

CRSQ

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Front Cover

Cover design by Michael Erkel
Tyrannosaurus rex is certainly the most “popular” of the dinosaurs, and our first article provides a microscopic look at its bones.

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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

Quarterly Dedication to Dr. John R. Meyer

This issue of the *CRS Quarterly* is dedicated to Dr. John R. Meyer. It would be quite easy to recognize each of his important biomedical research and/or teaching achievements at the following institutions where he has worked: the University of Iowa, the University of Colorado Medical School, the University of Louisville Medical School, the Los Angeles Baptist College (now the Master's College), Baptist Bible College, Faith Baptist Bible College, and the University of California at Los Angeles. Or we could readily elaborate on his activities as a board member in such other organizations as the Associates for Biblical Research, Faith Baptist Bible College, United Indian Mission, and The Institute for Creation Research. It would be possible likewise to publish a long list of his successful public creation lectures at churches, universities, television stations, radio stations, and summer camps in the United States and some other countries. But we will merely mention these accomplishments and then focus instead on his many contributions to the Creation Research Society itself where he has fulfilled several key assignments over a period of nearly 30 years.

My path crossed with Dr. Meyer's early in his career when our families met in 1969 to have lunch in Iowa. At that time he had just finished his graduate work at the University of Iowa and was seeking employment elsewhere. From the very onset of his career, John Meyer became aware of CRS and wanted to participate actively in the work of the society. He identified himself as a young-earth creationist at the onset of his career when such a move would have done very little to endear him to supervisors in the supposedly "open" and "unbiased" domain of biological research.

In 1974 he was elected to the CRS Board of Directors and attended his first board meeting in 1975, while teaching and carrying out cardiovascular research at the University of Louisville Medical School. Early in his days as a board member, Dr. Meyer suggested that we reorganize our meetings in order to hold one complete day of small committee sessions before the next day on which the full board could act upon the motions previously developed in each small committee. His suggestion was soon implemented and various standing committees were established to hold meetings the day before the plenary board session. This single modification wrought dynamic increases in the efficiency and productivity of the board and this procedure is still our *modus operandi*.

In addition to participating in board meetings, Dr. Meyer has served for several years as Chairman of the Research Committee—a major assignment—and as CRS Treasurer for six years, another very demanding task. He would undoubtedly have been elected to other board posts



John and Gerry Meyer

had his employment as the first CRS Lab Director not required that he resign from the board in 1992.

At the CRS board meeting in Ann Arbor, 1979, Walter Lammerts, John Meyer, Norbert Smith, Emmett Williams, and I hatched a plan to raise money so that CRS could establish a research center. Dr. Meyer promoted this idea with great energy, both inside and outside the board meetings and he was involved quite early in fund raising for the lab project. But raising money in the late 70's and early 80's was slow-moving business. Using what resources were available, Dr. Williams and two others undertook a scouting trip in quest of possible land for the lab in northern Arizona. After that trip, Dr. Williams supervised the purchase of our present Chino Valley site on behalf of the society. Shortly thereafter Dr. Meyer fenced the property and oversaw the drilling of a well that is still producing adequate supplies of water for VACRC. Meyer also contracted the installation of a suitable sewage system for such a day when funds would be available to build a lab.

As years elapsed, Dr. Meyer spearheaded the planning and supervised the construction of the VACRC lab building which was largely funded by one grant from the Van Andel Foundation—a grant that John Meyer successfully solicited and the Lord blessed. Dr. Meyer was appointed Lab Director in 1992 at which time he moved to Chino Valley, AZ. From then onward he has been personally re-

sponsible for most of the fund raising involved in the improvement of the property, the construction of new buildings, and the payment of his own salary each year.

Other major buildings constructed at the Chino Valley VACRC site as a result of John Meyer's fund raising and supervision include our spacious greenhouse and the Publications Center (from which our books and quarterlies are presently distributed). To allow for more space, he negotiated years ago for the purchase of an adjacent piece of property that has substantially increased the CRS acreage. Currently Meyer has visions of at least two more buildings for the center—an astronomical observatory and a visiting scientist's quarters.

Aside from and in addition to all these accomplishments, Dr. Meyer has been involved in various research endeavors either as the senior investigator or a secondary investigator. Some of these projects include: construction and use of a radio meteor observatory, measurement of stactite formation under laboratory conditions, studies on devil's claw (a local weed), fossils in Coconino sandstone,

tassel-eared squirrels, age and growth rate of VACRC lichens and mosses, growth rate and age of bristlecone pines, and the rate of erosion of the Painted Desert by way of the Little Colorado River drainage basin.

Much more could be said but space and human memory unfortunately are limiting factors. We would be remiss, however, if we did not mention the many years of service that CRS has received from John's wife, Gerry Meyer, who has been a cheerful, capable, and cooperative Administrative Assistant to John at VACRC—a capacity in which she continues to serve day by day. It is quite obvious that CRS would not be where it is today nor would it have accomplished all that it has if John Meyer had chosen to go into secular research alone, but God directed his studies and his interests to fill this need. I know I represent every member of CRS as we say to John and Gerry, "Our thanks, and hats off for a job well done". May the Lord continue to bless you and yours as you seek to serve Him in years ahead.

George F. Howe

In Memoriam: Carol B. Armstrong 1916–2001

When I was editor of the *Quarterly* in the late 1980's, I received a telephone call from Mrs. Armstrong volunteering her services, along with those of her husband Willard, to read galley proofs. I gladly accepted the offer, and thus began a long telephone/mail friendship with Mrs. Armstrong. Over the years, it would be difficult to estimate the number of corrections she made in the proofs for the *Quarterly*. It was a delight to have her help for I surely needed it. She continued to help future editors, and just a year or so ago when I started editing the *Quarterly* again, she was anxious to help Lane Lester and me, volunteering to read copy. Not only that, but she wrote book reviews and proofread the contents of at least two recent Creation Research Society monographs! The last help she so kindly gave me, just weeks before she died, was checking the final copy of the second edition of a monograph. I called her again to ask her for help on another monograph in late July only to discover she had passed away two days prior to my call.

Carol Bryan Armstrong was born December 28, 1916 in Dodge City, Kansas. The eldest of seven children, she grew up on her father's wheat farm near Ensign, Kansas. She obtained a B. A. degree at Fort Hays, Kansas State College and a Master's degree in Child Psychology at the University of Minnesota where she met Willard Armstrong. They were married for 56 years until his death in 1998. During most of that time, they lived in St. Louis, Missouri where Willard was Professor of Chemical Engineering at Washington University. They moved to Tampa, Florida, in 1981 where they both readily assisted *Quarterly* editors.

Mrs. Armstrong died July 19, 2001. She was a willing worker for the Creator. Her kindness and much needed help shall never be forgotten.

Emmett L. Williams
Editor, CRSQ

Life's Origins Get Murkier and Messier

Everything about the origin of life on earth is a mystery, and it seems the more that is known, the more acute the puzzles get... The chemistry of the first life is a nightmare to explain. No one yet has devised a plausible explanation to show how the earliest chemicals of life... might have constructed themselves from the inorganic chemicals

likely to have been around on the early earth. The spontaneous assembly of small RNA molecules on the primitive earth "would have been a near miracle"...

Nicholas Wade. Life's origins get murkier and messier. *New York Times* 13 June 2000, p. F1.

Editor's Comments

This issue contains Part II of Michael Oard's geomorphic model of the earth that involves the recessional phase of the Flood. This part includes the formation of water and wind gaps, pediments, submarine and land canyons. Oard favors his concept of vertical tectonics rather than plate tectonics. I urge our readers to "test" this model with the geomorphic features of the region in which they live.

The spontaneous generation of life from nonliving material is examined by David Woetzel. This has been the subject of many *Quarterly* articles in the past. I collected a bibliography of this topic in the 1980s (CRSQ 22:6). I update that list with more recent treatises:

Oard, M. J. 1983. More problems for chemical evolution. CRSQ 20:44.

Bluth, C. 1983. Review of *Abusing science—the case against creationism*. CRSQ 20:48.

Howe, G. F. 1983. Review of *Life itself*. CRSQ 20:191.

Williams, E. L. 1986. Review of *The mystery of life's origins; reassessing current theories of life*. CRSQ 22: 200–201.

