromorphology of Flatworms, 105 (D)
- Lunar Crater Giordano Bruno, Don B. DeYoung, 185 (A)

M

- Manning, Arthur
 - Abraham Trembley and the Hydra, 222 (A)
- Mastropaolo, Joseph
 - The Maximum-Power Stimulus Theory For Muscle 213 (A)
- Maximum-Power Stimulus Theory For Muscle/The, Joseph Mastropaolo, 213 (A)

Mitchell Caverns: Evidence of Climate Change, Paul W. Lewis, 235 (D)

Molecular Biology of the Cell, William Karkow, 192 (R)

Mythology of Modern Dating Methods/The, John K. Reed, 225 (R)

N

Noah's Ark and the Ziusudra Epic, Don B. DeYoung, 244 (R)

Noah's Flood, Clifford L. Lillo, 253 (R)

O

Oard, Michael J.

Plate Tectonics Unlikely/Lack of Evidence for Subduction Renders: Part I—Trench Sediments and Accretionary Prisms, 142 (A)

Plate Tectonics Unlikely/Lack of Evidence for Subduction Renders: Part II—Extension Dominant at “Convergent Subduction Zones”, 227 (A)

Obruchevichthys Adds Support For Creation, Colin Brown, 256 (L)

Origin of Closed Canyon, Trans-Pecos Texas: A Comparison to the Black Canyon of the Gunnison River, Colorado, Emmett L. Williams, 189 (P)

Origin of Flowering Plants/The, George F. Howe, 66 (L)

Ota Benga; The Pygmy in the Zoo, Jerry Bergman, 46 (R)

Over the Edge, Don B. DeYoung, 104 (R)

P

Parasitism by Design? The Surface Micromorphology of Flatworms, Mark H. Armitage and Richard Lumsden, 105 (D)

Peterson, Everett

The CCC Model and its Geologic Implications by Robert Gentet, 261 (L)

Plate Tectonics Unlikely /Lack of Evidence for Subduction Renders: Part I—Trench Sediments and Accretionary Prisms, Michael J. Oard, 142 (A)

Plate Tectonics Unlikely /Lack of Evidence for Subduction Renders: Part II—Extension Dominant at “Convergent Subduction Zones”, Michael J. Oard, 227 (A)

Plate Tectonic Theory?/Do the Microcontinents Between Greenland and the British Isles Fit With, Jim Honeyman, 191 (P)

Pneumatization found in *Archaeopteryx*, Colin Brown, 133 (L)

Production of Form, *Hox* Genes, and Symmetric Variation/The, Colin Brown, 58 (L)

R

Radioactive Decay/A Mechanism for Accelerated, Eugene F. Chaffin, 3 (A)

Rare Earth, Don B. DeYoung, 141 (R)

Reed, John K.

Bible-Based Flood Geology: Two Different Approaches to Resolving Earth History—A Reply to Tyler and Garner, 61 (L)

Historiography and Natural History, 160 (A)

Letter about Gentet's CCC Model, 200 (L)

The Mythology of Modern Dating Methods, 225 (R)

Refuting Evolution, Clifford L. Lillo, 35 (R)

Response from Robert Gentet, Robert E. Gentet, 261 (L)

Ride to Glory, Clifford L. Lillo, 226 (R)

S

Schobert, Dan

Dinosaurs and Creation, 254 (R)

Scopes: Creation on Trial, Carol Armstrong, 73 (R)

Sequence Stratigraphy/The Philosophy of, Part II—Application to Stratigraphy, Peter Klevberg, 36 (A)

Sequence Stratigraphy/The Philosophy of, Part III—Application to Sequence Stratigraphy, Peter Klevberg, 94 (A)

Shaver, Michael

Slumping at Grand Mesa, Colorado: Slow or Rapid?, 245 (P)

Show Me God, Carol Armstrong, 122 (R)

Slumping at Grand Mesa, Colorado: Slow or Rapid?, Michael Shaver, 245 (P)

Speed of Genetic Variation/The, Colin Brown, 260 (L)

Star Formation According to Faulkner and Mulfinger: Some Observations, Emmett L. Williams, 47 (P)

Star of Bethlehem, Don B. DeYoung, 183 (R)

Stone, David H.

In Search of Deep Time—Beyond the Fossil Record to a New History of Life, 193 (R)

Submarine Volcanism, Part I—Subaqueous Basalt Eruptions and Lava Flows, Carl R. Froede, Jr., 22 (A)

T

Teeth and Toe Patterns in Marsupials, Colin Brown, 133 (L)

Telomeres/The Life Clock and Paley's Watch, Jerry Bergman, 176 (A)

Trematode Parasites: Design, Mark H. Armitage, 208 (L)

Tyler, David J.

The Uniformitarian Column and Flood Geology: A Reply to Froede and Reed (1999, CRSQ 36:51–60), 60 (L)

U

- Uniformitarian Column and Flood Geology: A Reply to Froede and Reed (1999, CRSQ 36:51–60), David J. Tyler and Paul Garner, 60 (L)
- Are Uniformitarians Documenting Earth's Biblical Creation?, Carl R. Froede, Jr., 249 (P)

W

- What's Darwin Got to Do with It?: A Friendly Conversation About Evolution*, Jerry Bergman, 254 (R)
- What's Darwin Got to Do with It?: A Friendly Conversation About Evolution*, Wayne Friar, 158 (R)
- Williams, Emmett L.
Editor's Comments, 1, 81, 141 (D)

- Granitic Plutons and the Flood, 92 (D)
- Keyword Index for Volume 36, 74 (D)
- Origin of Closed Canyon, Trans-Pecos Texas: A Comparison to the Black Canyon of the Gunnison River, Colorado, 189 (P)
- Star Formation According to Faulkner and Mulfinger: Some Observations, 47 (P)
- Wisdom of the Bones/The*, Bolton Davidheiser, 93 (R)
- Woodmorappe, John
Letter about Gentet's CCC Model, 203 (L)

Y

- Young, Tim
Dinosaurs and Creation, 221 (R)

Book Review

Quest for Truth: Scientific Progress and Religious Beliefs by Mano Singham Phi Delta Kappa Education Foundation, Bloomington, IN. 2000, 184 pp., \$22

Mano Singham is a professor of nuclear physics at Case Western Reserve University in Cleveland. I first became aware of Prof. Singham through his recent thought-provoking article, *The Science and Religion Wars* (2000). In *Quest for Truth*, Dr. Singham expands on the subject introduced in his *Kappan* article. He also delves fully into the realm of the philosophy of science. His insights are intriguing and in places difficult to understand. But the book is nevertheless an excellent read for those interested in the overlap between science and religion.

Prof. Singham starts out by describing four models of "creationism":

1. *Creation science*, the belief that "the universe, life, humans, and other major species were created more or less whole by a divine Creator within the last ten thousand years or so" (p. 9).
2. *Gap theory*, in which the "creation process could have involved multiple cataclysms and creations and is flexible enough to accommodate most geological evidence" (p. 9). In other words, the universe is old and God intervened only at specific critical times in history.
3. *Day-age model*, in which the "six 'days' of creation in the Genesis story are interpreted metaphorically as representing long but indeterminate periods of time^{1/4}" (p. 10).
4. *Intelligent design*, in which proponents "infer that some form of divine guidance (a Creator) had to be present

and actively involved ^{1/4} to explain the appearance of life in all its present forms^{1/4}" (p. 11).

One may quibble a bit with Singham's terminology; for example, intelligent design proponents do not normally refer to their position as creationist. However, it is clear from the book that Dr. Singham has studied creation positions in detail and knows the basic tenets.

Singham accurately defines what he calls the creationist point of view: "If there is one common thread that all creationists share, it is that the world as we know it now is too complex and subtle to have come about without the active and repeated intervention of an external agent or a diety, acting outside the laws of science" (p. 11).

Singham goes on to contrast this with the naturalist point of view: "The scientific establishment, conversely, starts with the assumption that all natural phenomena should be explainable by natural [material, physical] laws that can be discovered using the methods of science" (p. 13). Since supernatural miracles "have no place in this framework" (p. 13), the creationist and naturalist worldviews are inevitably in conflict. (It may be noted that many scientists do not support this definition, but Singham is certainly correct that the science *establishment* adopts a naturalistic posture.)

Prof. Singham laments the fact that "there seems to be very little attempt by any of the protagonists in the science-religion wars to really understand what the other groups

are saying” (p. 31). Instead, both sides typically use vitriolic tactics to try to win the public to their side. This is most unfortunate, according to Singham, since “the issues raised are deeply interesting and have profound implications...” (p. 31).

One might wonder where Prof. Singham stands in this debate. He is, first of all, a practicing scientist who fully supports the naturalistic viewpoint. Dr. Singham says he is an atheist (although *agnostic* might be a better description, since he seems open to the possibility of a spiritual realm). Despite his naturalistic worldview, Prof. Singham is refreshingly open to resolving the conflict between science and religion. He genuinely understands that the creationist point of view has some merit, and he hopes that a peaceful resolution of the science-religion wars is possible.

At the end of the book Singham tries to suggest an approach that might help to ease the conflict. His answer is less than satisfying (to me at least), but nevertheless his views are worthy of consideration. A basic premise of Singham’s book is that “scientific progress is not necessarily leading us toward the truth” (p. 167). In other words, as we gain knowledge about the universe, we also uncover more questions to which we do not know the answers. This being the case, Singham says there will always be room for religious beliefs, since science can never reach the point where everything is known. There will always be a role for both science and religion, and thus these two ways of knowing should be able to coexist.

A far better approach to ending the conflict, many of us believe, would simply be to return to a *traditional* definition of science. In this, scientists would be allowed to pursue *all logical* explanations for phenomena in nature, not just *naturalistic* ones. (John Calvert and William Harris have given a detailed description of this proposal (www.intelligentdesignnetwork.org/endingwar.htm).

Finally, it may be useful to point out a few areas where those from a creation/design perspective might disagree with Prof. Singham. First, he misunderstands the intelligent design position when he states that design proponents “adopt the strategy of focusing their energies on finding flaws in the case for evolution...” (p. 33). In fact, what ID tries to do is look *objectively* at the scientific evidence to determine which features in living things may be designed by some form of intelligence. A primary function of ID theory is to make design *inferences* when these are warranted. One looks in nature for *specified complexity* (William Dembski’s term) or *irreducible complexity* (Michael Behe’s term). Finding flaws in evolution may be part of the process, but it is not a primary goal.

Second, Prof. Singham fails to make a key distinction between *empirical* (experimental) and *historical* sciences. He does state that certain theories (including Darwinian evolution and Big Bang cosmology) are “explanations of unique historical events that cannot be replicated” (p. 76).

Singham then goes on to say, however, that “I will use the term *experiment* to denote both repeatable, controllable, laboratory-type experiments and observations of the type involved in cosmology [history of the universe] and natural selection [Darwinian evolution]” (p. 76). This implies that (in Singham’s mind) there is no distinct difference between experimental sciences (like chemistry and physics) and historical sciences (like cosmology, design and evolution).

While the naturalistic point of view seems valid for use with experimental sciences, the use of the naturalistic assumption in historical sciences detracts from objectivity. Since historical sciences cannot be falsified by planned experiments, the only way to test theories like Darwinian evolution is to compare them with the alternatives. The use of naturalism to exclude design theory from consideration is, in effect, not good practice of the scientific method. If creation/design proponents at times search for flaws in evolution, they are simply comparing their theory with the naturalistic alternative and this is good science.

Third, Prof. Singham rejects the idea of an absolute truth. Our knowledge base is constantly growing, but Singham believes that this new knowledge is “not necessarily leading us toward the truth...” (p. 167). Singham apparently subscribes to the postmodern viewpoint that there is no such thing as objective truth. At the same time, Singham acknowledges that a strength of religion is that it provides a core of values that are believed to represent eternal truth. So perhaps at the core of the science-religion wars is a search for truth. Singham believes scientific progress will not lead to truth, while those who put their faith in God the Creator believe that truth has already been found and revealed to man. Since science is a part of God’s universe, there can be no real conflict between true science and religion.

In short, the real war between science and religion is not (as Prof. Singham would suppose) a fight between evolution/Darwinism and creation/design. The real debate is over the definition of science. Is science the search for *natural* explanations for phenomena in the universe (i.e., explanations that involve only natural law and chance), or is it the search for *logical* explanations (which may include natural law, chance, and design)? As long as the science establishment continues to exclude the possibility of intentional design in nature, I predict the war will continue.

Reference

Singham, Mano. 2000. The Science Religion Wars. *Phi Delta Kappan* 81:424-432.

Robert Lattimer, Ph.D.
72 East Case Drive
Hudson, Ohio 44236
lattimer@worldnet.att.net

Minutes of the 2001 Creation Research Society Board of Directors Meeting

On Thursday 31 May 2001 a meeting of the Board of Directors (BOD) was held at the Embassy Suites Phoenix Airport West Hotel, Phoenix, Arizona, from 2100 hours to 2300 hours to plan for the committee meetings on Friday. On Friday 1 June 2001 between the hours of 1000 and 1700 the Finance, Membership, Research, Quarterly, Internet, Publications, VACRC, Constitution/Bylaws/Advanced Planning, and RATE Committees each met separately for approximately two hours to plan for the Saturday business meeting.

On Saturday 2 June 2001 the closed business meeting of the BOD was called to order at 0830 hours. Present: T. Aufdemberge, E. Chaffin, D. DeYoung, W. Frair, R. Gentet, G. Howe, R. Humphreys, D. Kaufmann, L. Lester, G. Locklair, J. Meyer, M. Oard, R. Samec, G. Wolfrom. Absent: J. Reed, E. Williams.

A devotion on Joachin Neumann was given by Locklair.

Letters of greetings from Williams, Reed and Boylan were read to the Board.

The minutes of the 2000 BOD meeting were accepted as distributed prior to the meeting.

Secretary Kaufmann reported that the following were elected for a three-year term to the BOD: DeYoung, Samec, Humphreys, Kaufmann, Locklair, Williams.

The Treasurer's report by Gentet was presented and accepted. A budget of \$242,300 income and \$238,000 outgo for the year 2001 was accepted.

The Finance Committee report by Aufdemberge summarized the action for 2001 of the VACRC Heritage Cash Trust, CRS Heritage Cash Trust and the money market accounts with Raymond James and Associates, Inc.

The membership report by Wolfrom was given as follows: total membership for 2000/01 was 1717 (647 voting, 639 sustaining, 418 subscriber and 13 students). This is an increase of 102 from the 1999/00 membership year.

The membership committee report by Kaufmann resulted in the following actions. It was passed to increase our monthly expenditures from \$39 to \$99 to enable CRS to secure credit card transactions on the internet for memberships and books. It was passed that Locklair contact local creation organizations with a special membership promotion of sending one volume (four issues) of previous CRSQ's for a new member joining CRS.

The research committee report by Chaffin summarized the research projects that were approved or are currently in progress. These include a study of sedimentation loads carried by the Little Colorado River by Dr. John Meyer, a digital mapping project by Dr. John Reed, some botany projects involving ring muhly grass, lichens, and other

plants by Dr. George Howe, a study of paleosols by Peter Klevberg, and finds in a Texas cave by Robert Gentet.

The Quarterly committee report by Lester was given as follows: the majority of Quarterly articles was dominated by geology and biology with physics/astronomy and philosophy/theology having fewer articles. Each issue of the CRSQ has a balance of articles, notes, letters and book reviews.

The internet committee report by Locklair contained the following. The CRS web site (www.creationresearch.org) has a new webmaster, Mr. Fred Williams. The CRS-net listserve continues to be utilized by a number of CRS members, currently about 125 active members. CRS and ChristianAnswers.net (CAN) have entered into a cooperative agreement. CAN has a link to CRS on its web site; in exchange, CRS provides answers to questions related to origins issues. Our web host provider, Adgrafx, has e-mail aliases available.

The constitution committee report by Frair resulted in the following actions. The constitution committee proposes changing the title of *Secretary* to *Recording Secretary*. This serves as the announcement for the appropriate vote on this change at our 2002 BOD meeting. The Board approved the following changes to the Bylaws Article II, Section 4, as indicated in italics: The president shall appoint and supervise *temporary committees as needed and also* the following Standing committees: Constitution/Bylaws and Advanced Planning, Financial, *Internet*, *Membership*, Publication, *Quarterly* Editorial, Research, and Van Andel Creation Research Center.