Anderson, K. L. 1989. Prebiotic formation of the first cell. CRSQ 26:55–60.

Bergman, J. 2000. Why biogenesis is impossible. CRSQ 36:195–207.

The spontaneous generation of life is an article of faith in the evolutionary religion. The idea is completely unscientific, but that never dents the rigid modern mentality.

Jerry Bergman discusses the detrimental health effects of homosexual behavior. He concludes this is one of the

major reasons why Scripture condemns such behavior. The average life span of any male or female involved in such a lifelong lifestyle is only into the middle 40s.

Mark Armitage reports on a scanning electron microscopy study of dinosaur bones. The bones he examined were well-preserved and the author suggests that they likely are not very old, which is what one would expect from a young earth viewpoint. Carl Froede, Jr. briefly considers hot spots on the surface of the earth as a problem for plate tectonic theories. Jerry Akridge and I write on an active landslide system in the beautiful San Juan mountains of Colorado. We indicate that for such massive landslides to still be active, it is likely that this mountain range is not millions of years old. Christopher Chui continues his erosion studies of various rocks; the rates reported are from rocks collected in the Hawaiian Islands.

The book reviews and letters to the editor cover a wide range of topics. The editors hope you will find much subject matter to interest you. This issue is dedicated to the Meyers who have worked diligently to develop our research center in Chino Valley, Arizona. We remember and honor Mrs. Carol Armstrong for her help in our editorial endeavors. Lane Lester's excellent assembly of the *Quarterly's* is a difficult job which he performs with considerable talent. Likewise I thank all of our editors and contributors.

Emmett L. Williams
Editor

Book Review

The Wedge of Truth: Splitting the Foundations of Naturalism by Philip E. Johnson
InterVarsity Press, Downer's Grove, IL. 2000, 192 pp., \$17.99

This, the latest of Johnson's books, explains the wedge movement that is designed to form a crack in the seemingly impenetrable Darwinian edifice. Johnson's main goal is for creationists to get a seat at the table. The wedge movement is an effort to open the door of the rigid intellectual segregation now existing in the nation's colleges, among the intellectual elite and the news media. Johnson is confident that once the case can be presented, intelligent design will prevail. His key, therefore, is simply to get a hearing. This book, which is like a summary given to the judge arguing as to why our case should go forward, is one more attempt to get a hearing. Johnson feels once the crack is placed in the Darwinian armor, it will fall apart of its own accord. A major concern is the emotional reaction to criticism of Darwinism. Johnson notes the press reac-

tion to the Kansas situation was "universally strident, with table-pounding editorials and hostile commentary from every major newspaper in the United States as well as many from abroad" (p. 78). He also covers a wide variety of contemporary topics, such as the Kansas controversy which he tries to put in proper perspective.

One point stressed is that it is difficult for someone who has been indoctrinated in naturalism to understand the other side, theism. The example he gives is a staff reporter named Julia Keller who has a brilliant sister named Lisa. Lisa has a sterling academic record in biology and the other hard sciences, but has become a Christian and has come to doubt Darwinism. Julia explains when she heard the Kansas decision, she had the sudden "appalling vision of the lights going out all over Kansas in a steady encroach-

ment of medieval darkness” (p. 77). She then notes she can snicker at creationists, but can’t snicker at her brilliant, well-intentioned sister. Johnson notes that Lisa’s experience should help Julia understand that her perception of evolution opponents is inaccurate, but all too often evolutionists can’t see beyond their inaccurate stereotypes. Johnson accurately points out that there exists a “contempt” for one who questions Darwinism, and that “this reaction goes a long way toward explaining why there are so few persons with careers in main stream science who are willing to challenge Darwinism” (p. 78).

A chapter titled “Philip Wentworth Goes to Harvard” tells about a young and evidently once devout Christian who went to Harvard and lost his faith. This is a story one hears time and time again, and certainly Harvard bears its share of the responsibility. On the other hand, this writer has had several friends that attended Harvard and became stronger Christians and stronger creationists from their experience. The problem could be, as Johnson notes, Wentworth directed none of his skepticism toward the Harvard philosophy but instead reserved all of it for the Christian faith that he eventually discarded (p. 34). True, if Harvard educated instead of indoctrinated, it would be easier to do this, but unfortunately all too often many colleges, especially the so-called elite colleges, indoctrinate more than educate. The tragedy is, Harvard destroyed his faith without giving him anything comparable to take its place. What he gained was skepticism about much, especially much that is good, and a pervasive pessimism about life. Johnson relates the Philip Wentworth story because it is paradigmatic of “so many modernist intellectuals who thought they were dedicating themselves to a life of reason when, in reality, they were mostly learning to rationalize, to justify what they felt like doing” (p. 36).

More relevant to the science evidence for the creation world view is chapter two “The Information Quandary” which asks the question “Can natural law, time and chance create genetic information?” In this chapter Johnson analyzes the famous eleven second pause (a long time in the context of a video) in the Richard Dawkins interview in the “From a Frog to a Prince” video. The pause was after the narrator asked Dawkins if he could point to an example of a mutation or other evolutionary process that was information-enhancing, i.e., that created new genetic informa-

tion. When Dawkins finally answered he gave what Johnson called a “completely irrelevant reply about the transition between fish and the amphibians” (pp. 39–40). Johnson stresses that what is important is not the long pause which Dawkins was so upset over, but why Dawkins thought “only a creationist” would “ask for proof that mutations or natural selection can create new genetic information” (p. 41).

Dawkins, in an article in the *Skeptic*, after a barrage of long unkind statements about creationists, responded to the question. Johnson concludes Dawkins’ reply is interesting but is “no explanation of how random mutations in genes that are inactive (and hence not subject to natural selection) can be causing massive increases in genetic information (pp. 41–42). Johnson stresses that our body contains enormous amounts of information (equivalent to that found in four complete sets of *The Encyclopedia Britannica* in each cell, producing in each human the information equivalent to about 200-trillion sets of the *The Encyclopedia Britannica*, or more information in all the libraries in the world put together). He notes that if evolution can produce all this information, it must be very productive in creating information. Yet, he noted, a leading Darwinist thought it unreasonable, even reprehensible, to ask for a single specific example of an evolutionary process that is known to create new information (p. 42). This, of course, is the heart of evolution, and also is an area that this reviewer has been working on for a number of years now. And, this question which Johnson covers briefly (and should be explored in more detail by the creationist community) is where Darwinism fails. After reviewing the “me thinks it is like a weasel” example that Dawkins uses to illustrate evolution (and which creationists have eloquently used to show the impossibility of natural evolution) Johnson concludes that this topic, one that is of major interest to the intelligent design movement, has now only begun to be explored.

This book is in many ways an update of the work that Johnson has covered in his other volumes, and this review can touch only on a few areas which hopefully illustrates a book that is must reading for all creationists.

Jerry Bergman
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Augustine on Biblical “Contradictions”

If we are perplexed by an apparent contradiction in Scripture, it is not allowed to say, the author of this book is mistaken; but either the manuscript is faulty, or the translation is wrong, or you have not understood.

St. Augustine. 1952. *Reply to Faustus the Manichaeon*, 11.5, in *The Nicene and Post-Nicene Fathers of the Christian Church* (Editor, Phillip Schaff, 14 vols, reprint of original 1886–1894 edition) Eerdmans, Grand Rapids, MI.

Scanning Electron Microscope Study of Mummified Collagen Fibers in Fossil *Tyrannosaurus rex* Bone

Mark Armitage*

Abstract

A specimen of hip bone from a *Tyrannosaurus rex*, excavated from a ranch in Wyoming over 100 years ago, and thought to be 65 million years old is shown, by scanning electron microscopy, to have intact, mummified microscopic collagen fibers and other ultrastructural features within compact bone. Bone Haversian canals as well as lacunae and canaliculi are well preserved. Networks of collagen fibers remain intact within lacunae and what may be mummified osteocytes are shown to be present. Twenty-year-old, similarly fractured natural human hip bone shows comparable patterns of canals,

collagen networks and cells, including crenated erythrocytes. Hip bone from "Moab man," human remains collected from Utah and thought to be less than 200 years old, contains no such soft tissue features within compact bone. Moab man specimens appear cleanly stripped of soft tissues and harbor burrowing insect remains. These data call into question the long ages ascribed to these dinosaur fossils and support their rapid preservation in the absence of decomposers. The high level of ultrastructural preservation also implies that these dinosaur bones are simply not very old.

Introduction

The remarkable preservation of macro and microscopic structures of fossils in general and fossilized dinosaur bones in particular, has been the subject of many creationist books, articles and reviews (Calais, 1994; Helder, 1992; Howe, 1997; Taylor, 1999; Weiland, 1997b).

What appear to be red blood cells have been described from *Tyrannosaurus rex* bones (Weiland 1997a), while other dinosaur bones have been found which "cannot be distinguished from modern bone" (Weiland, 1999). Additionally, soft muscles, internal organs and even microscopic fibers have been well preserved in a juvenile dinosaur recovered in China (Snelling 1998).

In some of these writings it is often charged or implied by creationists that evolutionists are reluctant to make these startling revelations, even in recent times because it does not support their position that these fossils are over 65 million years old, or that they took millions of years to fossilize. Although the process of fossilization is not completely understood, it is assumed by both evolutionists and creationists that most fossils must be buried or stabilized very quickly in order to stand any chance of being preserved. Briggs states: "Of course fossilization is time de-

pendent. But although the age of most fossils is measured in millions of years (and some diagenic processes are certainly long term), whether or not an organism is destined to become a fossil may be determined very rapidly" (Briggs, 1995). Mineralized and petrified oddities such as bowler hats, fencing wire and sacks of flour (Walker, 2000; Weiland 2000) certainly show us that fossilization can take place quite rapidly, "freezing" the feeding practice or even the process of giving birth, forever into rock.

It is incorrect, however, to state that evolutionists have not been forthcoming with data that may show that fossilization and mineralization of biological materials can happen so rapidly as to preserve microscopic structures. As early as 1962 these scientists have shown that microscopic structures, such as bone collagen are well preserved in dinosaur bones (Little, Kelly and Courts, 1962). This work was followed by a series of studies by Pawlicki and his associates demonstrating by scanning and transmission electron microscopy that not only were collagen fibers found in dinosaur bones (thought to be 80 million or more years old), but that blood vessels, osteocytes (bone building cells) and even intact proteins, lipids, mucopolysaccharides and DNA were found (Pawlicki, Korbel and Kubiak, 1966; Pawlicki, 1975; 1977a; b; 1985; 1995). There are also good data in the literature that rapid fossilization of soft body structures may occur under certain anoxic or pH regulated (low pH level) conditions (Briggs and Kear 1993a;

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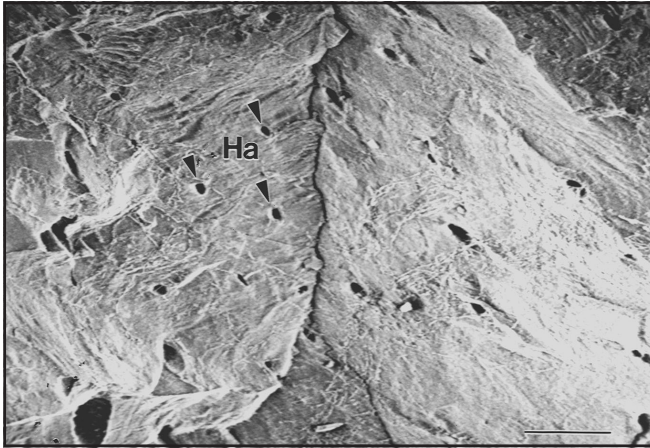


Figure 1. Low power micrograph of fractured dinosaur bone showing Haversian canals (Ha) through which blood vessels normally protrude (arrows). Scale bar = 3 mm (mm = millimeters; m = micrometers).

1993b; Briggs, 1995). Experimental taphonomy (the study of the transition of organic remains from biosphere to lithosphere) is ongoing in many paleontology laboratories. To quote Briggs (1995, pp. 539, 544), "Unless the morphology of the most labile tissues is 'stabilized' before the decay (within days or weeks) nothing remains...The results demonstrate that replication of soft-tissue can take place within weeks, even where the only major source of the phosphate is the carcass itself. They also show that the closure of the system is as important, at least in some cases, as the absence of oxygen."

In addition, some paleontologists are quite candid about the fact that the excellent preservation in many fossils must mean that fossilization or burial was instantaneous (Martill, 1989, p. 204). Martill even demonstrated muscle banding and cell nuclei in highly magnified fossilized fish muscle and stated that phosphatization (mineralization) must have been complete "within a few (probably less than 5) hours." Thus, for over 40 years evolutionist workers have reported openly on the presence of such remarkable preservation in dinosaur and other fossils.

In this study, fossilized bone from a *T. rex* dinosaur recovered from a dig at New Castle, Wyoming was evaluated for the presence of microscopic cells, vessels and fibers under the scanning electron microscope. These results were compared to recent human hipbone fragments supplied by an anatomical supply company and human hip fragments from a mine at Moab, Utah.

Materials and Methods

This study examined a museum specimen of *T. rex* hipbone (compact bone), approximately 3 X 2 cm in size. The specimen had been shellacked on one side and was indicated to have been in a museum drawer in Newcastle, WY

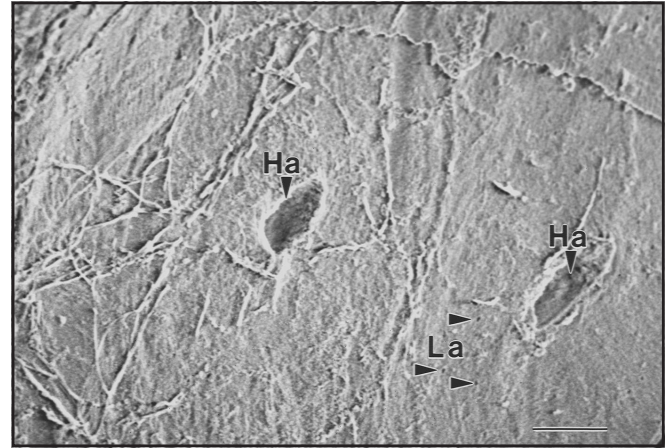


Figure 2. Micrograph showing two Haversian canals and surrounding bone matrix laid down by osteocytes. Small black dots as indicated by arrows are lacunae (La). Some collagen fibers are now evident. Scale bar = 400 m.

for about 100 years (Taylor, 2000). The bone fragment was pressure fractured in half, exposing the inner structure. It was affixed to a metal SEM stub, sputter coated in gold, and viewed at 15kv on a JEOL scanning electron microscope. Low power light micrographs were also made of the unprocessed bone fragments under a dissecting microscope. Recent human hipbone was used as a comparative control. The control bone was acquired from Carolina Biological Supply Co. (Burlington, NC) in a "kit" of processed human bones for the purposes of anatomical education approximately 20 years ago. According to the supply company (Hardy, 2001), these bones were fixed, cleaned of tissues by maceration, degreased in gasoline and air dried, but were not lacquer coated. They were shipped from India to the U.S. in the 1980's. Additionally, specimens of "Moab man" (AKA Malachite Man) hipbone were received from Mr. Joe Taylor (Taylor, 1999, p. 62). Moab man human skeletons were discovered in Big Indian Copper mine in 1971 and are considered by some to be intrusional skeletons and not *in situ* fossils (Berger and Protsch, 1989). These human bone fragments were similarly pressure fractured and processed for electron microscopy as above.

Results

In the dinosaur bone, Haversian bone canal systems (arrows, Figure 1) with their associated lacunae (Figure 2, arrows) are quite visible under low magnification and appear as deep impressions within the bone matrix under higher magnification (Figures 3, 4). Haversian canals contained no remnants of vessels and little loose collagen or other tissues, although their surfaces had a matte appearance. This was due to a carpet of collagen, thus, the calcium phosphate crystalline nature of the bone surface was not visible



Figure 3. Individual lacuna, now showing abundant numbers of well preserved collagen fibers and cellular debris (osteocytes?) at the bottom of each lacuna. Scale bar = 4 μ m.