The publications committee report by Oard stated that CRSQ's up to volume 35 will be on CD's at a cost of \$150.

The RATE (Radioisotopes and Age of Earth) committee report by Chaffin noted that their book is now being published and marketed.

The *Creation Matters* report by Wolfrom noted that we need to acquire more manuscripts.

It was passed that the CRS BOD express our appreciation for the work of John Meyer and his wife in developing and promoting the Van Andel Creation Research Center.

It was passed to acquire a 10 year subscription up to \$1000 to the new Russian creation journal, *Sotvorene*.

It was passed to raise the membership rate for all categories by two dollars.

It was passed to nominate the following for the BOD election in 2002: Aufdemberge, Gentet, Howe, Oard.

The following officers were elected for 2001/02: President: D. DeYoung, Vice President: E. Chaffin, Secretary: D. Kaufmann, Treasurer: R. Gentet, Membership Secretary: G. Wolfrom, Financial Secretary: T. Aufdemberge.

It was passed to hold the 2002 BOD meeting at Bob Jones University, Greenville, South Carolina on Thursday, May 31 to Saturday, June 2.

The meeting was adjourned at 1445 hours.

Respectfully submitted,
David A. Kaufmann, Secretary

Book Review

Seeing Red: Redshifts, Cosmology and Academic Science by Halton Arp
Apeiron, Montreal, Quebec. 1998, 306 pages, \$24.95

This is the second book by Dr. Arp on stellar redshifts and their cosmological implications. Halton “Chip” Arp received his undergraduate degree at Harvard and his Ph.D. in astronomy from the California Institute of Technology in 1953. He obtained a staff position at Mt Wilson and Palomar Observatories under Edwin Hubble in 1954 and worked there for 29 years before being dismissed. At the time of writing this book he was at the Max-Planck Institute for Astrophysics as a guest scientist working in X-ray astronomy. Arp is well known for his potentially revolutionary work on stellar redshifts, and their relationship to star formation and universe origin. This book provides additional evidence for his position on these topics and the detailed evolutionary theory with which he explains it.

In the preface Arp explains why a second book on this topic is necessary with the claim that his first book *Quasars, Redshifts and Controversies* (Arp, 1987) became “a list of topics and objects to be avoided at all costs” (p. i) by professional astronomers. In the ten years between the two books he has collected additional evidence that he believes has been deliberately covered up by “academic scientists” to shore up the standard theory of Big Bang cosmology. He states “Now we have a situation where new facts are judged by whether they fit old theories. If they do not they are condemned with the judgment: *There is no way of explaining these observations, so they cannot be true.*” (p. ii). He reveals how embittered he has become over this situation with derogatory comments throughout the book.

In the Introduction Dr. Arp summarizes his contention that redshifts are the key to explaining what has happened and is still happening in extragalactic astronomy. He defines redshifts and how they are observed in astronomy. Then he explains the history of the Hubble relation between redshift and distance and how his observations prove this relation is false. The error by most astronomers he points out is “assuming that redshifts always and only mean recession velocities” (p. 1). He believes that redshift is a function of the age of newly created matter and that it is an intrinsic characteristic of the stellar object or galaxy. This also leads to his theories for redshift quantization, continuing episodic creation of matter, and Mach’s generalization of Einsteinian general relativity and its relation to quantum mechanics. All these topics are addressed in this book.

Chapters 1 and 2 present the observational data that indicates redshift is an intrinsic characteristic of quasars and galaxies. First Arp shows that redshifts of closely paired quasars are very similar. One of each pair is found equidistant and in the opposite direction from a galaxy between them along the galaxy’s minor axis.. Both quasars have redshifts significantly larger than the central galaxy. Evidence of attachment of these quasars to the central galaxy is shown by remnants of bridges of highly energetic particles seen in both x-ray and radio frequency (rf) spectrums between the quasars and the central galaxy. The probability of occurrence of all these characteristics due to random alignments is very small and for the ten pairs listed would be infinitesimal. Even amateur astronomers using these characteristics (pair of similar redshift quasars equidistant along a straight line through the nucleus of the central galaxy) to predict and find more such pairs have been successful. Arp pleads for a systematic search for close quasar pairs that so far has been rejected by the astronomy establishment. In the second chapter he identifies the central galaxy of these quasar pairs as a Seyfert class galaxy. These are galaxies that have exceptionally brilliant, sharp nuclei and therefore produce strong x-ray emission. He finds that a majority (21 out of 24 x-ray fields processed showed associated pairs of sources) of Seyfert galaxies have a pair of blue stellar objects (BSO) associated with them that turn out to be higher redshift quasars. Arp calls these Seyfert galaxies “quasar factories”.

Chapter 3 addresses a major problem with the Hubble theory of distance being proportional to redshift (receding velocity) for stellar objects. The problem is “companion” galaxies that have different redshifts. These companions were first found at the ends of the arms of spiral galaxies. Arp believes that the central galaxy spun off these companions. To illustrate that this process is universal he goes to the larger structures of the universe, the group and supercluster. He starts with our own Local Group that is centered by a spiral (Sb) galaxy “the Andromeda Nebula” (M31) and shows data that all the galaxies (including our own Milky Way) around M31 have positive redshifts from it. He states this data “led to a quantitative proof of the dependence of redshift on age” (p. 62) and not on recession velocity. The next nearest group is centered on another Sb (M81) and it has the same higher redshift of surrounding

galaxies. These two nearby groups each would have a probability of accidental occurrence of 1 in 4 million. He moves on to the Local Supercluster centered on the Virgo cluster and finds all “the smaller galaxies in it are systematically redshifted with respect to the larger!” (p. 64). These smaller galaxies also have lower mass-to-luminosity ratios as measured from their rotation characteristics leading to the conclusion they were formed more recently. All this evidence points to a redshift related to age and not distance.

Arp takes the argument for intrinsic redshift from galaxies to individual stars in *Chapter 4*. Again he starts closest to home with examples from the two Magellanic Clouds that have a higher mean redshift than the Milky Way with respect to M31. He states this “would mark them in turn as our younger offspring” (p. 95). Within these galaxies are bright supergiant stars that were found to have a systematic positive redshift from the mean of the gas clouds and lower redshift stars. What would cause this redshift except that they are younger than the rest of the galaxy. According to Arp they definitely are not further away or individually moving away at a higher velocity! Applying this finding to the Milky Way explains the mysterious “K” effect discovered by W. W. Campbell in 1911, namely that the bright, blue stars in our own galaxy have systematically higher redshifts than the rest of galactic stars. Originally this effect had been explained by tired light but more recently that theory had been disproved by experimental data. Next Arp applies the results of the supergiant redshift measurements (“K” effect) to active star forming galaxies. In the conventional theory of star formation two galaxies merge and create shock waves that cause new stars to form from the dust debris. Arp’s theory says just the opposite, that new stars and galaxies are being ejected from an older galaxy nucleus. He presents data that shows the redshift of supergiant stars near the center of a galaxy where new stars are being created is higher than older stars further from the center. This is applicable to quasars and BL Lac objects (transitional objects between quasars and galaxies as identified by their non thermal, continuous radiation spectrum) as well. At this point (p. 109) he introduces his mathematical theory for redshift as a function of age with ‘particle mass proportional to age squared’ and ‘redshift inversely proportional to particle mass’. Then he applies the theory to redshift data showing that a next generation galaxy is in a range of 10–100 million years younger than its parent. In closing this chapter (p. 113) he relates that there are 38 documented cases of companion galaxies where the younger galaxy has a higher (4000 to 36000 km/sec) redshift than its proposed parent. He does not provide any documented counter examples.

In Chapters 5 and 6 Arp takes up the internal structure of the Virgo Supercluster and its twin Fornax. He forms a model that explains the distribution of galaxies within the

Virgo cluster corresponding to the theory of redshift inversely proportional to age. He starts at the center of the cluster and asks, “Is it significant that the brightest radio quasar in the sky falls in the dominant cluster in the sky — and forms a pair with the brightest radio galaxy in the cluster, almost exactly aligned across the brightest galaxy in the center of the cluster?” (p. 117). This is the alignment of 3C273, M49 and 3C274(M87) roughly north-south looking at the center of the Local Supercluster. More examples (12 are listed on p.120) of such alignments within the Virgo Cluster are identified. A search for radio sources (quasars) revealed many more in the vicinity of these large and massive galaxies than expected from random distribution. X-ray and even gamma ray scans have tied many of these radio sources with bridges to the large galaxies. Only a mass creation from “primordial matter” process explains the high energy radiation emission (p.137). Besides the radio sources an x-ray mapping of the cluster center reveals an alignment of four Abell Clusters (clusters of strong x-ray sources). Three of the four even have overlapping contour lines. Many other clusters have closely spaced Abell’s that suggest they have a generating source nearby. A search has found large radio galaxies for all of them. Now as if this evidence from the Local Supercluster was not enough Dr. Arp points out that the Virgo Cluster has a twin called Fornax in another quadrant of the sky. About this coincidence he states: “The two clusters are such a good match in all details, including the hierarchy of intrinsic redshifts, that I am tempted to say that if there is a creator (.....) we might expect to hear: ‘Look you dummies, I showed you the Virgo Cluster and you did not believe it so I will show you another one just like it and if you still don’t believe it — well let’s just forget the whole thing.’” (p. 164). On pages 165–167 he summarizes the empirical relationships he has observed in the data presented.

Arp uses Chapter 7 to debunk the use of the theory of gravitational lensing to explain the pairs of high redshifted quasars found in lower redshift galaxies. The main problem for lensing is that the image of an object by a single lens (the whole galaxy) would show a typical airy pattern. Examples of this have not been found in any of the high redshift quasars which have been observed. The theory then shifted to microlensing (lensing by small objects such as stars and planets within the galaxy) but this predicts a steep increase in the number of quasars with fainter apparent magnitudes within a galaxy. Arp shows “that only the brightest quasars have an increase steep enough to satisfy the predictions” (p. 170) not the fainter ones. The downfall of gravitational lensing is exemplified by the Einstein Cross. It is made up of four quasars of high redshift all within one arcsecond of a galaxy of low redshift at its center. For the central galaxy to have enough mass to image one quasar this way it would have to be the brightest object ever observed with a realistic mass to light ratio and isn’t even close (p. 176). But as Arp

points out astronomers today still explain high redshift quasars as gravitational images because the quasars are so far away as calculated by the Hubble relation that we should not be able to see them if they have a realistic brightness based on closer lower redshift ones we see.

In Chapter 8 we read about quantization of redshift and how it supports Arp's theory of redshift varying with age of matter. Observational measurements of quasars show values of redshift that come in steps (certain preferred values). This evidence first discovered by astronomers looking at far away galaxies is specifically strong for 72 km/sec steps. Later more detailed searches on the most accurate redshift data on quasars available found a large periodicity at 37.5 km/sec that has the significance of "one in a million" (p. 199). Nothing in the standard Big Bang theory explains such a significant effect since a continuous spectrum (no periodicity) is expected when distance is measured by redshift. Arp's explanation uses the Machian physics (physics based on Mach's principle that mass is the result of a particle interacting with the whole universe) premise "that elementary particles acquire mass by exchanging machions (the signal carrier for inertial mass) with other matter within their light travel horizon" (p. 201). The theory of redshift quantization as a function of electron spin is given on page 217. He applies quantization theory in succession to redshifts of quasars, redshifts of galaxies, structure of the solar system and finally to properties of fundamental particles like the electron. His conclusion is "quantization of physical parameters would seem to be governed by the laws of non-local physics" (p. 223). To Arp a whole new area of physics waits to be explored with only a very limited portion having been observed today.

Chapter 9 compares cosmologies pitting the Big Bang against the Quasi Steady State Cosmology (QSSC) with respect to the evidences presented in the earlier chapters. He reiterates his relationship of mass as a function of time and the Machian physics used to explain quantization. In the section labeled "Creation of Matter" (p. 228) he makes two revealing statements about creation of matter. First he states, "when we speak of creation of matter we do not mean matter coming into our universe from somewhere else (there is nowhere else) or from nothing. We must mean the transformation of previously existing mass-energy." What he has observed is new matter coming from centers of concentration of matter and energy (galaxy centers). This lead to his second statement, "The greatly publicized theory is black holes where everything falls in. But the observations show everything falling out". In the next two sections he describes why white holes explain the observational evidence better than the black holes. With this as his starting point he presents the evidences of how QSSC is a better explanation of the origin of the universe than the Big Bang. He includes such topics that usually support the Big Bang such as the expanding universe (p.

232) and the uniform Cosmic Background Radiation (pp. 236–238). On pages 250–252 he summarizes the two models and the evidences. He adds three appendices to this chapter that provide some of the mathematics and more details for his proposed model.

Chapter 10 he calls "Academia," and in it he summarizes how academic science as presently practiced is not self-correcting and progressing because it does not "use the observations to rule out a 75 year-old model which is presently unquestioned dogma" (p. 257). On page 259 he even labels "big science as the medieval church." He then lists some of the areas of science that have stunted growth because of teaching the Big Bang dogma. He notes the religious crusade against creation and states "Their establishment science is the most blatant possible form of creationism. The claim is that not just humans, but the *whole universe* was created instantaneously out of nothing" (p. 270). Referees and the peer review system that has evolved now just keeps the dogma instead of promoting creativity and new ideas. There is no more "if the observations prove it is wrong, it is wrong" (p. 273). He concludes with the statement "And in the end I must admit, that though my criticisms are passionate, I am at heart an academic who dreams of what might have been and (still the fatal innocence?) might yet be" (p. 277). To this I would add that he remains an evolutionist at heart and even with all his criticisms of the Big Bang model and establishment science his own model contains some of the same weaknesses such as not identifying initial conditions and origins of the evolutionary processes.

In the Epilogue he adds several more examples of recent observations that support his theory that he has identified after writing this book. He then includes a glossary and index that are very useful to a novice. The final pages are a set of color photographs that with the front and back cover show the best examples of the observational evidence he discussed in the book. The book is well laid out, well documented and clear in presenting his point of view. He presents a different model for the evolution of the universe that he claims better explains the observed data. But like the Big Bang theory it explains everything about the universe one man can think of, but avoids the same basic question of where everything came from in the first place. For that knowledge we have to go to a different book and it gives a different story of creation.

Reference

- Arp, Halton. 1987. *Quasars, redshifts and controversies*. Interstellar Media, Berkley.
 Del Dobberpuhl
 Van Andel Creation Research Center
 6801 N. Highway 89
 Chino Valley, AZ 86323

Notes from the Panorama of Science

Extraterrestrial Bombardment of the Inner Solar System: A Review With Questions and Comments Based On New Information

Carl R. Froede Jr.*

The global Flood of Genesis involved more than just water. Although not reported in Scripture, there is abundant physical evidence in the form of impact craters and tektite strewn fields across the globe which support extraterrestrial bombardment occurring during this same period. It is unclear if any impact event that might have occurred on Earth before the Flood (i.e., during the Creation Week and/or antediluvian timeframe; Froede, 1995; 1998) could have remained recognizable following the Flood event as the surface of the Earth was completely reshaped by numerous forces of high-geologic energy (Froede and DeYoung, 1996; Reed, Froede, and Bennett, 1996).

Previously, Dr. DeYoung and I proposed that extraterrestrial bombardment of the Earth occurred with the onset of the Flood (Froede and DeYoung, 1996). We postulated that the rate of bombardment on the surface of the Earth occurred at an initially high rate but only for a short time, with the rate falling off dramatically (i.e., exponentially). We proposed that a possible source of extraterrestrial material that bombarded Earth during the Flood likely came from a former planet (i.e., Phaeton), which disintegrated and/or exploded within the region presently known as the Asteroid Belt. Our basis for the source planet being located in the region of the present Asteroid Belt was based upon the intelligent design displayed by the Titus-Bode Rule (Froede and DeYoung, 1996).

Thinking about the effects of bombardment on Earth during the Flood lead Mr. James Brelsford and I to speculate on the effects that this event might have had on the surface of the Antediluvian moon (Froede and Brelsford, 1998). In a short article we postulated that the Moon's albedo likely decreased as the original white anorthite surface was lost to meteor impacts creating surface eruptions of large basalt flows and burial by darker igneous materials. Additional darkening of the Moon's surface occurs even today as solar flares from the Sun creates a dark brown patina on the outer surface of the anorthite. All of this darkening of the cream-to-white colored anorthite has decreased the Moon's original Antediluvian reflectance (i.e., albedo) providing less reflected light back to Earth after the Flood.

Dr. Williams and I reported on the Wetumpka Impact Crater in Alabama, and postulated that it formed near the close of the Flood in shallow marine conditions (Froede and Williams, 1999). The size of the crater (approximately 3.5 miles in diameter) suggests that a rather large-sized

dense object penetrated through a thin layer of sedimentary strata deep into underlying igneous and metamorphic crust. This object would likely have been a stony meteorite as no iron or other metal has been found in association with this crater.

Uniformitarians recognize impact craters across the surface of the Earth and Moon. Their naturalistic model drives the age determination of each crater. They believe that Earth's Moon was formed from the impact of a Mars-sized object early in Earth's formation approximately 4.5 billion years ago (Ga). This event ripped away enough material from the Earth to form the Moon and place it into orbit around the planet (Kerr, 2000). However, the greatest period of extraterrestrial bombardment, for both the Moon and Earth, occurred later in their history according to uniformitarian scientists, who continue to discover new sources of information for age-dating this period in time.

Recent Investigations

Recently, several uniformitarian geoscientists examined and age-dated numerous lunar meteorites and Moon rocks collected both on Earth and on numerous past United States and Union of Soviet Socialist Republics space flights (Cohen, Swindle, and Kring, 2000). Using ^{40}Ar - ^{39}Ar dating methods, these scientists determined that the Moon experienced its greatest period of bombardment, deemed the terminal lunar cataclysm, approximately 3.9 billion years ago (Cohen, Swindle, and Kring, 2000; Kerr, 2000). It was during the terminal lunar cataclysm that the Moon underwent massive bombardment based on the analysis of the over 1,700 large (12.5 to 750 mile diameter) impact craters on its surface (Cohen, Swindle, and Kring, 2000). Earth likely experienced over 17,000 large impact events during this same period of time (Cohen, Swindle, and Kring, 2000). Although younger age-dates for moon rocks have been found (suggesting later impact melt events), nothing older than the 3.9 Ga age was identified in the 43 samples of lunar rocks examined and tested (Cohen, Swindle, and Kring, 2000).

This massive bombardment event was not limited to the Moon, but extended throughout the entire inner solar system, including Mars (Cohen, Swindle, and Kring, 2000), and the Asteroid Belt (McSween, 1999). Previous age-dating of the "early heavy bombardment" period yielded dates ranging from 4.1 to 3.4 Ga (McSween, 1999). This

*2895 Emerson Lake Drive, Snellville, GA 30078-6644

new research places the period of cataclysmic bombardment from 3.9 to 3.4 Ga with the rate of bombardment falling off sharply following the onset of the impact period (Cohen, Swindle, and Kring, 2000).

Possible Source Areas

What are the possible source areas for such a tremendous volume of extraterrestrial material to bombard the inner solar system at such an early period of time in its history? Some uniformitarians look to imaginary sources like the Oort Cloud and Kuiper Belt—imaginary because they have never been detected, only postulated (Froede and DeYoung, 1996). These postulated areas are purported by uniformitarians to provide our solar system with the comets, asteroids, and extraterrestrial debris likely to explain the impact features observed within the solar system.

Kerr (2000) reported that researchers in Boulder, Colorado are proposing an idea that early in the development of the solar system newly forming Neptune and Uranus (orbiting between Jupiter and Saturn at the time, only to be thrown out to their present orbit later) could have generated both cometary and asteroid debris which was drawn inward in sufficient quantities to explain the impact craters found within the inner solar system. Theories like this one will continue to be proposed in an attempt by uniformitarians to explain a plausible source of extraterrestrial material necessary to account for the massive bombardment experienced by the inner solar system.

Although the asteroid belt is considered as a potential source of extraterrestrial materials by both Kerr (2000) and Cohen, Swindle, and Kring (2000) it is rejected due to the size of *existing* asteroids, because a planetary body within the asteroid belt *never* existed, or that the uniformitarian age-dating of the bombardment event does not match with the age-date model for the asteroid belt.

Young-Earth Creationist Interpretation

It has been proposed by several young-earth creationists that the Earth was bombarded by extraterrestrial materials initiated with the very onset of the Flood (Froede and DeYoung, 1996; Froede and Williams, 1999; plus references therein). There is abundant physical evidence both on the Earth and Moon as well as exhibited by other terrestrial planetary bodies and satellites within the inner solar system to support this concept. I believe that even if impact features formed on Earth or within the solar system during the Creation Week or antediluvian timeframes, they could not have persisted because of the destructive geologic forces in operation during the Flood.

However, some young-earth creationists disagree and invoke two cratering periods in Earth history. Dr. Faulkner



Figure 1. The top of Kitt Peak west of Tucson, Arizona.

postulates a major period of bombardment during the Creation Week with the source material being derived from debris associated with the creation of the Sun, Moon, and planets (similar in theory to the uniformitarian concept that asteroids and comets are merely debris left over from the formation of the planets; McSween, 1999), and a later minor period of bombardment during the Flood (Faulkner and Spencer, 2000). Personally, I do not believe that a pre-Flood (i.e., Creation Week or antediluvian timeframe) impact event on the Earth could be differentiated from the massive impact event experienced by the entire inner solar system during the Flood. I would like to see evidence in support of this position, along with some discussion about how to differentiate (based on the physical evidence) between the two periods.

Mr. Wayne Spencer has postulated that the solar system was visited by a swarm of celestial objects during the Flood (Faulkner and Spencer, 2000). I have problems with understanding the extraterrestrial bombardment models proposed by both Faulkner and Spencer, and ask for clarification on the following questions:

- Where is the source(s) of all of the extraterrestrial materials which bombarded Earth at the Creation Week or later during the Flood (whether invoking a major or minor impact event)?
- If this event only happened 4,500 to 6,500 years ago then why have astronomers not been able to locate this comet/meteor swarm still moving out in space with the advance telescopes we have in operation today (and have had for several decades)? The Kitt Peak National Observatory (Figure 1) presently has six telescopes in operation. Many of these telescopes have been operating for more than thirty years. Why have facilities like this one or the many others like it across the Earth not been able to identify a moving swarm of celestial objects as has been postulated by Faulkner and Spencer (2000)? It is likely because this “swarm” does not exist. I contend that the majority of extraterrestrial material which impacted the

inner solar system during the Flood was probably derived from the Asteroid Belt.

- DeYoung and I (1996) postulated a 4 to 5 month lag between the disintegration/explosion of Phaeton within the Asteroid Belt and the initiation of extraterrestrial bombardment of Earth at the onset of the Flood. How long did it take the proposed “swarm of celestial objects” moving in space to hit Earth (i.e., where is its point of origin and what is the traveling speed of the “swarm?”)? How far away in space would it exist from Earth at creation or in the universe today? With this knowledge young-earth creationists should be able to identify this swarm in space adding physical evidence to support the model.
- Please explain the concept of how God’s creation week work is pronounced “good” if it is under extraterrestrial bombardment during this period of time? Did God create the heavens and the Earth before the Fall of man with a swarm of celestial objects moving toward Earth?

The lack of any physical evidence from a known source area, which could account for the “swarm of celestial objects” which impacted the Earth and inner solar system during the Flood, challenges both Faulkner and Spencer (2000) theories. Models are necessary but with no physical substance they become dead-end “stories.” Young-earth creationists need to be very careful in developing models which lack any physical basis. Model(s) must also comply with the framework of Scripture. Failure on either point should result in the rejection of any proposed model.

Apparently, the only problem that either Faulkner or Spencer (2000) have with the source material being derived from a planet (exploding or disintegrating) in the asteroid belt is with the amount of time that it would take to clear the inner solar system from the debris. Uniformitarians estimate that the time necessary to remove debris from the inner solar system ranges between 10 to over 100 million years (Kerr, 2000; McSween, 1999). However, it is acknowledged by naturalists that the celestial objects that presently travel through the inner solar system which originated from the Asteroid Belt would be of recent origin (McSween, 1999). Presently, no young-earth creationist has published an evaluation of the time necessary to remove extraterrestrial debris originating from the Asteroid Belt moving toward the inner solar system.

It has been estimated that there are over one million asteroids within the Asteroid Belt (McSween, 1999). Its origin remains a topic of debate. While DeYoung and I (1996) postulated that the Asteroid Belt represents the remains of a disintegrated or exploded planet, there are other possibilities. The Asteroid Belt could have been created in place without ever having been a planet (but the composition of the various asteroids fit well with the collective composition of a small planet not to mention that Types 1 and 2 chondrites experienced aqueous alteration, i.e., the minerals reacted with water inferring a planet with water

[McSween, 1999]). It is also possible that the Asteroid Belt formed from the disintegration of a number of planetesimals. According to uniformitarians, the debris forming the Asteroid Belt dates to the same age as Earth (approximately, 4.5 billion years) and yet the number of objects crossing Earth’s orbit are few (Heide and Wlotzka, 1995). This suggests that the inner solar system has swept up much of the past debris ejected from the Asteroid Belt. It is widely recognized that Jupiter exerts such a massive gravitational effect on the asteroid belt that it can send asteroids toward the Sun even today. The existence of Kirkwood gaps in the Asteroid Belt suggests that Jupiter has had (and continues to have) a major effect on the existing asteroid belt, one that supports a viable source for extraterrestrial materials useful to bombard the inner solar system.

If we take the age of the Earth, Moon, and Asteroid Belt along with the period of bombardment postulated by uniformitarians as relative and not actual, and compare them to a Biblical framework for Earth history (e.g., Froede, 1995, 1998), it would be easy to correlate the period of greatest extraterrestrial bombardment to the Flood. If bombardment occurred during the Creation Week then we would expect age-dates to correspond to 4.5 Ga, the purported uniformitarian age of the Earth, Moon, and Asteroid Belt. However, what is reported is a period of heavy bombardment well after (i.e., 3.9 Ga) the formation of these space objects. I contend that although these uniformitarian age-dates do not provide any direct evidence in support of Flood bombardment, the relative ages supports the concept that bombardment occurred which could correspond to the Flood.

Conclusion

Young-earth creationists and uniformitarians agree that the Earth, Moon, and inner solar system experienced tremendous extraterrestrial bombardment in the past. New age-dating using ^{40}Ar - ^{39}Ar on lunar rocks and meteorites by uniformitarians has served to refine the time when this event occurred. They postulate that the lunar impact cataclysm occurred early in the history of the Moon with confidence that the entire inner solar system was also effected by extraterrestrial impacts. The source of the extraterrestrial materials remains a mystery as uniformitarians look to nonexistent fields of comets in deep space or debris created with the origin of planets.

Although uniformitarians acknowledge that the asteroids within the asteroid belt make an attractive source of materials readily available for the bombardment of the inner solar system, they reject it for the 3.9 Ga bombardment period based on various model-driven reasons.

Young-earth creationists apparently have several models from which to choose when attempting to explain the impact craters observed on the Earth, Moon, and inner

planets. The problem presently is locating a source of material that meets the time frames and physical evidence necessary to support the Bible-based young-earth Flood framework. I contend that the most likely source for extra-terrestrial materials is from the Asteroid Belt as it continues to supply bombardment materials to the inner solar system. To invoke other source areas requires some basis of physical substantiation and explanation within the Biblical framework.

The origin of the Asteroid Belt will always be a subject of discussion; whether it formed from a single exploding/disintegrating planet or series of planetesimals, from the collision of multiple space objects within the region, or possibly even as an asteroid belt original to the Creation Week. I believe that the Asteroid Belt likely provided the “celestial objects” which impacted all the terrestrial planets (and satellites) within the solar system during the global Flood of Genesis (which can be viewed as occurring on the scale of at least the inner solar system). To invoke another source for massive extraterrestrial bombardment either before or during the Flood requires some defense in the form of physical evidence—none of which has been offered to date. Thus, I contend that the Asteroid Belt provides a plausible and defensible source of materials for the bombardment of the inner solar system with the onset of the Flood.

Acknowledgments

I am grateful for the review provided to me by Emmett Williams. John Reed also provided helpful assistance in getting this document in acceptable shape for publication. I am thankful for the support I continue to receive from my wife Susan. Glory to God in the highest (Prov 3:5–6).

References

- CRSQ: *Creation Research Society Quarterly*
 Cohen, B. A., T. D. Swindle, and D. A. Kring. 2000. Support for the lunar cataclysm hypothesis from lunar meteorite impact melt ages. *Science* 290:1754–1756.
 Faulkner, D. and W. Spencer. 2000. Reply to Biblically-based cratering theory. *Creation Ex Nihilo Technical Journal* 14(3):75–77.
 Froede, C. R., Jr. 1995. A proposal for a creationist geological timescale. *CRSQ* 32:90–94.
 ———. 1998. *Field studies in catastrophic geology*. Creation Research Society Technical Monograph No. 7, Creation Research Society Books, St. Joseph, MO.
 Froede, C. R., Jr. and J. Brelsford. 1998. Speculation regarding the albedo of the Antediluvian Moon. *CRSQ* 35:166–167.
 Froede, C. R., Jr. and D. B. DeYoung. 1996. Impact events within the young-earth Flood model. *CRSQ* 33:23–34.
 Froede, C. R., Jr. and E. L. Williams. 1999. The Wetumpka Impact Crater, Elmore County, Alabama: An interpretation within the young-earth Flood model. *CRSQ* 36:32–37.
 Heide, F. and F. Wlotzka. 1995. *Meteorites: Messengers from space*. Springer-Verlag, New York.
 Kerr, R. A. 2000. Beating up on a young Earth, and possibly life. *Science* 290:1677.
 McSween, H. Y., Jr. 1999. *Meteorites and their parent bodies*. Second edition. Cambridge University Press, New York.
 Reed, J. K., C. R. Froede Jr., and C. B. Bennett. 1996. The role of geologic energy in interpreting the stratigraphic record. *CRSQ* 33:97–101.

Aerodynamics of Wind Pollination in Living and Fossil Plants

Computer analyses and wind tunnel experiments have been carried out on a number of plants, from cone-bearing forms to various angiosperm plants (Niklas, 1984; 1987). The results show almost perfectly engineered methods to capture pollen. Life sized models were made of certain fossil plants, particularly those of about 300 million years ago that were likely wind pollinated. Such fossil plants have shown less of this aerodynamic nature. There are modern plants that have various methods of being pollinated, however, and these also lack the same aerodynamic nature of pollen capture. Could the fossil plants of 300 million years ago have had a number of ways to be pollinated—could there have been a difference in density of the air which may have also made a difference? In both wind tunnel experiments and computer analyses, creationists could carry out work on various plants and try to make models of fossil

forms. If only by computer models, they could try to analyze various changes in density of air to see what results are produced. For further reading on this subject, see Niklas, 1984; 1987.

References

- Niklas, K. J. 1987. Aerodynamics of wind pollination. *Scientific American* 257 (1): 72–77.
 Niklas, K. J. 1984. The motion of windborne pollen grains around conifer ovulate cones: implications on wind pollination. *American Journal of Botany* 71(1):356–374.
 Colin Brown
 61 Derby Road
 Warrington WA3-3LE
 England UK.

Evidence for, Conflict over, and Confidence in Creationist Models of Earth History

John K. Reed*

Creationism is expanding from its initial, critical phase *vis a vis* uniformitarian and evolutionary dogma into its “next generation.” In addition to unmasking the false claims of Naturalism, creationists are now building new models based upon their own presuppositions that offer positive interpretations of the past. As apologetic efforts make way for a true biblical natural history, we find the frontier wide open and new models will compete for broad explanatory power and respect. The novelty of these models, along with their scale and scope inevitably result in disagreement and debate. Understanding how to minimize pain during this process is beneficial to everyone. After all, conducting our discussions in an atmosphere of Christian love and respect should be a hallmark of creationist debate.

What are the rules of debate? Often, our criteria are subjective and confused. One way to focus debate about these new models is to understand that there is a hierarchy of evidence by which any new creationist model should be evaluated (Figure 1). Although positivism has cast its baleful influence over science and sometimes even creationists, it is not simply the accretion of physical data that provides the soundest support. A well-defined biblical *method* of assessing evidence is necessary to clarify the process and allow better evaluation of any new model. Within this proposed framework, models of earth history show many strengths and weaknesses not previously apparent—often because we confuse empirical support generated either by quantity of data or its innovative qualities with evidentiary value. Sometimes we even mistake the author(s)’ credentials, presentation skills, or the clever application of technology with strength of evidence.