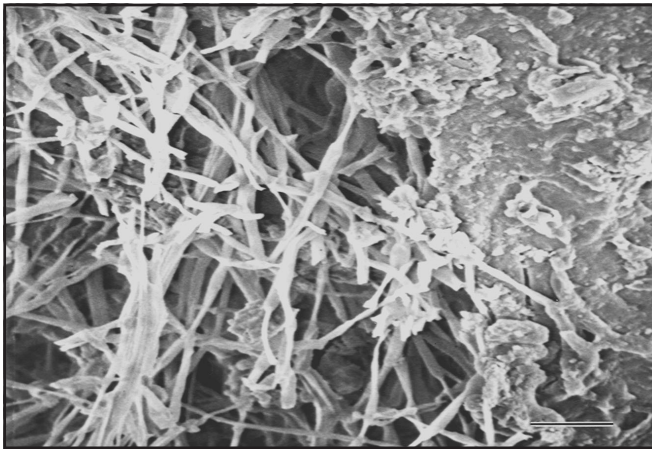


Figure 5. Network of collagen fibers, probably a precursor to bone matrix, laid down by osteocyte. Scale bar = 1.25 μ m.

(Kessel and Kardon, 1979). Canaliculi were also observed along the walls within canals. Lacunae, on the other hand, were often surrounded and filled with large masses of unconsolidated, mummified (or otherwise preserved) fibers, probably polymerized collagen or possibly fibrin (Figures 3, 4, 5). Often there appeared a network of fibers (probably a precursor to the calcium phosphate bone matrix) as seen in Figure 5. Mummified cellular debris, including possible osteocytes, was also found within the bottom of many lacunae (Figure 4, arrows). Canaliculi could be easily seen perforating the lacunae walls and are seen as black dots also surrounding lacunae (Figures 3, 4). It was clearly evident that no mineralization of these collagen fibers had occurred, since well-rounded bifurcations characterized fiber junctions (Figure 6).

Collagen fibers from a fresh human wound scab (Figure 7) and similarly positioned *T. rex* bone collagen at the same magnification (Figure 8) are remarkably similar. The



Figure 4. Another lacuna, also showing abundant numbers of well preserved collagen fibers and cellular debris (osteocytes?) at the bottom of each lacuna. Arrows represent possible mummified osteocyte. Scale bar = 3 μ m.

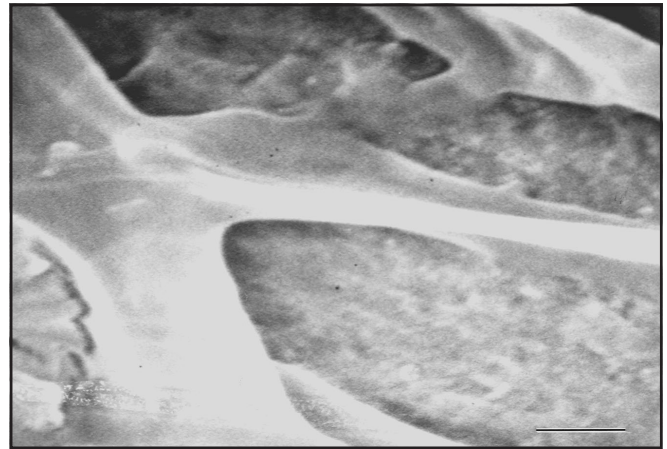


Figure 6. Very high magnification micrograph of a bifurcation junction on a collagen fiber. Note smooth and well-rounded surfaces denoting mummification rather than mineralization. Scale bar = 0.15 μ m.

T. rex collagen appears somewhat shrunken and deformed compared to the human specimen, but in all other respects could pass as recently laid down collagen. In comparison, the Moab man samples seemed devoid of any soft tissue at all. A Haversian system is shown in Figure 9, and there are no fibers associated with the canal, nor were there any fibers or other soft tissues seen in or around lacunae. In addition, when pressure fractured, a minute (1–2 mm in size) insect exoskeleton (resembling a Springtail of the Order *Collembola*) was observed, affixed to the surface of a trabecular process in the cancellous bone section of the sample. This exoskeleton, probably the remains of a molt, was lost in processing. If boring insects had access to this Moab man skeletal sample, as have been discovered at other fossil sites in Utah (Hasiotis and Fiorillo, 1997), then this might explain the lack of soft tissue remains in the Moab man samples examined. In stark contrast, however,

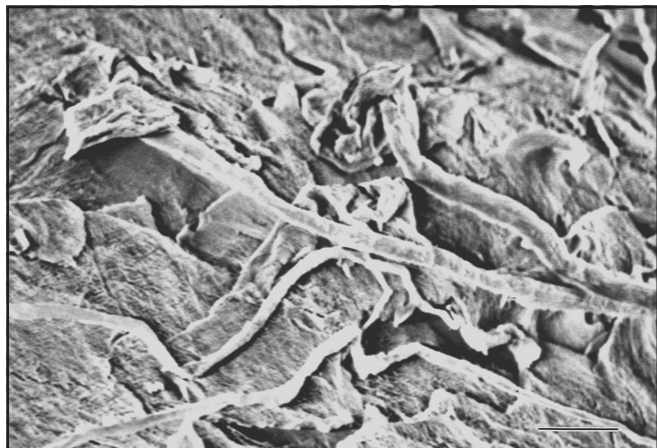


Figure 7. Human collagen fibers on a wound scab. Scale bar = 0.5 μ m.

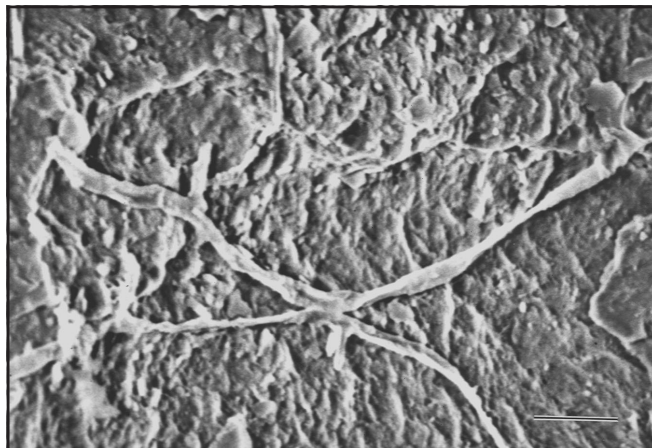


Figure 8. Collagen fibers from *T. rex* bone. Same magnification as Figure 7.

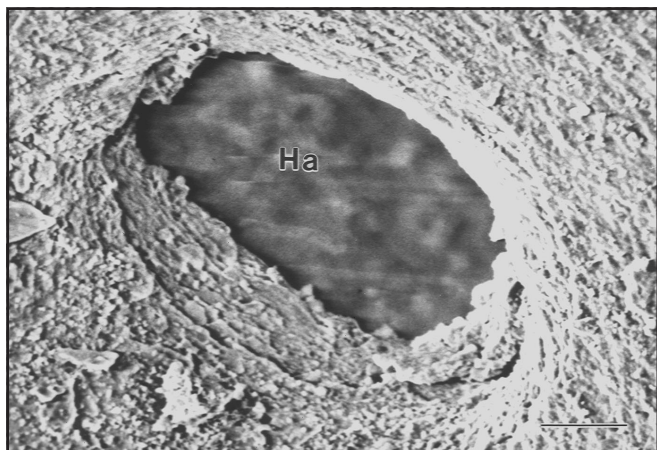


Figure 9. Portion of fractured surface of human bone, Moab man specimen. Note large Haversian canal and absence of fibers and other soft tissues. Scale bar = 85 μ m.

are the results from the recent human hipbone from the anatomical supply company. Internal bone surfaces were thickly populated with collagen mats while canaliculi showed up well on the inner surfaces of Haversian canals (Figure 10, arrows). In addition to webs of collagen, compressed soft tissues, resembling what might be osteocytes were observed (Figure 11), as well as crenated erythrocytes which were plentiful (Figure 12).

There is also good correlation between dinosaur collagen and human collagen fibers at similar magnifications, which are otherwise indistinguishable (Figures 8 and 12).