Reed (2001a) has demonstrated that natural history is a mixed question; strongly influenced by extrascientific presuppositions, be they biblical or naturalist. Thus, the use of empirical evidence alone as a gauge of strength of models is inadequate and reflects an unhealthy preoccupation with the positivism that permeates modern science. Figure 1 illustrates this hierarchical approach. The highest level and corresponding greatest weight of evidence is found in the clear affirmation or denial of a proposition by the Bible. It carries a correspondingly high level of confidence and a corresponding strong requirement for staunch defense. Its shortcoming is the limited amount of information provided and the correspondingly limited extent of confirmation available to models of natural history.

In the hierarchy, the next level of evidence after explicit biblical pronouncement is implicit biblical authority. Any

Hierarchical Approach to Evidence	
Hierarchy of Evidence	Confidence
Affirmed or denied by Bible	Decreasing Certainty 
Consistent with Biblical Worldview	
Formally valid	
Empirically compelling	

Figure 1. Hierarchical model of evidence for creationist models of earth history.

serious student of theology recognizes the role played by extending biblical propositions by compelling logical inference. For models of earth history, this level of the hierarchy can be measured by the compatibility that a model demonstrates with the Biblical Worldview. The Bible builds a framework of reality that constrains our thought about those topics that it does not directly address. Many of our presuppositions about the foundation and method of natural history reside in this worldview. Thus, it provides a good check to our speculation. The third level of the hierarchy is that of formal validity (present, but in the background, at the higher levels of the hierarchy). Without coherence and consistency, a model cannot command allegiance. Finally the level of empirical evidence is reached. Although this aspect of natural history commands the least commitment and evidentiary value, it paradoxically provides the overwhelming quantity of evidence. But quantity can never guarantee truth. Empirical data do not possess the evidentiary power of clear biblical pronouncements, for example. Those that seem to think so find themselves lost in a morass of compromise that we have seen and regretted all too often (e.g., theistic evolutionists, old earthers, etc.). What is important to note here is that the correspondingly lowest level of evidence should demand the lowest level of confidence and conflict in natural history models.

*John K. Reed, Ph.D., 915 Hunting Horn Way, Evans, GA 30809

Catastrophic plate tectonics (CPT) as explained by Austin et al. (1994) is a good candidate for this style of analysis. Many accept the concept because we respect the credentials of the authors, and marvel at their use of technology and their presentation skills. The implied weight of evidence for uniformitarian plate tectonics plays its role, as does a laudable desire to be relevant. Thus CPT has gained widespread popularity among creationists. Some oppose the concept with competing global models (Brown, 1995). Others question without offering a substitute (Reed et al., 2001b). However, CPT apparently dominates the creationist landscape. But when the model is evaluated using the evidentiary hierarchy, how does it then appear? Figure 2 summarizes the discussion below.

- The Bible does not affirm or deny a role for plate tectonic processes in the Genesis Flood. The most cited reference to Flood tectonism comes from Genesis 7:11 (*... all the fountains of the great deep were broken up ...*). However, the language used asserts no detail and is not compromised by either a plate tectonic or non-plate tectonic interpretation. Therefore, our confidence in CPT (or any other detailed Flood tectonic model) does not reach the standard of biblical truth and our confidence in or debate of the theory should be tempered accordingly.
- It is presently unclear whether CPT is compatible with the Biblical Worldview. On one hand its authors are committed creationists and have affirmed biblical truth in this area consistently. However, we must never confuse intent and outcome. In spite of their intent, its authors have not clearly distinguished CPT from its uniformitarian parent. Uniformitarian plate tectonics is clearly incompatible with Genesis; advocating evolution, an old earth, and denying the Flood. In addition to the obvious problems, uniformitarian and evolutionary assumptions are deeply embedded in plate tectonics. For example, a powerful evidence for plate tectonics is the conclusion that the age of the oceanic lithosphere increases from the midocean ridges to the continents. But what role does age dating by radiometric methods and microfossil assemblages (based upon evolutionary position) play in this conclusion? To date, the advocates of CPT have not presented a clear and comprehensive comparative analysis designed to distinguish their model from those unbiblical presuppositions. Therefore, we must wait for this analysis, and the advocates of CPT must understand that they deny their model this level of confidence until they successfully differentiate it from its uniformitarian parent.
- For the reasons discussed above, it is not clear that CPT passes tests of formal validity. On one hand, there are questions about the relationship between a creationist version of plate tectonics and unbiblical presuppositions in its parent. On the other hand, advocates of CPT claim that evidence marshaled to support uniformitarian plate

Evidentiary Assessment of CPT		
Hierarchy of Evidence	Confidence	CPT
Affirmed or denied by Bible	Decreasing Certainty 	Neither
Consistent with Biblical Worldview		Unclear
Formally valid		Unclear
Empirically compelling		No

Figure 2. Catastrophic plate tectonics evaluated in the hierarchical framework.

tectonics also supports their model. This logical dilemma can only be resolved by the process of differentiation described above and by a similar comparative analysis specifying which lines of evidence for uniformitarian plate tectonics are valid when applied to CPT, and the demonstration that these conclusions are consistent with the Bible at all points.

- Finally we arrive at our favorite level, that of empirical evidence. CPT currently rests at this level of evidence, and correspondingly at this level of confidence. What is this physical evidence? At present, it seems to consist primarily of computer modeling of a theoretical version of subduction, “runaway subduction”—a process unobservable and unmeasurable in nature. The evidence presented is complex and mathematically sophisticated. However, one must not mistake a single line of evidence as compelling (no matter how complex and well developed) if it cannot address the full scope of the hypothetical propositions that it is purporting to support. In other words, you cannot build a cathedral on a foundation that contains only one pier. Either plate tectonic model attempts to explain a wide spectrum of geological and geophysical events. Thus, the evidence presented should include a wide aggregate of geological and geophysical observations. Apart from the scope and scale of the evidence, even the “single pier” of numerical modeling is unsound. Based on geological observations, Oard (2001) presents equally compelling evidence that subduction does not take place at all. Other lines of evidence remain poorly explored, because CPT is poorly defined in print, although further geological data suggest that CPT is at best equivocal at this level of evidence (Reed, 2001b).

This analysis demonstrates that CPT is actually a much weaker model of earth history than its widespread acceptance suggests. It is not affirmed by the Bible. Its supposed

strength found in overlap with uniformitarian plate tectonics actually raises questions of both compatibility with the Biblical Worldview and formal validity. Finally, the empirical evidence is narrow and incomplete. Although the total evidentiary value assigned by this method to CPT is low, it remains open to advancement by meeting tests for formal validity and compatibility with the Biblical Worldview described above. Further empirical support may also be forthcoming as its advocates better define and describe particulars of their model not currently in print. I look forward to its advocates publishing additional descriptive detail about their model.

Although this note has focused on CPT, it is not CPT *per se* that is the main point. It is instead the truncated method of assessing the value of any creationist model solely or even primarily by empirical evidence. This method is congenial to Naturalists, but alien to biblical reality. As new creationist models are introduced, they too should all be able to endure similar scrutiny, and creationists should be ready to assess them with insight. If they cannot attain high levels in the evidentiary hierarchy, then they should suffer an equivalent lack of confidence. Recognizing this, creationists should tailor their arguments for and against any model along the lines of the evidentiary hierarchy.

References

- Austin, S.A., J.R. Baumgardner, D.R. Humphreys, A.A. Snelling, L. Vardiman, and K.P. Wise. 1994. Catastrophic plate tectonics: a global Flood model of earth history. In Walsh, R.E. (editor), *Proceedings of the Third International Conference on Creationism* (Technical Symposium Sessions), pp. 609–621. Creation Science Fellowship, Pittsburgh, PA.
- Oard, M.J. 2001. Subduction unlikely—plate tectonics improbable. In Reed, J.K. (editor). *Plate Tectonics: A Different View*, pp. 95–143. Creation Research Society Books, St. Joseph, Mo.
- Reed, J.K. 2001a. *Natural history in the biblical worldview: foundation and framework*. Creation Research Society Books, St. Joseph, Mo.
- , (editor). 2001b. *Plate Tectonics: A Different View*. Creation Research Society Books, St. Joseph, Mo.
- Reed, J.K., C.R. Froede, Jr., M.J. Oard, and J. Woodmorappe. 2001. An introduction to plate tectonics and catastrophic plate tectonics. In Reed, J.K., (editor). *Plate Tectonics: A Different View*, pp. 11–23. Creation Research Society Books, St. Joseph, Mo.

Book Reviews

Genesis, Creation, and Creationism by Lloyd R. Bailey
 Paulist Press, New York. 1993, 259 pp. \$14.95

Bailey examines, and attempts to refute, *biblical* creation using his critical view of the Bible. The author is Professor of Hebrew Bible at Duke Divinity School in North Carolina. For starters, instead of the familiar “In the beginning God created ...” of Genesis 1:1 (NKJV, NASB, NIV) he uses the translation “In the beginning, *when* God created the heavens and the earth ...” New Authorized Bible (NAB). Other Bible translations using that wrong translation are the TEV, the NRSV, and the NEB. The point of the change is to deny creation *ex nihilo*. (Instead of the Bible saying that God created matter in the beginning, it is made to imply that there was preexisting material when God began to create.) Theologian Kelly (1997, p. 65) points out there is no textual evidence for that revision, or normal Hebrew grammatical usage supporting it.

Bailey claims that postulating eternal matter is not merely “modernism” because Emperor Julian from the fourth century A.D. understood Moses after that manner (p. 105). That anti-Christian emperor, known as “Julian the Apostate” because he attempted to exterminate Christianity, is not a reliable authority for the interpretation of the Bible. Bailey is aware of Hebrews 11:3, “By faith we un-

derstand that the worlds were prepared by the word of God, so that what is seen was not made out of things which are visible” yet he does not answer its teaching of creation *ex nihilo* (p. 110). Other *ex nihilo* verses he does not mention are 2 Peter 3:5 and Psalms 33:6.

Bailey criticizes Henry Morris for saying Nimrod was a “mighty tyrant in the face of Yahweh” (p. 43). He asserts that is “creationist abuse of the Bible,” although he acknowledges that the Jerusalem Targum (an ancient paraphrase of the Bible) speaks of Nimrod’s wickedness. It could be Bailey is not knowledgeable of other witnesses for Morris’s idea. Josephus wrote, “it was Nimrod who excited them to such an affront and contempt of God ... He [was also a tyrant] seeing no other way of turning men from the fear of God” (1,4,2). Philo, an Alexandrian Jew in the first century after Christ, said,

Nimrod . . . having a nature truly dissolute, does not at all keep fast the spiritual bond of the soul, nor of nature, nor of consistency of manners, but rather like a giant born of the earth, prefers earthly to heavenly things . . . On which account there is much propriety in the expression, he was a giant against God, which

thus declares the opposition of such beings to the deity; for a wicked man is nothing else than an enemy, contending against God: on which account it has become a proverb that every one who sins greatly ought to be referred to him as the original and chief of sinners, being spoken of "as a second Nimrod." (Philo, Questions and Answers on Genesis, II, 81).

The second chapter of Bailey's book discusses perceived scientific problems with creation. These include the supposed fossil progression in the stratigraphic layers (p. 22), the idea that dinosaurs and other life forms were not alive when man first appeared (p. 25–26), and the time needed for light to reach earth from distant stars (pp. 29–37).

Bailey claims that Christianity and evolution are not mutually exclusive because of "generations of scientists and theologians who have advocated theistic evolution" (p. 16). However, careful, consistent thinkers have indeed decided that they are mutually exclusive. Charles Hodge (1874) postulated the answer to the question, *What is Darwinism?*; Darwinism is atheism. That conclusion, Hodge declared, is necessary because Darwinism is incompatible with teleology (which is essential for Christianity).

In chapter 4, *Indications of what the Biblical Agenda is Not*, Bailey rejects the ages of the patriarchs in the Genesis chapters 5 and 10 genealogies because of the "unreality from a biological point of view of the ages" (p. 59). However, he is unable to find any alternative theory to account for these numbers. He errs by confusing Lamech from Seth's line (Genesis 5:25, 31) with the Lamech from Cain's line (Genesis 4:19); appearing not to realize that two different people could be given the same name (p. 63). He thinks that the Genesis genealogy is derived from the Babylonian king list. However, Hasel (1980) wrote a number of strong arguments against equating those two documents.

In chapter five, *Indications of What the Biblical Agenda Is*, he advocates what has come to be known in theological circles as the "Framework Hypothesis." This theory holds that the first chapters of Genesis are fictitious history, de-

claring only "Who" created and not "How" creation occurred. He claims "to find in Genesis 1 a sustained although subtle attack upon polytheism" (p. 100). Though others would concur with him, no acknowledgment of polytheism is there. Bailey sees a biblical dependence on Babylon instead of a common origin for each with subsequent Babylonian corruption. He says (about Genesis 1) "the older Babylonian story has been depolytheized, de-Mardukized, de-Mesopotamianized; it has been thoroughly monotheized, Yahwized, and Israelitized [in Genesis]" (p. 100). The *Toledoth* theory is the most promising route for understanding Genesis 1, having been developed by C.V. Taylor (1994). Appendixes include Judge Overton's opinion from the Arkansas trial and resolutions against creation by several church groups among other subjects. Bailey's failure to advance a viable alternative theory for understanding Genesis speaks well for a literal understanding, notwithstanding his destructive intent.

References

- Hasel, G. 1980. The meaning of the chronogenealogies of Genesis 5 and 11. *Origins* 7(2):53–70. [on-line at www.grisda.org/origins/07053.htm]
- Hodge, Charles. 1874 (reprinted, 1994, editors Mark Noll and David Livingston). *What is Darwinism?* Baker, Grand Rapids, MI.
- Josephus. William Whiston, translator. 1987. *The works of Josephus*. Hendrickson, Peabody, MA
- Kelly, Douglas, F. 1997. *Creation and change*. Mentor, Ross-shire, Great Britain.
- Philo. C.D. Yonge, translator. 1993 *The works of Philo*. Hendrickson, Peabody, MA.
- Taylor, C.V. 1994. Who wrote Genesis? Are the *Toledoth* colophons? *Creation Ex Nihilo Technical Journal* 8(2): 202–211.

John Goertzen
Bluejay@birdlover.com

The World of Chemistry by John Tiner

Master Books, Green Forest, AR. 2001, 142 pages, \$14

Master Books, a division of New Leaf Press, has greatly expanded their number of book titles in recent years. Volumes are beautifully bound, reasonably priced, carefully edited and thoroughly creationist when applicable. It is encouraging to have Master books on our side.

This high school chemistry primer is written by a teacher and researcher. John Tiner has also authored creationist-oriented books in the same series about medicine and cultural earth history. This book discusses chemistry with many practical ideas concerning metals, diamonds, water and semiconducting silicon. There are

several good glimpses of personalities. Did you know that Henry Cavendish (1731-1810) was the "Howard Hughes" of his day? Cavendish was wealthy, eccentric, withdrawn, made his servants stay out of his sight, and he died alone (pp. 28-29). Also, author science pioneer Humphrey Davy (1778-1829) was greatly weakened by chemical exposure and hired Michael Faraday to work in his place (p.40).

This book is highly recommended for chemistry students and others wanting a refresher course. There is a full index and illustrations.

Don DeYoung

Letters to the Editor

Star Formation: Natural or Supernatural?

Recent creationists over the years have taken two approaches to evolutionary theorizing. One approach, followed by most recent creationists of the past, has been to build a positive creationist framework informed by biblical principles and genuine scientific data. Such studies have typically been careful to distinguish between actual data obtained by observations, and evolutionary inferences from data. A typical corollary of this approach has been that evolutionary inferences are flawed and that sufficiently close examination will lead to exposure of the deficiencies in evolutionary reasoning.

However, another approach has been appearing with increasing frequency in recent years, especially in creationist astronomy literature. This newer approach seeks to validate evolutionary concepts as much as possible without abandoning recent creation altogether. One of the earliest papers taking this approach was published about ten years ago (Faulkner and DeYoung, 1991, pp. 87–92). This paper asserted that “if creationists wish to scrap stellar evolution completely, then it is incumbent on us to rework stellar structure and/or physics in a convincing fashion” (Faulkner and DeYoung, 1991, p. 88). The implication of this assessment seems to be that creationists ought not to reject evolutionary concepts such as stellar evolution without first developing a “better” concept of their own as a substitute. This claim, sometimes called the “best-in-field” fallacy (MacBeth, 1971, p. 78), maintains in effect that one is not justified in rejecting falsehood until a theory of elegance equal to the false position has been devised.