Discussion

Controversy surrounds the “Moab man” skeletons in several regards. There is general consensus that these remains are unfossilized and that they represent an intrusive aspect to the Dakota sandstone (Cretaceous) rock where they were found and not humans buried *in situ* (Taylor, 2000;

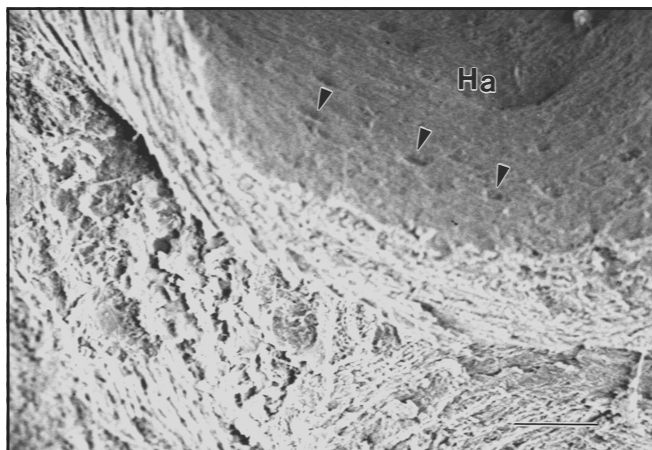


Figure 10. Portion of fractured surface of human bone, recent anatomical specimen. Network of collagen fibers is clearly visible, as are canaliculi (arrows) on inside surface of Haversian canal wall. Scale bar = 12.75 μ m.

Berger and Protsch, 1989). They have been renamed by Mr. Taylor as “Malachite man” (Taylor, 1999) due to the bright green patina they display as a result of the high concentration of copper (solution?) from the formation in which they are buried. This green stain was observed to extend almost completely through the compact bone, but it did not extend into the cancellous sections of the bone. The discovery of insect remains inside this bone indicates that they may have been exposed to the elements and to decomposers prior to the infiltration of the copper into the bone matrix, but in any event it seems the copper was not sufficient to preserve collagen fibers. This might explain the lack of soft tissues within the bone as it may have been consumed before any preservation or mummification could have taken place. Preserved human collagen fibers have been found, however, in ancient human remains from Egypt (Hino, Ammitzboll, Moller and Asboe-Hansen, 1982). Even though preservation of collagen and other ultrastructural features were observed (as a result of

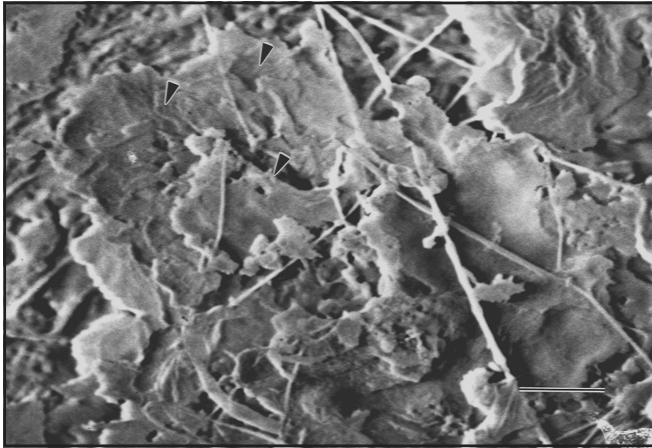


Figure 11. Recent human bone specimen. Collagen fibers crisscross a matrix of soft tissue (osteocytes?) Scale bar = 2 μ m.

the embalming process), they were approximately one half normal size and were significantly deformed after only 1700 years postmortem. Alternately, osteocytes have been discovered in a state of perfect preservation within the temporal bone of a 2600-year-old Egyptian mummy, but in this case, the bone was impregnated and preserved by a hard resin polymer (Benitez and Lynn, 1975).

In contrast, the dinosaur specimen exhibits remarkable preservation of soft tissues to the ultrastructural level. The state of preservation in this *T. rex* bone resembles that of *fixed tissues* found in recent human bone, thus the preservation, or fossilization process must have immediately followed or have been concurrent with death. It must also have been rapid enough to foil decomposers, but the fine structure of the soft tissue does not exhibit the effects of any mineralization. Additionally, the fact that this level of preservation has remained to this day casts doubts on the time period that may have elapsed between fossilization and the present. The collagen fibers in the dinosaur bone appear to be mummified and not fossilized, therefore they would have been subject to the same sorts of time-related processes that have affected human remains embalmed in Egypt in 100–300 A.D (Hino, et al, 1982). The *T. rex* specimen examined does not show these age-related effects.

Conclusion

Numerous microscopic structures such as bone lacunae, canaliculi, osteocytes and collagen fibers, protected from the elements deep within bone, have been found under scanning electron microscopy in a *T. rex* hip bone specimen which has been in a museum for about 100 years. These structures appear to be mummified and were not mineralized by the fossilization process. It is possible that fossilization events might be so rapid that preservation of

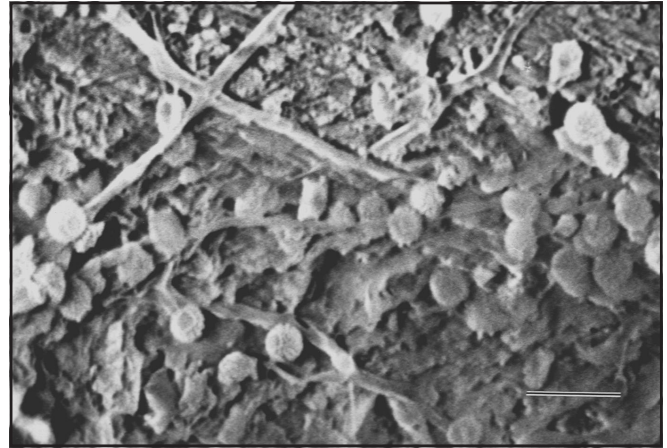


Figure 12. Recent human bone specimen. Collagen fibers surrounded by crenated erythrocytes (arrows). Scale bar = 15 μ m.

such structures is guaranteed, and perhaps these specimens are not as old as the literature suggests.

Acknowledgments

The author thanks Mr. Joe Taylor, curator of Mt. Blanco Fossil Museum, (Crosbyton, TX), for *T. rex* and “Moab man” specimens and for his assistance during the project. The author is also indebted to Dr. George Howe and the anonymous reviewers of this paper for critical comments.

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Book Review

Impeaching Mere Creationism by Philip Frymire
 Writer's Club Press, San Jose, CA. 2000, 102 pages, \$11.95

Frymire is a petroleum geologist by profession and admits he is “not a practicing professional zoologist” but enjoys “keeping up with the latest developments in evolutionary theory” (p. viii). In this work he attempts to refute creationism, specifically the intelligent design (ID) branch. The key sentence in understanding the book is his admission that “I had never read a creationist book” until reading Philip Johnson’s *Defeating Darwinism* (p. viii). He then read two other of Johnson’s books, and from this reading of creationist literature endeavored to refute the entire creation movement. The results of his admitted lack of study and research on creationism show on every page.

To write a book about something typically takes years of study, or at least it should if one wants to produce an accu-

rate book. Frymire has read several books written against the creation movement such as by Richard Dawkins, Carl Zimmer, and Niles Eldridge, and repeats many of the mistakes commonly made over and over again. An example is the claim that the vertebrate eye retina is inverted, i.e., light has to travel through blood vessels and nerves before it reaches the rods and cones, an “absurd” design that he concludes is proof that there was no intelligent creator (p. 36). This claim has been thoroughly refuted in the creationist and the scientific literature in general (see for example, Bergman, 2000).

As is typical of critiques of creationism, name calling is found on almost every page, such as that creationists spout “anti-evolution twaddle” (p. vii). He claims while evolution-

ists are looking for answers, “intelligent design theorists, on the other hand, won’t even bother to look for answers. That’s why intelligent design (ID) is not only useless but dangerous to science” (p. 38). He noticed certain “flaws” in ID thinking that he claims is “an affliction from which Johnson suffers greatly” (p. 44). He constantly points out the “flaws” in the creation, seemingly oblivious to how important this fact is to the Biblical doctrine of the fall and how intelligent design theory deals with this concern. Statements are common and reveal his admitted lack of knowledge, such as “creationism doesn’t explain anything, doesn’t predict anything, and has never led to the discovery of anything new about nature” (p. 83). One who has spent much time in a cell or molecular biology research situation soon realizes that virtually all research in this area (as well as in many other areas of biology) is essentially reverse engineering (Maddox, 1998). One assumes (or soon learns) that cell ultrastructure design is complex, purposeful and ingenious and helps to answer the question “how could this work most effectively and economically” (p. 83).

Frymire claims he is “not attacking anyone’s religious beliefs” (p. xi) then proceeds to do just that, even questioning God’s existence by utilizing the most common atheist arguments such as if God is the creator then “Who made God?” concluding that “a supernatural explanation” is the lazy way out” (p. 2). In response to this, I would ask “would receiving sophisticated language like signals picked up by SETI interpreted as contact with extraterrestrial beings be interpreted as the lazy way out?” He then adds “supernaturalism has been an impediment to science because it explains nothing and suggests no new lines of research. There has never been a case in the whole history of science where invoking the supernatural has led to any scientific advance” (p. 2). One familiar with early developments of science, and even many contemporary developments, realizes how foolish this statement is (see Morris, 1982). He concludes that there is evidently “no evidence for supernatural involvement in the real, everyday world” and that ideas such as “creationism” are “strange beliefs” (p. 4–5).

Frymire is unaware of the enormous difficulty involved in extrapolating both qualitative and quantitative changes beyond certain limits, claiming given more time, proven microevolution become macroevolution. The fallaciousness of this claim is illustrated in a study that found completion of a certain course can raise the average IQ 5 points. Extrapolating from this, though, is not proof that completion of ten similar courses will raise it 50 points, and twenty similar courses 100 points (easily exceeding the highest IQ on record, that of Marilyn Vos Savant whose IQ

rated is at 200). Most similar examples of both mental and physiological improvement produce s-curves because the improvement rapidly drops off with increased training. Such concerns are not even acknowledged, let alone dealt with, by Frymire.

Frymire occasionally discusses points that are critical in understanding the difficulties of macroevolution. For example, he notes that one “can never know for certain that an individual fossil was ancestral to another fossil or to a currently living organism. All you can say for sure is that younger fossils (and modern organisms) had ancestors that lived at the same time as the individual fossil in question” (p. 17). This point is often forgotten in critiques of creationism, and Frymire himself ignores the implications of this observation.

He does not accept Johnson’s conclusion that God created living things for a purpose, but argues instead along the lines of Richard Dawkins that the organism’s only “purpose” in life is to pass on its genes, and what *appears* to be design in an organism is simply the maximization of the means to pass on their genes. He notes that creationists like to picture the genome as intelligently written, a conclusion he concludes is disproven by the erroneous but often stated claim that “97%” of the genome consists of “so-called junk DNA or selfish DNA” (p. 62). Frymire evidently is unaware of the enormous progress made in understanding the function of this DNA.

Frymire concludes that “there is no *evidence* that evolution is guided” or supervised. In other words, God may exist, but He had nothing to do with the creation of anything, and essentially has no role in the universe, and is out of a job. Therefore, for all practical purposes, no reason exists to believe that such a being exists.

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Homosexuality, Disease, and Creationism

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Abstract

The propriety of homosexual behavior has been a topic of much discussion for several decades. At the bottom of the controversy in the religious community is the condemnation of homosexual behavior by the Scriptures. I conclude that one major reason why the Scriptures condemn homosexual behavior is its detrimental health effects. A

review of the medical literature (focusing on males) finds that homosexual behavior has a clear detrimental effect on health, causing numerous serious (and often lethal) diseases. As a result, the average person of either sex who is involved in a lifelong homosexual lifestyle can expect to live only into the middle 40s.

Introduction

From the perspective of creation, sex is a biological drive designed for the specific purpose of fulfilling the command to “be fruitful, and multiply, and fill the earth” (Gen. 1:28; 2:24; 9:1–7¹). People who identify themselves as homosexuals indulge in behavior that subverts this goal. Furthermore, the Biblical law regarding marriage as stated in Genesis precludes same-sex “marriage”: “And Adam said, This is now bone of my bones, and flesh of my flesh; she shall be called Woman, because she was taken out of Man. Therefore shall a man leave his father and his mother, and shall cleave unto his wife; and they shall be one flesh” (Genesis 2:23, 24. See also I Corinthians 6:16).

One of the many scriptural passages that condemn both male and female homosexuality is Romans 1:18–28, which asserts that God opposes those that rebelled by exchanging natural sex “relations for unnatural ones. In the same way the men likewise also abandoned natural relations with women and were inflamed with lust for one another.” This scripture concludes that men who committed homosexual acts with other men “*received in themselves the due penalty for their perversion*” [New International Version (NIV); emphasis mine]. This paper argues that part of this “penalty” is the health consequences that result from homosexual behavior.

1 Timothy 1:9–11 adds that those who are “...lawless and unruly, ungodly and sinners [includes] ... men who lie with males” (some translations use the word sodomites, others such as the New American Standard Bible use homosexuals) which “is in opposition to the healthful teaching according to the glorious good news of the happy God” (Interlinear Translation, 1985. Also see Leviticus 20:13).

Notice the term *healthful* in the Interlinear Translation. *Strong's Concordance* states that the Greek word (word 5198 υγι α νοου) here can mean healthful, and many modern translations use the term *healthful*. Some English translations use the word “sound” instead of “healthful” which would not contradict the meaning emphasized here. Jude 7 adds: “Sodom and Gomorrah and the cities about them, after they ...[had] gone out after flesh for unnatural use, are placed before[us] as a [warning] example by undergoing the judicial punishment of everlasting fire” (Interlinear translation). The term Sodom is the basis for the word “sodomy,” which is used to designate homosexual behavior (cf. Genesis 19:4, 5, 24, 25).

Also commonly cited is 1 Corinthians 6:9 (NIV), which states: “Do not be deceived; Neither the sexually immoral ... nor homosexual offenders ... will inherit the Kingdom of God. And that is what some of you were.” These texts, plus the teachings of the so-called “church fathers,” have been the major historical basis for the Christian condemnation of homosexual behavior (McNeill, 1976; Soards, 1995). The Jewish and Muslim position has historically been similar to the Christian position and is based on similar reasoning.

In a survey of church positions on homosexuality, Siker notes that most church policy statements “...consider homosexual orientation as a distortion of God’s design and homosexual behavior as sin” (1994). Ellis and Ames note that “in the western world, heterosexuality was attributable to what God had ordained as natural and good,” and all deviations from it were viewed as harmful (1987, p. 233). In the West, this position has been the majority view for most of the last several millennia.

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¹This and other Bible quotations are from the King James Version unless noted otherwise.

A major factor responsible for the recent change in this view is the influence of Hegelian philosophy (the denial of absolute truth), the Wellhausen conclusions (the evolutionary naturalistic explanation of religion), and as a result of these ideas, the secularization of society coupled with the teaching of naturalistic evolution. Many modern Darwinists teach that *no behavior* is “right or wrong,” “good or bad,” and any behavior that results in pleasure (and most humanists would add, that does not hurt anyone) is fully proper. Furthermore since homosexual behavior exists, it must have some positive role in evolution (Smit, 1987). Many Darwinists also conclude that since life has no purpose (at least no long-term purpose aside from what we give it), ultimate judgments cannot be made about behavior except in terms of their survival or reproductive advantage (Gould, 1989, p. 233; Dawkins 1986).

Furthermore, most evolutionists assert that the design of the sexual organs arose solely via evolution as a result of selection, time, and chance; not by creation for a specific purpose (Bagemihl, 1999; Howe, 1994). Thus there are not “wrong” ways to use the sex organs, according to such logic, but only “painful” or “dysfunctional” ways. Many Darwinists likewise argue that many animals engage in homosexual behavior, indicating that it is natural behavior. Thus, since humans are animals, this behavior is appropriate for humans as well (Bagemihl, 1999). This view implies that Christians are intolerant when they condemn homosexuality which evolutionists regard as a “natural” and common behavior. Furthermore self-identified homosexuals are comparatively rare: most studies find that the homosexual subpopulation consists of about 2–3 percent of the total population, not 10 percent as is commonly claimed (Muir 1993).

The Scriptures teach that God’s laws were given for the ultimate *benefit* of humanity, which is why He could promise the Israelites that if they followed those laws, they would have “none of these diseases” (Exodus 15:26). This paper argues that a major reason *why* the Scriptures condemn homosexuality is because it has adverse effects on human health. Many biblical prohibitions (such as the quarantine laws and certain others) plainly were given for health reasons (Thomsen, 1974; McMillen and Stern, 2000; and Greenblatt, 1963).