This paper furthermore maintained that creationist acceptance of the term “stellar evolution” is justified on the grounds that “the use of the word ‘evolution’ here [in the phrase “stellar evolution”] carries a different connotation [than] it does in biology where an increase in complexity is implied. Instead, its astronomical use means change, whether the change is one of decay or perceived improvement” (Faulkner and DeYoung, 1991, p. 87). It is commendable that the authors of this statement qualify the improvement supposedly occurring as merely “perceived,” but the fact remains that this is not how evolutionists themselves commonly view “stellar evolution.” As with many evolutionary concepts, definitions of this term vary from one author to another, possibly because of the lack of any real “improvement” in the universe despite the evolutionary expectation of it (Milne, 1931, pp. 715–716). It is not uncommon for astronomers when discussing stellar or cosmic evolution *alone* to define it as mere change (Fix, 1999, p. 432). Be that as it may, it is nevertheless false to maintain that the evolutionary community views stellar evolution

differently from biological evolution. Among those authors comparing *both* stellar (or cosmic) evolution in the same context, the two are virtually always viewed as contiguous parts of one coherent process (Dobzhansky et al., 1977, p. 9), the ultimate end of which is increased complexity and upward development (Eddington, 1959, p. 56; Gamov, 1952, pp. 27–28; Weisskopf, 1977, pp. 408–409; Huxley, 1955, p. 278; Dobzhansky et al., 1977, pp. 8, 510).

The primary author of the aforementioned CRSQ paper was recent creationist Dr. Danny Faulkner, who has continued since 1991 to advocate the acceptance by recent creationists of concepts heretofore thought of as evolutionary. For example, the formation of planets by (rapid) accretion on the fourth day of the creation week has been proposed as a possibility (Faulkner, 1999, p. 100). “The proposal is that the accretion was a rapid (taking less than a day), directed event . . .” (Faulkner and Spencer, 2000, p. 76). This proposal is made despite the fact that accretion has never been demonstrated to be a physical reality in any laboratory simulation (Whipple and Green, 1985, pp. 200–203; Arnold, 1971, pp. 519–522; Hartmann, 1993, p. 134), and despite the fact that the heavenly bodies were created by God’s spoken word (Ps. 33:6), not by a process—rapid or not—described by the post-creation laws of science.

Dr. Faulkner’s most recent paper claims that star formation does not violate the second law of thermodynamics (Faulkner, 2001, pp. 40–44). Faulkner acknowledges that star formation has never been observed, and that stellar evolution theory does not presently allow for star formation unless another pre-existing (unstable) star is in proximity to trigger formation in the interstellar medium by a shock wave or other mechanism. If this were where this paper ended, perhaps the paper would be acceptable, but unfortunately, the paper concludes by calling on creationists to investigate how star formation might have taken place: “How the first stars formed is probably the greatest problem for stellar evolution, and in recent years much theoretical work has addressed this. The issue of how a cloud is supposed to commence collapse . . . is still a very fruitful pursuit for creationists . . .” (Faulkner, 2001, p. 43).

In effect, this paper is calling on creationists to solve the evolutionists’ stellar formation problem. It would seem that pursuing stellar evolution models would be a dead end for biblical creationists and not a “very fruitful pursuit” at all. This concluding statement is therefore quite a dangerous one. It makes an attempt to redefine the boundaries of legitimate recent-creationist investigation by implicitly asserting that star formation must occur in some fashion

akin to evolutionary theorizing. It is thus implied that all that recent creationists must do is to figure out how the process of stellar formation could be “speeded up” to fit into the time-frame of a young universe. Such a view ignores the fact that the biblical record indicates that star formation cannot be occurring in the present, since the stars were created during the Creation Week (Gen. 1:14–18), and the creation was finished at the end of that Week (Gen. 2:1).

With stellar evolution, planetary accretion and star formation having been advocated, it would seem that the next step might be to legitimize yet another evolutionary mechanism within the recent creationist time frame. Seemingly overlooked, however, is the fact that actual observations have not legitimized any of these evolutionary processes. Nor does Scripture suggest that God employed any of them. The acceptance of such “legitimization” does not bode well for the future of creationist astronomy, for once the evolutionary mechanisms are seen as compatible with recent-creation, one would need to relinquish only the short time frame to have a return to conventional evolution itself.

I have often heard the lament that creationist astronomy is the least developed creationist discipline. However, following this new approach of legitimizing evolutionary models is not the route toward a creationist astronomy. This approach ignores the work of creationists in the past which could form the basis of a truly creationist astronomy. It is also a route toward an eventual full-blown acceptance of conventional evolutionary models, for once the evolutionary models are accepted as somehow “creationistic,” history shows that finally the young-age constraint would be given up. This of course is the slippery route followed decades ago by organizations such as the American Scientific Affiliation, which today considers recent creation to be an offense to the gospel.

References

- CRSQ: *Creation Research Society Quarterly*
 CENTJ: *Creation Ex Nihilo Technical Journal*
 Arnold, J.R., 1971, Condensation and agglomeration of grains, in *Comets, Asteroids, Meteorites* (A. H. Delsemme, editor), pp. 519–525.
 Ni-Fe alloy condensate grains were grown at 10^{-4} atm (taken to be the pressure in the pre-solar nebula) to submicron size in an enclosed environment with no turbulence. What do these conditions have to do with actual accretion? Surprisingly, the author’s conclusion is, not much: “However, the direct growth from the gas of large grains or droplets is very difficult, under any conditions familiar to us” (p. 523).
 Not surprisingly, hope is nevertheless held out that accretion can somehow occur under hypotheti-

cal conditions not yet simulated: “Undoubtedly there are astrophysical situations, as there are terrestrial ones, where these special conditions are and large masses can grow directly by condensation from the vapor. It is hardly imaginable, however, that they could extend widely through the solar system. Donn and Sears (B. Donn and G.W. Sears, *Science*, Vol. 140, 1963, p. 1208) have discussed this question in detail” (p. 523).” This last paper is a theoretical one invoking a number of *ad hoc* assumptions necessary to make accretion appear plausible, such as hypothetical crystal growth at alleged “screw dislocations” caused by putative radiation damage under supposedly less-than-normal supersaturation regimes. Even the assumed supersaturation in the primordial nebula is *ad hoc*, since this would require a prior high concentration of material, which is what the theory is trying to produce in the first place.

In sum, Arnold is acknowledging in a roundabout way that his terrestrial “simulation” has really no bearing on the “special conditions” needed for solar system accretion, and that he does not know what the required “special conditions” might be.

Dobzhansky, T., F.J. Ayala, G.L. Stebbins, and J.W. Valentine, 1977, *Evolution*, W.H. Freeman, San Francisco.

The authors assert that cosmic evolution is part of a holistic process: “What is the relationship between organic and other kinds of evolution? During the century and more since Darwinism came into being, the concept of evolution has been applied not only to the living world but to the nonbiological as well. Thus we speak of the evolution of the entire universe, the solar system, and the physical earth . . .” (p. 9).

The authors first deny that evolution is progressive change: “A valid definition of evolution must not include the notion that evolution is always progressive, leading inevitably from simpler to more complex forms of life” (p. 8). Later they clarify this assertion, claiming that while evolutionary progress may not be uniform, nevertheless the overall effect of evolution is upward progress: “Some authors have argued that progress has not occurred in evolution because, no matter what standard is chosen, fluctuations of value can be found in every evolutionary lineage. This criticism is valid against uniform [progress], but not net evolutionary progress” (p. 510).

Eddington, A.S., 1959, *New Pathways in Science*, University of Michigan, Ann Arbor.

“Evolution shows us that more highly organized systems develop as time goes on. . . . These highly developed systems may obtain their organization by a process of collection, not by creation. A human be-

- ing as he grows from past to future becomes more and more highly organized . . ." (p. 56).
- Faulkner, D.A., 1999, A biblically-based cratering theory, *CENTJ*, 13(1):100–104.
- , 2001, Does the collapse of a gas cloud to form a star violate the second law of thermodynamics?, *CRSQ*, 38(1):40–44.
- Faulkner, D.A., and D.B. DeYoung, 1991, Toward a creationist astronomy, *CRSQ*, 28(3):87–92.
- Faulkner, D.A. and W. Spencer, 2000, Letter to the editor: Danny Faulkner and Wayne Spencer reply, *CENTJ*, 14(3):75–77.
- Fix, J.D., 1999, *Astronomy*, WCB/McGraw-Hill, Boston.
- “When astronomers say that a star evolves, they mean that it changes its appearance and internal structure” (p. 432).
- Gamov, G., 1952, *The Creation of the Universe*, Mentor, New York.
- “We may also assume that in the distant past our universe was considerably less differentiated and complex than it is now and that the state of matter at that time could be accurately described by the classical concept of ‘primordial chaos’ . . . The problem of scientific cosmogony can be formulated as an attempt to reconstruct the evolutionary process which led from the simplicity of the early days of creation to the present immense complexity of the universe around us” (pp. 27–28).
- Hartmann, W.K., 1993, *Moons and Planets*, Wadsworth, Belmont, CA.
- “Ordinary evidence suggests that if neighboring, sun-orbiting rock particles hit at low speeds, they would simply bounce apart without sticking; if they hit at high speeds, they would shatter each other instead of combining. . . . [Researchers performed] an experiment with silicate particles hitting each other at speeds of 1.5 to 9.5 km/s (typical of collisions in today’s asteroid belt) to test whether any sticking or impact welding occurred. They found none; the particles shattered” (p. 134).
- While noting that actual physical experiments failed to show that bodies such as asteroids could have formed by accretion, neither Hartmann nor other evolutionists can give up the idea that accretion must have occurred. Hartmann points out that Kerridge and Vedder (Kerridge, J.F., and J. Vedder, 1972, Accretionary processes in the early solar system: an experimental approach, *Science*, 177:161) rationalized much slower hypothetical approach velocities (the velocity became an adjustable parameter) which might hypothetically allow accretion to occur. The question is not so much, could such velocities exist, but did they? The prior expectation that accretion would occur under the presently observable velocities was falsified. Greenberg et al. (Greenberg, R., J. Wacker, W. Harmann, and C. Chapman, 1978, Planetesimals to planets: numerical simulation of collisional evolution, *Icarus*, 35:1) ran computer simulations at the lower velocities and concluded that under these hypothetical conditions, accretion was possible.
- This type of “confirmation” is an example of the approach which says, “When experiments do not confirm a theory, do not trust the data, trust a refined numerical model instead.”
- Huxley, J., 1955, Evolution and genetics, in *What Is Science?* (James Roy Newman, editor), Simon and Schuster, New York, p. 278.
- “Evolution in the extended sense can be defined as a directional and essentially irreversible process occurring in time, which in its course gives rise to an increase of variety and an increasingly high level of organization in its products. Our present knowledge indeed forces us to the view that the whole of reality is evolution—a single process of self-transformation” [emphasis in original] (p. 278).
- MacBeth, N., 1971, *Darwin Retried*, Gambit, Ipswich, MA.
- “Perhaps [the best-in-field fallacy] appears with unusual frequency among the evolutionary theorists, who seem to have a special weakness for it. . . . If such a theorist makes a suggestion that is better than other suggestions, or better than nothing, he feels that he has accomplished something even if his suggestion will obviously not hold water. He does not believe that he must meet any objective standards of logic, reason or probability [or observability]” (p. 78).
- Milne, E.A., 1931, Contributions to a British Association discussion on the evolution of the universe, *Nature*, 128(supplement):715–716.
- Milne asserts the universe is evolving, but cites only examples of decay: “It has sometimes been asked whether the universe is evolving at all. Certainly its future evolution is a matter of speculation, and its past evolution is a matter of inference. But that it is evolving at this present time is not a matter of speculation at all—it is a matter of observation. We actually see stars undergoing drastic changes—changes of organization so fundamental that they can almost be described as mutations. I refer to those outbursts which we call ‘novae’ . . .
- “Such outbursts are by no means uncommon. The first quarter of the current century has witnessed five novae visible to the naked eye. . . . But many more have been observed in the most distant regions of space. Up to 1929 more than eighty novae had been recorded in the great nebula of Andromeda,

and were used by Hubble to determine its distance. Thus novae are distributed through space. They are also distributed fairly frequently in time. Hubble has estimated that some thirty novae occur each year in the Andromeda nebula. It has also been estimated that in our own galactic system there is at least one nova per year. . . . Thus we have in each nova an evolutionary event characteristic of the stars as a whole" (pp. 715–716).

Weisskopf, V.F., 1977, The frontiers and limits of science, *American Scientist*, 65(4):408–409.

"The development of the universe . . . is a progression from the elementary to the complex, from the less complex to the more complex. . . . This evolutionary history of the world, from the 'big bang' to the present universe, is a series of gradual steps from the simple to the complicated, from the unordered to the organized, from the formless gas of elementary particles to the morphic atoms and molecules, and further to the still more structured liquids and solids, and finally to the sophisticated living organisms. There is an obvious tendency of nature from disorder to order and organization" (pp. 408–409).

Whipple, F.L., and D.W.E. Green, 1985, *The Mystery of Comets*, Smithsonian, Washington.

Whipple and Green describe the laboratory tests of Mayo Greenberg at the Leiden Observatory in the

Netherlands. Greenberg attempted to simulate the formation and growth of interstellar dust grains in molecular clouds. Greenberg exposed the types of gases found in a molecular cloud at about 20 K to ultraviolet radiation of the intensity thought to be similar to typical dim starlight. However, no coalescence of gas molecules occurred without introducing two artificial conditions (1) the use of a cold finger as a nucleation site for the initiation of coalescence; and (2) the use of gas concentration higher than would actually exist in a molecular cloud. The second condition was especially important, since molecular clouds have too low a concentration of gases to allow spontaneous nucleation even at a temperature as cold as 20 K (pp. 200–203).

Therefore, Greenberg's "simulation" of dust grain formation was not really a simulation at all. Two special conditions which would not be true in nature were imposed by the "human intelligence" conducting the experiment. This brings to mind the fact that only Divine intelligence, not natural processes, could accomplish the creation of the cosmos.

Jonathan Henry
Science Division
Clearwater Christian College
3400 Gulf-to-Bay Blvd.
Clearwater, FL 33759

Stellar Evolution Challenged—A Reply to Henry

Jonathan Henry addresses a key issue, the limitation on legitimate science exploration in view of the supernatural creation. This issue has been explored previously (DeYoung, 2000). Dr. Henry charges that our paper accommodates an evolution position. However we strongly challenge stellar evolution as commonly understood, "We feel that the whole topic of stellar evolution needs detailed examination from a creationist viewpoint (Faulkner and DeYoung, 1991, p. 88). We do not see how the recent creation position in any way legitimizes evolutionary models.

References

- DeYoung, Don B. 2000 Dark matter *CRSQ* 36:177–182.
Faulkner, Danny R. and Don B. DeYoung 1991 Toward a creationist astronomy *CRSQ* 28:87–92.

Don B. DeYoung
Grace College
200 Seminary Drive
Winona Lake, IN 46590

The Dangers of Cloning Humans

In a letter in re-sponse to my article (Bergman, 2000) C. Lane Anderson (*CRSQ* 38:110) mentioned several major concerns, a few that I would like to discuss here. The disease known as *progeria* causes lethal pseudo rapid aging at a rate about nine times normal. It is due not to "aged" sperm cells but to a genetically caused deficiency that results in pronounced shortening of the patient's telomeres. The pedigree parents are always normal, thus the disease is not inherited. The rare autosomal dominant defect occurs spontaneously either in the egg or sperm; therefore it is in

the genes of the children only, not the parents (Simon, 1999, p. 227). Only a few dozen cases have been identified so far worldwide.

The concern that a cloned animal (or at least the DNA) will be as old as the parent is an issue that is now being addressed by research. So far the results are unclear. As the fertilized cell divides, it has been determined that the donor DNA in clones produces many more mutations than normal, which may be one reason why nearly all cloning attempts fail. On the other hand, we have learned

much from the research on the cloning that already has been achieved. Cloning is possible only because all cells (except for erythrocytes and some immune system cells) have a *complete* DNA genome. This means that each cell contains the instructions for constructing another complete animal. Humans have at least 250 different cell types, and nearly every one of these can be used to clone a new person (Baldi, 2001 p. 147).

Although the DNA of an adult cell contains all of the genetic information needed to recreate the animal, adult cells generally are incapable of running the “create-a-whole-new animal” program needed to produce a new animal. Eggs, though, do contain all of the complex equipment needed to run the so called “organism development program.” An egg can divide as soon as it is fertilized because it contains all of the equipment required to undergo cell division. A fertilized egg needs only to duplicate its DNA, which occurs during combination of the haploid genome from the egg (23 chromosomes) and the haploid genome from the sperm. After the fertilized egg has divided into two cells, the new cells still have enough nutrients and cellular materials stored inside to continue dividing for many cell divisions. It will stop dividing only when all of the stored material is depleted.

As noted, to clone a baby one needs both an unfertilized egg (with its genetic material removed) and the DNA from a normal cell. The genes, though, are as old as the cell used to obtain the DNA. If the cell is from an adult, the DNA could be 30 (or more) years old. Therefore, some feel that the chromosomes may have shorter telomeres, and also may be damaged by mutations since most cells accumulate mutations as they age (for a discussion on telomeres, see Bergman, 2000).

Cloning is accomplished via several steps, one of which involves placing an ordinary somatic cell, such as a skin cell, in a culture dish that contains a nutrient broth to allow the cell to grow and divide to produce more skin cells. Cloning also requires obtaining an unfertilized egg from the organism that you want to clone. Next, the haploid genome (23 chromosomes in humans) contained in every egg must be removed. One way to accomplish this is by deftly yanking the chromosomes out of the egg. The egg without genetic material is now prepared to host the diploid DNA from a somatic cell.

The majority of the cell's DNA resides in the nucleus compartment, which also needs to be carefully removed as a unit from a somatic cell so that the chromosomes are not damaged or spilled. The nucleus then is placed in a tiny micro needle, and injected into the prepared egg viewed under a microscope to insure it is inserted properly (Lester and Hefley, 1980). Inserting the new diploid DNA from a somatic cell into the egg requires intricate microscopic work. Fortunately, the cell membrane is liquid and self-seals after the DNA is inserted.

Once this is achieved, the egg is almost ready to begin dividing. Many cloners use the cell fusion technique in which the egg and a somatic cell are fused together with an electrical jolt to become one cell. After fusion, the nucleus from the somatic cell becomes the new nucleus of the egg cell (Travis, 2001).

No matter which approach is used, the result is an egg that contains a new and complete DNA genome. What happens next is “shrouded in mystery” (Simon, 1999, p. 173). Unknown egg components cause the adult DNA genome to be converted *back* to the condition *before* it was part of a specialized adult cell. Part of this process involves *removing* the chemicals (such as those used in methylation) and the proteins normally attached to some of the genes in adult DNA for the purpose of switching them off or regulating them. They are removed by an unknown mechanism in the egg that restores the DNA to the condition necessary to initiate the organism development program. Once this occurs, the egg with its newly reset DNA will start to divide. It soon will form a small ball of cells called a *blastocyst*. At this point, the developing embryo can be implanted inside the womb of a surrogate mother.

The success of Dolly the sheep, and cloned cows, pigs, goats, and mice implies that we have perfected the fine art of cloning. Actually, most animal clones die, usually during embryonic development (Humpherys et al., 2001). Many are stillborn, and these often have monstrous abnormalities (Jaenisch and Wilmut, 2001). Furthermore, the carrier mothers often suffer miscarriages, and occasionally die themselves. Cloned animals that are born alive often remain fragile, and many die from immune-system defects that leave them unable to fight most infections properly (Travis, 2001).

Massachusetts Institute of Technology biologist Rudolf Jaenisch predicts that early human cloning attempts will result in so many deaths that the first 100 attempts will produce roughly only five live births. He also predicts that the surrogate mothers will have a high risk of miscarriages and stillbirths—and at the very least many mothers will have a difficult pregnancy, partly because the cloned fetus and placenta tend to be abnormally large. Called “large-offspring syndrome” this is one reason as many as 50 percent of the clones die at birth (Travis, 2001). Jaenisch adds that many of the few offspring that survive birth will die in days or weeks from abnormal livers, hearts, kidneys, or lungs, and only one to two will survive and “appear” normal. Only a lifetime, though, will determine *if they in fact are normal*. The evidence now indicates that they will be more prone to cancer, premature aging, immune defects, and a variety of other problems—an issue that only years of follow-up will answer fully (Rideout et al., 2000; Humpherys et al., 2001). Some researchers feel many of the problems are due to incomplete reprogramming of the DNA. The existing methylating pattern on the

DNA used to turn genes off must revert to the embryonic condition. Research indicates that the methylation regulation pattern in clones is frequently quite different than that in normal embryos (Travis, 2001).

The deaths might not be the worst of what can happen. The worst may be the clones born alive that must be kept alive on a respirator for years. Or would we need to pass special laws to allow sick cloned children to be euthanized? Scientists have had some cloning success with certain types of short-lived animals; but what happens if we clone a human and it turns out to have serious genetic defects that show up only as a child (or even as an adult)? Would this be the basis for a lawsuit? My guess is that the lawyers already are looking into this situation as a potential windfall, although who they would sue may turn out to be problematic. Would it be the clinic, the doctors involved, the hospital, the state for allowing this procedure, or the donor (and which one—the donor who supplied the egg or the one who supplied the DNA)?

I wish to thank Bert Thompson, Ph.D., John Woodmorappe, MA, and Clifford Lillo, MA, B for their insight on an earlier draft of this paper.

References

- Baldi, Pierre. 2001. *The shattered self: The end of natural evolution*. MIT Press, Cambridge, MA.
- Bergman, Jerry. 2000. The life clock and Paley's watch: The telomeres. *CRSQ* 37(3):176–183.
- Humphery's, David, K. Eggan, H. Akutsu, K. Hochedlinger, W.M. Rideout III, D. Biniszkievicz, R. Yanagimachi, and R. Jaenisch. 2001. Epigenetic instability in ES cells and cloned mice. *Science*, 293(5527):95–97.
- Jaenisch, Rudolf and I. Wilmut. 2001. Developmental biology. Don't clone humans! *Science* 291(5513):2552.
- Lester, Lane P. and James C. Hefley. 1980. *Cloning: miracle or menace?* Tyndale House Publishers, Inc., Wheaton, IL.
- Rideout, W.M. 3rd, T. Wakayama, A. Wutz, K. Eggan, L. Jackson-Grusby, J. Dausman, R. Yanagimachi, and Rudolf Jaenisch. 2000. Generation of mice from wild-type and targeted ES cells by nuclear cloning. *Nature Genetics* 24(2):109–110.
- Simon, Anne. *The real science behind the X-files*. Simon and Schuster, New York.
- Travis, John. 2001. Dolly was lucky. Scientists warn that cloning is too dangerous for people. *Science News* 160(16):250–252.

Jerry Bergman, Ph.D.
Biology Department
Northwest State College
Archbold, OH 43502-9517

On Conclusive and Illustrative Significance of Arguments for Design

Faulkner (1998) demonstrated that solar eclipses on the Earth had quite a unique character, both with respect to beauty and to the impression they produced, and, besides, they ensure an exclusive possibility of studying the Sun. It was considered as an argument in favor of design. Faulkner however believed it was a weak argument for design and concluded: "It is hoped that other creationists join in the discussion to define and refine the design argument". As a creationist, I wish to join in the discussion and to examine the question of whether arguments for design are needed as its proof, and if not, what is their true significance?

Why should one resort to arguments for the theory of creation if, unlike other, more special theories in science, creation can be proved strictly enough? Will it not seem to a poorly informed person that creationism is as little substantiated as evolutionism and they are on equal terms? If there is a proof for creation, then even very strong arguments become superfluous and may serve, if at all, merely as illustrations.

The proof for creationism is as follows. None of the "theories of evolution" has escaped being disproved by facts. Lamarckism in its most general form is disproved by W. Johannsen's (1903) experiments. The strongest (according to general opinion) "theory of evolution" (selectionism)

is strictly disproved by studies of fertility that show a complete destructiveness of the mutation process, which therefore cannot be the basis of selectogenesis (Ivanov, 2000). Evolutionism in its gradual form is disproved by the empirical generalization laid on the foundation of systematics—the concept of invariance of species.

These data have been available to science since the time of Linnaeus, and the fact that evolutionism has taken root despite the facts disproving it demonstrates that it has been cultivated artificially as a false philosophical and political doctrine. There is documentary evidence thereof (Nilus, 1903), evidence that stands, contrary to all the attempts to present it false or to pass over it in silence; "for nothing is hidden except to be revealed" (Mark 4:22).

As for evolutionism in the form of macrogenesis and systemic mutations (saltations), that is the theory of punctuated equilibrium, it is an eclectic attempt to reconcile the discreteness and invariance of species with transmutationism, based on assumption of absolutely improbable hypothetical phenomena not confirmed by any data.

In science negative results have the advantage over the positive ones in that they are conclusive and decisive. Positive data only support a theory but do not prove it, whereas negative data, which contradict its postulates, prove un-

equivocally the failure of the theory and that it should be abandoned as implausible. Thus the search for other theories should be commenced.

One can give many refutations of evolutionism, because 1) there are a few “theories of evolution” and 2) any fact contradicting the foundations of the theory proves its falsehood. However, the refutations given here seem quite sufficient. Hence, according to the rule of *tertium non datur*, the truth of creationism is proved by contradiction. Falsehood of a thesis means truth the antithesis, and *vice versa*.

This assertion that creation has been proved is not too strong, as it may seem at first glance because of unusualness of the situation (for in natural sciences, generally speaking, there are no proofs of truth of theories), since the disproof of evolutionism does not indicate concretely which theory of creation should be recognized as true, but supports creation in a most general form.

According to N. Bohr, truth and clarity are mutually supplementing concepts. As Lao-Tse expressed the same idea, “who knows does not understand, and who understands does not know”. On the strength of this, it is not understanding, *i.e.* connection with former notions, that is the basis of cognition, but the habit developed by continuous readiness to accept things as they really are, despite their paradoxical nature. Evolutionism is clear and understandable for many people and this is achieved by means of ignoring the facts that contradict it, so that truth is sacrificed. Theory of creation, accepting these facts, remains true, but at the expense of clarity, because one has to recognize the act of creation is beyond all understanding.

Shortly before Bohr, the same idea was realized by Danilyevsky (1885) and put forward as an evidence against the Darwin’s theory: “It is just this transparent clarity and the elementary intelligibility of the theory that represent the symptoms which are no to its advantage and make suppose that it is absolutely deprived of objective truth”. F. Jenkin (1867) believed that if a theory is constructed in a purely metaphysical manner, ignoring the facts that contradict it, *i.e.* with such treatment of facts, which Darwin indulges in, it is only a very short-witted person that cannot make it logically coherent and clear. One has always to be cautious whether the clarity of the theory is not a product of vulgarization and excessive simplification.

The requirement to explain everything is an enormous obstacle to development of science, because the existence of a field of cognition where the human mind cannot penetrate in principle is ignored. If we want to hold to truth, we have to assume and to take into account the existence of the unconscious and the unintelligible. A theory that is “quite clear” always ignores the facts that contradict it. And on the contrary, if it includes the unintelligible, it promotes strongly our knowledge, which has been exemplified many times in natural sciences and even in the history

of mathematics, when apparently illegitimate methods were employed which, nonetheless, led to correct results. “Enter by the narrow gate” (Matthew 7:13), teaches the Savior, and we may apply this to the paradoxicality of truth. Then He says: “Therefore everyone who hears these words of Mine, and acts upon them, may be compared to a wise man, who built his house upon the rock” (Matthew 7:24). A theory that is unlikely at first glance must not be banished from the threshold, but thoroughly studied, and it is only thereupon that its destiny can be rightly settled. Because of the non-acceptance of this principle, the enormous building of evolutionism turned out to be constructed upon sand.

Faulkner’s division of arguments into weak and strong ones is rather conditional and subjective. If expediency that is intention is obvious, the argument is considered as a strong one, if not, then the opposite is true. The strength of the argument depends on the degree to which the situation is carefully studied. For example, if the effect of full eclipses upon life on the Earth were cleared up completely, their functionality would be thereby proved. However, so far we only can make conjectures about it, eclipses, in spite of all their spectacularity, the impression they produce, and their usefulness for studies, cannot be a strong and demonstrative illustration of functionality.

Biological laws are a special thing and present strong arguments just because of their evident intention. The laws of fertility are purely biological. One of them is that fertility of plants and animals oscillates at a much lower level than is required for maximization of the number of surviving offspring, and another asserts that fertility modifications are not adaptive but serve for regulation of population density. They could not have been discovered by purely physical or chemical methods, or by studies at the molecular level. They even contradict physical and chemical notions (Koltsov, 1927; Schrödinger, 1943) since the latter are based on immanent laws and do not take into account the transcendental, supernatural phenomena because the researchers who were limited to studies of the inorganic world actually do not know the biological world. Yet these laws are determined by a specific biological organization the spontaneous “evolutionary” origin of which is completely ruled out. They follow from the requirements of the ecosystem and are therefore unthinkable without the Creator, just like all the biological laws determined by an intentional construction of organisms and of the ecosystem as a superorganism.

Denying the supernatural creation, we must assume an unnatural transmutation that contradicts the structure of species and of the ecosystem. Denying the unnatural transmutation, we inevitably arrive at supernatural creation. Hence one can see that design is the basis of true biology. Without design, biology as a science ceases to exist and becomes limited to vulgarized and simplified mechanistic

notions. It is transformed into an arena of evolutionistic conjectures and fantasies. Biological science confirms design in the best possible way. Design and only design ensures the scientific status of biology.

Science is a mnemonic system of facts; therefore, if even only a few of the facts are ignored, construction of a satisfactory system becomes impossible. As for evolutionism, it is a system of notions, not facts, and therefore, strictly speaking, it is not a science. This is evidenced even by its names: *Lamarckism* and *Darwinism*, which are similar to names of philosophical doctrines (Danilyevsky, 1885).

Summarizing briefly, 1) the proof of design consists in disproving evolutionism; 2) factual arguments for design are not needed for proof, but for confirmation and illustration of special cases of functionality of all that exists; and 3) a phenomenon may be used as an argument for creation only if such functionality is beyond any doubt.

Acknowledgments

I wish to thank Dr. David A. Kaufmann for his assistance in the publication of this letter and Dr. Victor G. Kolpakov for his help in translation into English and some correction of the text. I also thank Dr. Dmitry A. Afonnikov, Dr. Emmett Williams, Dr. George Howe, and Ms. Lazella Lawson for their help in preparation of this letter for publication.

References

CRSQ: *Creation Research Society Quarterly*.

- Danilyevsky, N.Ya. 1885–1889. *Darwinism*. Vol. 1–2. M. Ye. Komarov's Publisher, St. Petersburg (in Russian).
- Faulkner, D.R. 1998. The angular size of the Moon and other planetary satellites: an argument for design. *CRSQ* 35:23–26.
- Ivanov, Yuri N. 2000. Laws of fertility, role of natural selection, and destructiveness of mutations. *CRSQ* 37:153–158.
- Jenkin, F. 1867. The origin of species. *The North British Review* 46:277–318.
- Johannsen, W.L. 1935 (1903). *On inheritance in populations and in pure strains*. Selkhozgiz, Moscow/Leningrad (in Russian).
- Koltsov, N.K. 1968 (1927). Physical and chemical foundation of morphology. In: *Classics of Soviet Genetics of 1920–1940*:83–92. Nauka, Leningrad (in Russian).
- Nilus, S.A. 1994 (1903). *The great in small*. Blagovest, Novosibirsk (in Russian).
- Schrödinger, E. 1972 (1943). *What is life? The physical aspect of the living cell*. Atomizdat, Moscow (in Russian).

Yuri N. Ivanov
Institute of Cytology and
Genetics SD RAS
10 Lavrentyev Ave.
Novosibirsk 630090 Russia
FAX: (3832) 33 12 78
E-mail: iyn@bionet.nsc.ru

Book Reviews: The Age of the Universe (What are the Biblical Limits?)