A review of the literature shows that homosexual behavior clearly has a major detrimental effect on health, a fact that has been well documented since at least the 1970s (Penn, 1997; Bryne, 1994; McMillen and Stern, 2000; Abraham, 1980). The adverse effect of homosexual behavior on health explains why the average male involved in a lifelong homosexual lifestyle lives only to age 43, while females live to age 45 (corresponding to an over 30 year lifespan decrease; Cameron et al., 1994; 1998). By itself, auto immune deficiency disorder (AIDS) reduces a homosexual’s life expectancy by only about 10%. The major reason

for early death is numerous contagious diseases transmitted through the practice of sodomy.

Sexually Transmitted Diseases and Homosexuality

Most venereal and other sexually transmitted diseases (STDs) are far more serious for those involved in homosexual behavior² than for heterosexuals. Disease transmission among non-promiscuous heterosexual couples is extremely rare, and almost always is due to poor hygiene.

A very high percent of men involved in the homosexual life style engage in extremely risky behavior, which then places them at a high risk for AIDS and many other STDs (Stephenson, 2000; Elford, et al., 1999; Lemp, et al., 1995; McKusick, et al., 1985). The sexual practices in which homosexuals engage (a major one for males being sodomy) generally are regarded as unacceptable in Christian culture even among heterosexuals. From a medical standpoint, such behavior is fraught with major health dangers, including not only AIDS but also many types of cancer, tuberculosis, abnormal hemorrhaging, and virus causing

²The term involved in homosexual behavior is used because the concern here is with behavior. In my decade of working at various psychology clinics, I queried all of my “homosexual” clients about their erotic attraction to the opposite sex. All claimed that they were attracted to women and most did *not* fit the common definition of homosexual, a person sexually attracted *only* to their own sex, but all were to some degree bisexual. Many were once married and most had sexual encounters with the opposite sex. One other study of 498 “lesbians” found fully 81% reported heterosexual behavior (Lemp et al., 1995). Furthermore, Masters and Johnson’s scientific studies of persons labeled homosexual found that both groups consistently listed heterosexual encounters as highly erotic, actually at the top of a list of their erotic fantasies. In one study, both male and female homosexuals listed a “heterosexual encounter” as their *third* most common sexual fantasy! (McCutcheon, 1989). This finding also supports the conclusion that most persons labeled gay are, at best, in varying degrees bisexual, especially in view of the fact that many also have heterosexual relations and many were once married and had families. Psychiatrist Emmanuel Rosen concluded that “all people have both heterosexual and homosexual drives. What varies is how you deal with those drives. Just because you have a homosexual impulse or idea has absolutely nothing to do with your sexual orientation. You are defined by your sexual *behavior*, not your sexual *impulses*” (1998, p. 56). Many persons become involved in a homosexual lifestyle after they are married and have children.

warts which can spread rapidly and cause secondary infections, bleeding and even cancer (Koblin, et al., 1996; Frisch, et al., 1997; Chu, et al., 1992; Dooley, et al., 1992; Beral, et al., 1992).

Condoms are only partially effective (or impractical) for the major types of sex in which homosexuals commonly engage, and many dislike using condoms even for behavior for which they are appropriate (Stephenson, 2000; Van de Ven, et al., 1997). Even if homosexuals ceased engaging in sodomy, the disease problem among them still would be a serious matter as a result of other common homosexual practices (such as what is called "water sports" which involves urination on their partner).

Although sodomy between males is a leading cause of AIDS, the spread of AIDS from the homosexual to the heterosexual population has been exacerbated by the fact that many "homosexuals" do not restrict themselves to strictly homosexual behavior (Melbye and Biggar, 1992). AIDS is especially difficult to control because most infected people often do not develop clear symptoms of the disease until about 10 years after they contract the human immunodeficiency virus (HIV). By late 1999, over 700,000 cases of AIDS had been reported in America, over 13 million in the world, and about 60 thousand new cases are reported each year in America alone (Chin, 2000; *Statistical Abstract of the United States*, 2000). Penn (1997) claims that fully one in two sexually active homosexual men are HIV-positive. Furthermore, the AIDS epidemic is growing very rapidly, especially in the third-world nations (Cock and Weiss, 2000). The problem is now pandemic and is the most serious in Africa where up to half the teenagers in some counties alive today are expected to die of AIDS (Whyte, 2000; Cock and Weiss, 2000).

Other diseases that are common in the homosexual population include urethritis, viral herpes, pediculosis infestation, condyloma, amoebic colon infections, and anal and penile cancer (Rueda, 1982, pp. 52–53; Palefsky, 1998). One study indicated that about half of all homosexuals eventually contract parasitic amebiasis, and that colon disease and rectal gonorrhea are far higher among this population. Gonorrhea also has been again increasing among the homosexual population over the past few years. Now considered epidemic, this disease is a major problem for many reasons, but especially because it can foster transmission of the AIDS virus evidently because the disease weakens the body's defense system and the bacteria acts as a carrier of the HIV virus.

Not only do the gonadal sexual practices produce a major risk among homosexuals. Human herpes virus 8, the cause of Kaposi's sarcoma, is also epidemic among homosexuals, primarily due to oral exposure of infectious saliva (Pauk et al., 2000). In Kampala, Uganda, Kaposi's sarcoma associated with AIDS is now the most common type of cancer in both sexes (Wabinga et al., 2000). Herpes virus

including Herpes simplex, also incurable, is also considered by many to be epidemic in the gay community (Penn, 1997). Herpes can be extremely painful and often leads to other serious medical complications (McMillen and Stern, 1984).

Tyler claims that sperm may influence the development of many diseases, both local and systemic, including cancer (Tyler, 1994). Non-self sperm that enter the anus or urethra of a man can both invade the delicate mucus linings and enter the blood stream. The reaction of a host body to invading sperm can be similar to its reaction to bacteria and viruses. In most instances disease symptoms are absent at the site of sperm entry, but entry-site diseases systems can include mucoid and purulent discharges often diagnosed as gonorrhea, and nonspecific urethritis and sores which may be diagnosed as herpes, chancroid, or syphilis (Tyler, 1994).

Tyler believes that sperm and certain semen secretions invading a body are in some ways the immunological equivalent of the transplantation of any and all cells or even organs. Antibodies attacking the sperm probably can attack corresponding cells and organs of the host. The result may be a cause of some autoimmune diseases including arthritis, diabetes, thyroiditis, and lupus erythematosus. Sperm may even have a role in AIDS, urinary infections, congenital and inherited defects and atherosclerosis (Tyler, 1994).

In support of this interpretation, studies reveal that homosexual behavior produces a venereal disease rate as much as 22 times above the national average. The major anatomical problems associated with sodomy (tearing of mucosa and lubrication problems, the latter often overcome by use of various jellies) generally are not a problem in heterosexual relationships. The fact that males and females were designed for each other leads logically to the conclusion that romantic couples made up of the same sex will experience more conflicts. This is exactly what the research has found. Burke and Follingstad (1999) in a review of 19 studies found that a much higher prevalence of partner abuse exists among both lesbian and gay populations compared to heterosexual populations. Other research has found that homosexuals are more prone to substance abuse, including smoking, higher rates of school-related violence, suicide, and also depression (Averbach, 2000).

Traditionally Non-Sexually Transmitted Diseases and Homosexuality

Many traditionally non-sexually transmitted diseases also are much more common among homosexuals than heterosexuals. For example, during sodomy, sperm often penetrate the colon wall. Once inside of the body, the sperm adversely affect the immune system, leading to a greater

vulnerability to a variety of diseases (Biggar, et al., 1984; Mavligit, et al., 1984). Homosexual behavior commonly transmits many diseases that are rare among heterosexuals. For example, homosexuals as a group are far more apt to have a wide variety of bowel diseases which are generally lumped together under the designation "gay bowel syndrome." Many types of infections such as prostatitis (inflammation of the prostate gland), an often chronic and extremely painful condition, also are very common in homosexuals (Penn, 1997).