Two reviews of the same(?) book are presented in the June 2001 *Creation Research Society Quarterly*. The first critiques a 146 page book published in 1999 by Morning Star Publications, WA., written by Gorman Gray, sold for \$10, and called simply, *The Age of the Universe*. The second covers a book of 192 pages, published in 2000, sold for \$9.99, by the same author and publisher, and called, *The Age of the Universe: What are the Biblical Limits?*

Richard Overman, reviewer #1, finds the tone of the 146 page book actually hostile to young-earth creationists, while throwing them a few condescending bones. He finds the book to be the usual special pleading to make the Bible fit “science.” But, at the end of his review, Overman undercuts his presentation by saying, “I find it incredible that God would allow His Word to be misinterpreted for 400 years only to correct this mistake with a new ‘alternative translation’ because science demands it.” While one may heartily concur that there is no need of a forced translation to fit a preconceived interpretation, it would not be the first time in history that most people had been fooled about

Biblical interpretation for hundreds of years, even with a good translation!

Carol Armstrong, reviewer #2, says of the 192 page book, “This is a scholarly book...ideas herein expressed merit careful consideration by those engaged in the study of origins.” She finds author Gray’s arguments presented “in a most irenic way, giving great detail in attempting to make these ideas clear. Although Overman’s review is more detailed, Armstrong brings out a point about Genesis 1:1 not mentioned in the first review. It is Gray’s idea that Genesis 1:1 describes an event, rather than a summary of the creation as is often assumed. Thus, he finds no necessary identification of Day One with the event of creation in Genesis 1:1. That’s a big deal, to which Overman would have done well to respond.

A third review is needed to reconcile the first two. Was Gray’s 1999 work so offensive to young-earth creationists that he saw fit to change his attitude, while at the same time expanding his explanations with 46 more pages of detail in his 2000 book? Or, was the 2000 book simply printed

in a smaller format, requiring more pages, but still exactly the same? In that case, our two reviewers saw it through very different eyes! We need Gray to answer some questions, too:

1) If the earth hung around in space for “multiple ages” before Day One, and then God remade it completely, so that one could not tell it had been around for billions of years, wouldn’t that be out of character for God to deceive us as to its antiquity? This is the flip side of the “appearance of age” red herring the old-earth folks are wont to drag across the path of logic and reason. We young-earthers see all the evidence on earth and in the vicinity of the solar system as perfectly consistent with a very young age, with no evidence that must be interpreted as an old age. Why would God deceive us? Of course, He cannot.

2) Whether or not the earth was ever extant, as Gray insists, or not, the creation event of Day One is no less mirac-

ulous. If there is no difference in the miraculous quality of the event, and since the purpose of the created universe is as a home for mankind, what is the compelling logic demanding that an infinite God let it lay around for billions of years before doing anything with it? When a sinner takes months to get around to organizing and repairing his house that he should have done in a day or two, he is guilty of slothfulness. This doesn’t seem to be the example a righteous, almighty God would set.

These types of arguments are not the most sound, being based mostly on our ignorance of creation events. But, they are just as sound as any Gray offers. And that’s the rub: why should anyone believe him?

George Drake
23 July 2001
1622 W. 15th Street
Long Beach, CA 90813

Simple Logical Fallacies in Evolution

“Evolution is a fact. You see it in everything. Don’t you believe in evolution?”, bristled the high school science teacher at the National Education Association Exposition in Chicago in July 2000. How do you answer that loaded question at the end of an outburst of complex statements? A simple “Yes” or “No” would destroy any real communication.

The three thoughts expressed above need to be unpacked. The words “Evolution”, “it” and “evolution” in those sentences meant three different things, but the speaker illogically regarded all of them as being identical. She needed help to see the logical fallacies in her thinking, but that was very difficult because questioning the notion of evolution stirs up so much emotion. Also, she had undoubtedly seen logical fallacies used repeatedly in the textbooks and the scientific origins literature she had read.

In her first assertion, “Evolution is a fact”, what did she mean by “evolution”? In order for the statement to be true, she must have been talking about microevolution, a small observable change in a population gene pool over several generations. On that level, she probably meant that bacteria develop resistance to antibiotics, grasshoppers develop resistance to pesticides, the beaks of the finches on the Galapagos Islands change, and breeders of domesticated animals produce new varieties. These scientifically observable and sometimes reversible “facts” are matters of scientific belief and are not contested by informed creationists.

Next, consider that even Thomas Huxley, Darwin’s bulldog, understood the distinction between science and philosophy in the origins issue when he wrote:

Looking back through the prodigious vista of the past, I find no record of the commencement of life, and therefore I am devoid of any means of forming a definite conclusion as to the conditions of its appear-

ance. Belief, in the scientific sense of the word, is a serious matter, and needs strong foundations. To say, therefore, in the admitted absence of evidence, that I have any belief as to the mode in which existing forms of life have originated, would be using words in a wrong sense. (Sullivan, 1933, p. 95)

Furthermore, Huxley distinguished a separate category of knowledge in relation to origins. He explained that he would expect to see macroevolution if he could have observed the origin of life, but as he continued he said:

That is the expectation to which analogical reasoning leads me; but I beg you once more to recollect that I have no right to call my opinion anything but an act of philosophical faith. (Sullivan, 1933, p. 95)

In contrast to Thomas Huxley, the teacher used the term “evolution” in her first statement to mean macroevolution, too. On this philosophical level she meant that life sprang from non-living matter and then changed spontaneously over time by natural processes to produce the variety of life we have today. Thomas Huxley correctly called this use of the word an act of philosophical faith.

On this philosophical level her statement that, “Evolution is a fact” is illogical. The statement presents the logical fallacy of *begging the question*. Begging the question means assuming as proved the very point that is to be established (Copi, 1972, pp. 83–84; Kreyche, 1954, pp. 268–269). Here, the scientific belief about microevolution becomes the basis of the philosophical assumption that macroevolution is a fact. The existence of macroevolution, however, is the point to be established. This logical fallacy of begging the question often appears in the thinking of evolutionists.

Furthermore, the teacher combined evolution as a scientific belief (microevolution) and a philosophical faith (macroevolution) in a single word in one sentence. She and other contemporary evolutionists fail to understand the distinction; therefore, they get caught up in *equivocation*. When committing this fallacy one assigns more than one meaning to the same word (Copi, 1972, p.72; Kreyche, 1954, pp. 260–261, 292). In her second assertion, “You see it in everything,” there is even a third meaning for the word. This idea of the ubiquity of evolution is presented early in introductory evolution courses when the professor claims that automobiles and computer chips “evolve”.

Indeed, this “evolution” is seen everywhere. It is nothing more than the observation of change, and it only means change over time. Incredibly, this phrase, “change over time”, actually appears in the *Illinois Learning Standards* (Illinois State Board of Education, 1997, p. 35) as an inappropriate substitute for the word “evolve” in the early high school biology section. This third meaning of the word applies to everything that changes. It is much broader than the concepts of microevolution and macroevolution in biology. Yet, all three meanings of the word “evolution” are commonly intermingled. That is why the teacher’s question was a complex one that could not be answered with a “Yes” or “No”.

These first two fallacies demonstrate the illogical nature of many arguments for macroevolution. Other errors of logic are also encountered in arguments against the notions of creation. The first of these is the *false cause*. This involves an attempt to draw from a conclusion of an opponent’s position an absurd or untrue consequent (Copi, 1972, p. 72; Kreyche, 1954, pp. 269, 292). This probably arises when evolutionists do not understand the creation paradigm. As a result, they draw false conclusions which are not espoused by creationists and then argue against the false cause. For example, Douglas J. Futuyma writes, “A Creator could presumably make a perfect organism that could live forever. But genes cannot.” (Futuyma, 1995, p. 122).

Futuyma further examines the subject of mortality, and starts “doing” theology without revealing the source of his theological “knowledge”. In his theology he assumes that the world as now constituted is the way it was originally created by God. But the Biblical creationist understands that the original world was created perfect, without sin and death, and that the present world is under a curse because of man’s sin. Futuyma’s arguments fail to consider this effect of the fall and argue illogically against the false cause.

Yet another fallacy used in trying to refute the creation view is the *ad populum* argument. This argument is an attempt to convince people of the truth of a position by appealing to prejudices, emotions, or statements such as, “Everybody believes it, so you must be wrong.” (Copi, 1972, pp.79–80; Kreyche, 1954, p. 267) Futuyma also exhibits this fallacy when he writes, “As of 1982, the histori-

cal evidence of evolution is viewed as fact by almost all biologists.” (Futuyma, 1995, p. 43)

This is just one of many sections in the writings of Futuyma and others that could be referenced, arguing that most scientists believe in macroevolution; therefore, it must be scientifically correct. However, logical conclusions are not established by ballot but by evidence and reason.

One last simple fallacy to consider is the *ad hominem* argument. This line of attack is based on trying to discredit an opponent’s argument by discrediting the opponent himself (Copi, 1972, pp.75–76; Kreyche, 1954, p. 267). Futuyma commits the *ad hominem* fallacy by speaking of creationists in the following terms:

Their Biblical analysis is as absurd as their scientific views; they cannot admit of metaphor, parable, or historical scholarship in their reading of the Bible.... (Futuyma, 1995, p. 20)

Quite to the contrary, creationists recognize metaphor and parable where those elements appear in the genre of Scripture. However, neither element is present in Genesis 1–11. “Admitting of” them here, where they do not appear, would result in doing violence to the clear meaning of the text. As for the modern “historical scholarship”, it has a false basis in macroevolution, and must be viewed with great skepticism in order to understand the Bible properly. Futuyma’s remarks are both illogical and a mischaracterization of those with whom he disagrees. More strident attacks, especially from Dr. Stephen J. Gould of Harvard University, are in the literature.

These fallacies are very easily refuted, because to identify them is to refute them. It is peculiar that scientists, who are reputed to rely heavily on reason, succumb readily to logical fallacies when arguing for macroevolution or against creation. Why is there a tendency on the part of evolutionists to abandon science and logic when discussing origins. Does it involve an issue other than intelligence and logic? It appears to me that it does.

References:

- Copi, Irving. 1972. *Introduction to logic*. MacMillan Co., New York.
- Futuyma, Douglas. 1995. *Science on trial*. Sinaur Associates, Inc., Sunderland, MA.
- Illinois State Board of Education, July 25. 1997. *Illinois learning standards for elementary and secondary students*, Std. 12.A.4c., Springfield, IL.
- Kreyche, Robert J. 1954. *Logic for undergraduates*, Holt, Rinehart and Winston, New York.
- Sullivan, J. W.N., 1933. *The limitations of science*. The New American Library, New York.
- Walter I. Sivertsen
3410 Ann Ave.
Park City, IL 60085-4764

Hasty Conclusions

Bolton Davidheiser (2001) comments that “Too many people who should know better write of the ‘five senses.’ There are seven physical senses.” Actually there are at least eight. In addition to the muscular sense and temperature sense he mentions there is also the sense of balance. There may be more senses. Let us beware of the fallacy of thinking we have learned all there is to a subject, even one as mundane as the human senses.

Much Ado About Nothing

In recent years, experiments with Hox genes have led to many claims for some of the outcomes. The following are some of the examples.

A horse was born with a number of toes instead of the normal one toe; a snake produced rudimentary limbs; mice embryos have been born with a backbone similar to that seen in jawless fish; and mice were born without the full complement of bones in the ear. Instead, it is said they had one bone which was claimed to be that of the quadrate, a feature normally found in reptiles. Finally, flies hatched with nine pairs of wings (Day, 1995, pp. 30-33).

First of all, what insect has ever been seen with nine pairs of wings? This is a clear case of a simple mistake in the body plan by way of the Hox genes. In the case of the backbone and the bone in the ear, these are clearly not real fish and reptile tissue, but Day claimed that nature was using existing pathways in development and twisted them into ancient pathways (Day, 1995, p. 34). In the case of the bone in the ear, a Hox gene known as Hoxa-2 was disabled in order to produce the single bone (Day, 1995, p. 34). Clearly a certain amount of manipulation is involved here. Monotremes have reptile-like features, but they are made of the animals' own tissue and not really that of a reptile (Brown, 1987, p. 77). What this reminds us of, to some extent is the genetic potential there is in creation. Controlling the timing of certain proteins helped in the production of teeth in hens (Brown, 1999, p. 39), and life-form's genetic potential may have played its part in the past by being the mechanism by which the Creator had certain life-forms share features, the other being that some of them were created directly by God.

Flood Geology versus the CCC Model

Most creationist geologists follow (more or less) basic principles laid out by Whitcomb and Morris (1961) - one being the recognition that the Genesis Flood formed the bulk of the rock record. Disagreements abound over the placement of Flood stratigraphic boundaries in the rock record,

Reference

- Davidheiser, Bolton, 2001. An exhortation for the correct use of words. *Creation Research Society Quarterly* 37:4.
Eric Blievernicht
940 E. Sunset Pike
Terre Haute, IN 47802
ebliiever@earthlink.net

It may be that the horse did once have more than one toe; this would not go against creation if this is so but, at the same time, this could still be a case of scientists manipulating the Hox genes. In (Brown, 1989) I did point out the many features shared by the snake and the monitor lizard, but evolutionists did not link the two together despite all of this. We also know there are lizards that have lost their limbs, and the serpent was condemned to go on its belly in Genesis. Even so, on the other hand, this could still be only a manipulation of the Hox genes. In all of these cases, there are few claims of anything actually being made. But there is, instead as the title of the comic work by the great bard Shakespeare puts it, ‘Much Ado About Nothing’.

References

- CRSQ: Creation Research Society Quarterly
Brown, C. 1987. The law of symmetric variation and the gene-theme mode. *CRSQ* 24:75-80.
———. 1989. The origin of the snake. *CRSQ* 26:55.
———. 1999. Of hen's teeth and dinosaur's feathers. *CRSQ* 36:39
Cohen, P. 2001. Monsters in our midst. *New Scientist* 171 (2300):31-33.
Day, S. 1995. Invasion of the shapechangers. *New Scientist* 148 (2001):30-35.

Colin Brown
61 Derby Road, Golborne
Warrington WA3 3LE U.K.

mechanisms, etc., but a perusal of creationist literature reveals an almost universal consensus on the bulk of the Phanerozoic record being a relict of the Flood. The recently introduced CCC model (Gentet, 2000) challenges that position by assigning most of the rock record to curse-

related, non-Flood, catastrophic preservation of distinct ecosystems. The great Flood is left with an as-yet-to-be-identified erosional surface. Lain (2001) defends that model in a recent letter.

As a geologist, I find that this model's position puzzling absent a desire to minimize the effects of the Flood *a la* Baron Cuvier. Mr. Lain (2001, p. 168) states that in the CCC model, "natural processes were going on from the very beginning of creation, though in some instances the magnitude of these events were greater than anything we have so far experienced..." This statement could just have easily been made by a modern uniformitarian apologist. That is not meant as an accusation against Mr. Lain, but as an indication of a much-needed clarity in the model. The CCC model has been criticized as a "neo-Cuvierist" approach to Flood geology, and Mr. Lain's letter fails to provide any distinction with respect to the geologic record between the CCC model and that 19th Century failure. The baron was one of the most eminent scientists of his century, but his attempted compromise of multiple catastrophes - recapitulated in the CCC model - was squashed between its inability to find explicit support in the Bible on one side, and uniformitarian geology on the other. Why repeat that mistake?

In a similar fashion, the reader will find, if he troubles himself to reread the original five critiques and Mr. Lain's defense, that the defense addresses none of the basic issues raised in the "purported" critiques, and only raises new questions about the validity and direction of this model. Exegetical/hermeneutical, formal, and empirical errors merely serve to highlight the model's inherent weakness.

Biblical truth should take precedence with creationists. The acknowledgement of that truth in the CCC model is one of its only strengths. However, after digging through Mr. Lain's letter, I find that the biblical support for the CCC model resolves itself into poor exegesis and support from non-biblical sources. Mr. Lain cites Josephus, the book of Jasher, and Eusebius as authorities supporting the CCC model. I prefer Genesis and other pertinent passages of the Bible. Mr. Lain should clarify his position on these sources, for it appears that they are given equal weight with Scripture. His exegesis appears similarly flawed when he applies the warning of I Timothy 1:4 to the biblical genealogies. This unique interpretation, if correct, would suggest that the publication of numerous interesting articles that have appeared in the CRSQ about the biblical chronology was sin!

How does the CCC explain the rock record? Mr. Lain speaks of ecosystems, created on the 3rd, 5th, and 6th days of Genesis 1, and expanding across the face of the earth, awaiting preservation in multiple catastrophes accompanying the curse. This rather unique interpretation of the Genesis days finds no explicit support in the text of Genesis 1, or anywhere else in the Bible. Not being a biologist, I

cannot comment on whether the ecosystems based on the days of creation are even tenable in a biologic sense, but they appear unwieldy at best. There is nothing in Genesis 1 that equates the days of Creation with specific ecosystems, and the purported survival of these ecosystems before, during, and after the Flood itself contradicts the unique nature of the Flood and its biblically-based purpose and effect (e.g., II Peter 3:6; Genesis 6:13).

Mr. Lain equates the "ecosystem" of the 5th day with the "Cambrian explosion." However, the "Cambrian explosion" is first and foremost a testimony to widespread extinction and rapid marine deposition across continental interiors. There is a significant difference between the *existence* of marine life in its "ecosystem" and its *preservation* in fossil graveyards. The presence of widespread marine Cambrian strata, often overlying regional erosional unconformities, seems much easier to attribute to the global extinction event of the Genesis Flood, rather than the 5th day of Creation.

Mr. Lain challenges Flood geologists to explain how marine fossils were formed in the Flood when Genesis 7 does not include the account of their destruction. That's easy. The reasoning is as follows: 1) the Flood was global, 2) 'global' includes the oceans, 3) marine creatures live in the oceans, 4) the effects of the Flood (volcanism, geochemical changes, tectonic upheaval, rapid clastic and chemical sedimentation) on marine environments would result in the mass death and burial of many marine organisms. While those details are not provided in Genesis, I believe that this can be attributed more easily to Moses' economy of words than it can be to assume it did not happen because it was not explicitly described. If Mr. Lain's comment represents an approach to historiography, it would result in the death of history as a discipline, since only explicit, positive biblical teaching would be allowed. Of course, that would invalidate the CCC model, too.

Mr. Lain's approach to the fossil record is a false dilemma – a logical fallacy. He allows the only interpretive approaches to the rock record to be those of evolution or the CCC model. Keeping your opponent out of the stadium is certainly one way to win, but not generally recognized as fair play. Mr. Lain should reread the numerous articles published in the CRSQ over many years that offer other interpretive options.

Mr. Lain makes exhaustive use of uniformitarian interpretations as an argument against creationist opposition to the CCC model. He seems to think that the conclusion of "no Flood" logically flows from the work of those who would never admit its possibility in the first place. I will leave it to others to point out published literature debunking the "no Flood" interpretation of trace fossils, fossil assemblages, etc., or the reliability of such things as dendrochronology in determining the age of the earth.

In my earlier “purported” critique, I noted that the existence of widespread (and arguably correlative) marine “Paleozoic” strata over much of North America supports continent-wide deposition by the Flood. Mr. Lain must explain how the continent of North America could be inundated by “curse catastrophes” and still retain the biblical teaching of the uniqueness of a global Flood that left less evidence!

Mr. Lain could clarify these issues by answering several crucial questions:

- What are the field criteria for identifying Flood strata from non-Flood strata in the CCC model?
- If the uniformitarian geologic periods are paleoenvironments, then why is there a unidirectional order in the sequence? Why is there not a random distribution of say, Precambrian-Cenozoic-Paleozoic-Mesozoic at least in some locales?
- If the Flood was the world-destroying catastrophe presented in Scripture, then why is it such a miniscule part of the rock record, while numerous minor catastrophes, connected to the curse, form major depositional units?
- Is there sufficient time, even in the 10,000-year time-frame advocated by Mr. Lain for the geologic work of the rock record to be accomplished absent the Flood?

Perhaps there is a great deal of misunderstanding about this model, but at present, the CCC model severely undercuts Flood geology by creating the potential for accommodation of the *interpretations* of uniformitarian geologists in their arguments against a biblical Flood. I hope that the readers of *CRSQ* appreciate the seriousness of the challenge presented by the CCC model. Because if it is correct then all of the Flood geology studies published by the CRS in its quarterly journal and in many books and monographs require tremendous revision or rejection. I think the evidence points in the other direction.

References

- CRSQ: Creation Research Society Quarterly*
 Gentet, R.E. 2000. The CCC model and its geologic implications. *CRSQ* 37:10-21.
 Lain, E.C. 2001. Defense of the CCC model. *CRSQ* 38(3):165-168.
 Whitcomb, J.C., Jr. and H.M. Morris. 1961. *The Genesis Flood*. Baker Book House. Grand Rapids, MI.
 John K. Reed
 915 Hunting Horn Way
 Evans, GA 30809

Book Review

***Lights Out: Sleep, Sugar, and Survival* by R.S. Wiley and Bent Formby
 Simon and Schuster Inc., New York. 2000, 354 pages, \$24.95**

Since low fat diets and exercise have gone to war against obesity, the average American has gained 8.5 pounds. Increasing numbers of people are getting Type II diabetes. For those who feel they exercise like a maniac, are always hungry, are overweight, and gain weight if they even smell a cookie, this book may have the answer. These researchers wrote *Lights Out* to present the proof that overeating fat and a lack of exercise do not cause obesity, heart disease, diabetes, and cancer. They base their conclusions on more than a decade of research at the National Institutes of Health and back it up with more than one thousand scientific sources.

Up to about 1900 when the sun set, it got dark. If people stayed up late it was to the dim red glow of fire or candles. When it got dark people went to bed and slept. In the winter people spent up to 14 hours a day in the dark.

In the past the abdominal fat pad common in insulin-resistant, high cholesterol and Type II diabetes patients would have kept internal organs warm and served as an energy store for famine season of winter. The liver dumps sugar into cholesterol production to lower the freezing temperature of cell membranes. Chronic high insulin

leads to insulin resistance. Blood sugar cannot enter muscle cells, so all sugar goes to fat cells for storage or gets turned into cholesterol. This makes insulation and anti-freeze to prepare the body for winter freeze and famine that never comes for modern day Americans.

Cryptochromes in the blood pick up the blue spectrum of sunlight and carry it throughout the body. In the summer the body gets the message to produce hormones that say, “Eat all you can and build up a fat pad so you will survive the dark winter famine.” Today artificial lights trick the body into thinking every day year round is the season to eat a lot and gain weight. Today we do not merely have fruits ripening in the summer; we have concentrated sugary foods year round. Sugar consumption has increased 150% since 1900. Long hours of light cause insulin release to store extra carbohydrates as fat and cholesterol to have something to live on when summer is over. The flickering light of the TV is addictive because it causes dopamine release; it also tells your body to eat and store fat.

Even if one slept eight hours a night, several hours were probably spent sleeping in a room with morning light leak-

ing in. The evening's artificial light was abnormal spectrum. Instead of the sun, a clock or TV dictates bedtime.

Staying up late means insulin stays higher in the night when it should be low. Cortisol falls so late that it will not come up normally in the morning. Prolactin does not come up until after 3.5 hours of melatonin, so after a short night it stays too high in the morning. If cortisol is not high enough to enhance dopamine, a person may feel rushed and have poor memory and trouble planning. In the afternoon the appetite comes roaring on Melatonin would have suppressed appetite at night, but it will not form with the lights on. After sunset the light bulbs, computer monitor, refrigerator light, and TV screen tell the body to eat carbohydrates and gain weight. Attempting to exercise the extra weight off means cortisol level goes up, and insulin response system goes up to mobilize blood sugar and may eventually lead to insulin-resistance.

Fat cells release leptin that land on receptors (neuropeptide Y) to tell the body it has gained enough weight. But if the person is 20 pounds overweight, so much leptin is released that the receptors go dead from overload. In nature no one would get so fat that leptin could do this, because the sugary food supply runs out in the winter. Borneo has an annual fruiting season. The rest of the year the orangutans eat twigs and insects and burn fat.

The length of light and dark hours each day regulates hormones such as insulin, serotonin, and dopamine. Light shuts off melatonin production at the preoptic site connection to the pineal gland. Research on rats showed that even the light of less than a candle in the dark phase (night) disrupts the production of the antioxidant melatonin and increases tumor growth. Mice that got long nights of darkness would not get cancer when substances were painted on their bellies. Mice that got short night of darkness ruined toxicology experiments by dying before the experiments were over. Long hours of light and short nights led to more tumors and higher insulin, blood sugar, and insulin resistance. Researchers at John Hopkins University gave mice a series of injections of Windex, water bottle plastic, antiperspirant, and carcinogens. The short night

mice got cancer so quickly, the scientists could not tell which chemical to blame. They could not give the long night mice cancer even many carcinogens down the line.

The short nights of darkness were also connected to death from heart disease. Cryptochromes in the blood carrying the message of blue light knock out the enzyme that metabolizes methionine. Short nights of darkness cause chronic high cortisol and endotoxin LPS. The authors blame heart attacks, not on cholesterol or lack of exercise, but on trauma such as fright in an earthquake or a chronic fear state putting the heart into almost permanent physiological panic. Long dark nights change the heart's metabolism from sugar burning to fat burning, but artificially long hours of light every day all year long eliminate seasons as far as the body can tell.

When the authors asked Dr. Thomas Wehr, the head of the department studying seasonal and circadian rhythmicity at the NIH whether he felt the public had the right to know that people have a right to know that on less than 9.5 hours of sleep at night-i.e., in the dark, they will (a) never be able to stop eating sugar, smoking, and drinking alcohol and (b) most certainly develop one of the following conditions: diabetes, heart, disease, cancer, infertility, mental illness, and/or premature aging, he said, "Well, yes, they do have a right to know. They should be told: but it won't change anything. Nobody will ever turn off the lights." The authors believe people have the right to know about this lifesaving information, and decide for themselves, and I agree.

Numerous sections about cavemen and evolution and Darwin could have been deleted without affecting the content. References I would include are Luke 21:26, "Men's hearts failing them for fear" and Genesis 1:14-18, "...for seasons...the greater light to rule the day, and the lesser light to rule the night..." We let light bulbs rule the night and seasons. The Creator knew best.

Janice Cockerham
PO Box 669
Zuni, NM 87327

Nothing Practical From Evolution

No product, discovery, medical procedure, or advance has come out of evolutionary theory. Without evolutionary theory, all practical biology would stand just as it is. No major corporation has a Department of Evolution because scientists who have to produce results don't use it. In fact, I would like to challenge the readership of this publication [*The Scientist*] to come up with one practical application of biology that would have been impossible were it not

for the hypothesis of evolution. In the meantime, I think that scientists should leave the important questions, such as what is the meaning of life and is there a God, to religion, which knows how to answer such questions, and stick to what they know how to do, such as breeding insect-resistant corn and curing cancer.

N. Avraham Sonenthal
to *The Scientist* (11[14]:10)

Creation Research Society

Membership/Subscription Application and Renewal Form

The membership/subscription categories are defined below:

1. **Voting Member** Those having at least an earned master's degree in a recognized area of science.
2. **Sustaining Member** Those without an advanced degree in science, but who are interested in and support the work of the Society.
3. **Student Member** Those who are enrolled full time in high school or undergraduate college.
4. **Senior Member** Voting or sustaining members who are age 65 or older.
5. **Life Member** A special category for voting and sustaining members entitling them to a lifetime membership to the Society.
6. **Patron Member** A special category for voting and sustaining members who either make a one-time \$2,500 contribution to the Society's general fund, or contribute \$500/year for five years. A Patron Member receives a life-time subscription, a plaque, and has his or her name listed in the *Quarterly* each year.
7. **Subscriber** Libraries, churches, schools, etc., and individuals who do not subscribe to the Statement of Belief.

All members (categories 1-6 above) must subscribe to the Statement of Belief as defined on the next page.

Please complete the lower portion of this form, and mail it with payment to the membership secretary:

Dr. Glen W. Wolfrom, Creation Research Society, P.O. Box 8263, St. Joseph, MO 64508-8263



This is a ☐ new ☐ renewal application for the subscription year beginning June ☐ 2001, ☐ 2002, ☐ _____.

Please Type or Print Legibly

Name _____ Address _____

City _____ State _____ Zip _____ Country _____

Degree _____ Field _____

Year granted _____ Institution _____

Presently associated with _____

I have read and subscribe to the Creation Research Society Statement of Belief.

Signature _____ Date _____

Check Appropriate Category:

- | | | |
|-------------------------------------|----------------------------------|--------|
| ☐ Voting | ☐ Regular | \$29 |
| | ☐ Senior | \$24 |
| | ☐ Life | \$350 |
| | ☐ Patron | \$2500 |
| ☐ Sustaining | ☐ Regular | \$29 |
| | ☐ Senior | \$24 |
| | ☐ Life | \$350 |
| | ☐ Patron | \$2500 |
| ☐ Student | | \$24 |
| ☐ Subscriber | | \$32 |

<u>Item</u>	<u>Amount Due</u>
Member/Subscriber	\$ _____
Added \$7 charge for orders outside U.S.A.	\$ _____
Optional contribution	\$ _____
Books	\$ _____
Total Due	\$ _____
Payment method: ☐ Visa ☐ Master Card ☐ Check	
Card number _____	
Expiration Date (mo/yr) _____	
Signature _____	

Foreign orders, including Canadian, *must* be made in U.S. dollars by a check drawn on a U.S. bank, international money order, or credit card.

Please do *not* send cash.

Student Members (high school or undergraduate college) are requested to complete the following:

High school or institution now attending _____

Your year in school _____ Year you expect to graduate _____ Major if college student _____

Signature _____

Order Blank for Past Issues

Cost of complete volumes (per volume): members (all categories) \$22.00
 nonmembers and subscribers (libraries, schools, churches, etc.) \$25.00
 Cost of single issues (per issue): members (all categories) \$6.00
 nonmembers and subscribers (libraries, schools, churches, etc.) \$7.00

Volume	Number				Volume	Number				Volume	Number			
	1	2	3	4		1	2	3	4		1	2	3	4
1	☐	☐	☐	☐	14	☐	☐	☐	☐	27	☐	☐	☐	☐
2	☐	☐	☐	☐	15	☐	☐	☐	☐	28	☐	☐	☐	☐
3	☐	☐	☐	☐	16	☐	☐	☐	☐	29	☐	☐	☐	☐
4	☐	☐	☐	☐	17	☐	☐	☐	☐	30	☐	☐	☐	☐
5	☐	☐	☐	☐	18	☐	☐	☐	☐	31	☐	☐	☐	☐
6	☐	☐	☐	☐	19	☐	☐	☐	☐	32	☐	☐	☐	☐
7 ☐	(complete volume only)				20	☐	☐	☐	☐	33	☐	☐	☐	☐
8 ☐	(complete volume only)				21	☐	☐	☐	☐	34	☐	☐	☐	☐
9	☐	☐	☐	☐	22	☐	☐	☐	☐	35	☐	☐	☐	☐
10	☐	☐	☐	☐	23	☐	☐	☐	☐	36	☐	☐	☐	☐
11	☐	☐	☐	☐	24	☐	☐	☐	☐	37	☐	☐	☐	☐
12	☐	☐	☐	☐	25	☐	☐	☐	☐	38	☐	☐	☐	☐
13 ☐	(complete volume only)				26	☐	☐	☐	☐					

Make check or money order payable to Creation Research Society. Please do *not* send cash. Foreign orders, including Canadian, please use a check in U.S. funds drawn on a U.S. bank, an international money order, or credit card.

(Please print clearly or type)

Name _____

Address _____

City/State _____ ZIP _____

Country _____

Method of payment: ☐ MasterCard ☐ Visa ☐ Check Card No. _____ Exp. Date (mo/yr) _____

Date _____ Signature _____

Add 20% for postage
 (minimum \$4.00, maximum \$20)
 (foreign minimum \$5, no maximum)

Total \$ _____

Mail to:
 Creation Research Society
 P.O. Box 8263
 St. Joseph, MO 64508-8263

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 need for an association devoted to research and publication in the field of scientific creation, with a current membership of over 600 voting members (graduate degrees in science) and about 1000 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. In 1996 the CRSQ was joined by the newsletter *Creation Matters* as a source of information of interest to creationists.

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. As part of its vigorous research and field study programs, the Society operates The Van Andel Creation Research Center in Chino Valley, Arizona.

Membership—Voting membership is limited to scientists who have at least an earned graduate degree in a natural or applied science and subscribe to the Statement of Belief. Sustaining membership is available for those who do not meet the academic criterion for voting membership, but do subscribe to the Statement of Belief.

Statement of Belief—Members of the Creation Research Society, which include research scientists representing various fields of scientific inquiry, 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. 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 Savior. The act 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.