Frisch, et al. (1997) found a strong relationship between homosexual promiscuity and the risk of anal squamous cell carcinoma, which in most cases is caused by one or more of the following factors: a sexually transmitted pathogenic human papilloma virus, a history of receptive anal intercourse, a history of sexually transmitted diseases, more than 10 sexual partners, and HIV infection (Ryan, et al., 2000). In response to this concern, Fox noted:

First, the colon and rectum are *made for* the elimination of fecal matter and not for sexual experience. Fecal matter is eliminated because it is indigestible and contains disease-causing materials. With sexual penetration, the rectal muscles are often torn or over-expanded, and the fragile lining of the colon is almost always torn. The tearing of the colon allows fecal matter to penetrate into the body, bringing with it infectious disease (Fox, 1994, p. 2, italics in original).

The disease problem among homosexuals is so serious that many patronize medical doctors who specialize in treating homosexuals in order to deal with their many health concerns. Homosexual social networks, as well as the homosexual press, are common sources that patients use to contact such physicians. In spite of the best health care system in the world, a large majority of those people who engage in long-term homosexual behavior, especially sodomy, live less than half a normal lifespan. Antibiotics can delay death, and even cure many bacterial venereal diseases, but they have many side effects. Eventually, resistant strains often emerge that may prove to be lethal and that can be communicable to others. Over-use of antibiotics is a major problem, and the attitude that infection is not a major concern because antibiotics will take care of the problem is irresponsible and results in behavior which in the long term is potentially lethal.

Hepatitis Now Epidemic Among Homosexual Population

Much of the sexual behavior common among homosexuals is objectionable from a general health standpoint. Active homosexuals have much higher rate of infectious

disease than the general population (approximately 10 times higher, in fact). Both classical venereal diseases and diseases such as hepatitis A and B now have been epidemic among the homosexual population for years (Christenson, et al., 1982 and Penn, 1997). About 300,000 new cases of hepatitis A and B are diagnosed annually in America. Fully 80% of homosexuals have evidence of exposure to the hepatitis virus, compared to only 5% of the rest of the population (Clark, 1995, p. 115). Hepatitis B, a viral disease several hundred times as infectious as AIDS, induces both the chronic and acute form of hepatitis, either of which can be fatal. It also is a major cause of liver cancer (Clark, 1995, p. 115).

In a study of hepatitis A, Corey and Holmes (1980) found the annual incidence among homosexual men was 22%, while no heterosexual men acquired hepatitis A during the study. The researchers concluded that contracting the virus correlated strongly with homosexual behavior. Syphilis also is quite common in homosexuals: the Centers for Disease Control in Atlanta, Georgia estimates that over 40,000 syphilitic infections occurred in 1999, at least half of which were in men who had sex with other men.

The Promiscuity Problem

Not only does the type of behavior in which homosexuals engage place them at a much higher risk, but their high level of promiscuity also is a major contributor to their problems (Cameron et al., 1989). One survey indicated, for example, that homosexual males have an average of *over 50* sexual partners in their lifetime (Rueda, 1982, pp. 52–53). Bell, et al. (1981) found that 43% of white male homosexuals reported having sex with *more than 500* partners, and a whopping 28% with *over 1,000* partners. Another study found that 28% had over 1,000 partners, 15% had 500 to 1,000, 32% from 100 to 500 and only 25% had fewer than 100 partners in their lifetime (Cone, 1994). Cooper (2000) found that, of the groups he studied, homosexual men are at the highest risk of becoming "cybersex compulsives," meaning they spend more than 11 hours per week on their computer for sexual purposes.

While the conclusions of all surveys in this field depend upon the sampling population, sample size, and specific questions asked, all reveal that an enormous amount of promiscuity is a normal part of the gay lifestyle (Cone, 1994). The writer's personal interviews, although a small sample (N = 45), nonetheless indicate that these survey results are reasonably accurate. The level of the disease problem can be debated, but there is no question that the problem is serious (with AIDS being the most publicized example).

This promiscuity clearly is contrary to the Biblical injunction that a man and woman marry and "not defile the

marriage bed.” Although promiscuity among heterosexuals also carries many dangers, they generally are fewer than those associated with homosexuality. Infections from sexual relations are rare in monogamous couples who practice appropriate hygiene and normal sex. A major reason why this is true is because vaginal secretions contain high levels of germicides that successfully minimize the chances of infection as a result of heterosexual relations. Conversely, no such secretions are produced during sodomy. One would expect equal protection for both homosexual and heterosexual acts if both were created by God.

No evidence for a biological basis of homosexuality has yet been demonstrated, and the extant research does not provide evidence to support the idea of the so-called “gay gene” (Byne, 1994). Research has found that humans can inherit traits such as certain personality characteristics that can predispose one to homosexuality just as height is inherited. Height helps greatly to be a basket ball player, but one cannot therefore conclude that a tendency to basket ball playing is inherited (Santinover, 1996 and 1997).

Conclusions

One reason for many of the scriptural prohibitions (e.g., cleanliness, not eating pork, quarantine rules, etc.) was to protect physical health. Likewise, a major reason why the Scriptures condemn sodomy is due to its detrimental health effects. The medical literature demonstrates that male homosexual behavior has a clearly detrimental effect on health, causing a variety of serious, and eventually lethal, diseases. While this article overwhelmingly focuses upon males, both sexes are at risk, as shown by the fact that persons of both sexes involved in lifelong homosexual practices live only into their middle 40's (Cameron, Cameron and Playfair, 1998).

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Book Review

The First Fossil Hunters: Paleontology in Greek and Roman Times by Adrienne Mayor
Princeton University Press, Princeton, NJ. 2000, 361 pp., \$34.95

Mayor describes classical Greco-Roman bone hunting by comparing paleontological fossil distributions with ancient artifacts and records. A number of classical writers describe the finding, preservation, and even veneration of fossils (they were often considered remnants of giant *human* heroes from the distant past). The first chapter observes that classical griffin descriptions are not mythological or sensational; also their representation (winged quadrupeds with a beak) was remarkably consistent. She suggests that the origin of the legend was the observation of *Protoceratops* fossils in the Gobi desert, where they were thought to live. However, reports of griffin-like creatures with four legs plus wings are not limited to the Classical Era. A Swiss villager, Winkelreid, killed a griffin as described by the famous naturalist Gesner during 1589, then again by Athanasius Kircher in 1678, the latter providing a picture like the classical Greek representations (reprinted by Wellnhofer, 1991, p. 20). Furthermore the Egyptians had a “griffin” animal determinative for the word *serref* as well as the ideogram *khekh* (Budge, 1978, p. 681, 563).

Chapter two discusses fossil distributions from the Miocene, Neogene, and Pleistocene epochs that are known in the Mediterranean Sea area. The third chapter attempts to combine ancient fossil descriptions with the fossils now known. The Roman Emperor Augustus (63 B.C.–AD. 14) “established the world’s first paleontological museum at his villa on the island of Capri” (p. 143). His biographer, Suetonius, wrote that “it housed a collection of the huge limb bones of immense monsters of land and sea popularly known as giants’ bones.” Suetonius’s comment is valuable because it demonstrates he was aware of the *animal* origin for the bones. A number of classical writers believed some (probably animal) bones were from human giants. For instance, Josephus wrote that the early Israelites had wiped out “a race of giants, who had bodies so large and countenance so entirely different than humans” whose bones were still on display when he was alive [first century AD] (p. 139).

Chapter four talks about the artistic and archaeological evidence for ancient fossil findings. For instance the sixth century B.C. “Monster of Troy” vase depicts a giant fossil skull embedded in a cliff. In 1903 a fossil sea urchin was found in Heliopolis, Egypt with the history of its ancient discovery engraved on it in hieroglyphs, again demonstrating the study of fossils in antiquity (p. 175). A number of fossils have been found in archaeological excavations, such as an oversized femur at the temple of Hera on Samos.

On p. 203 Mayor disparages “creation science” and “intelligent design” though she seems unfamiliar with them. A number of classical philosophers, Anaximander, Lucretius among them, propagated concepts similar to evolution or even natural selection (p. 214). Similarly, Pliny, Aristotle and Theophrastus discussed the petrification process resulting from “crystal precipitation” (pp. 208–209). Chapter six discusses ancient curiosities (preserved tritons, fish-tailed humanoids, that Pausanias observed) and fictions (centaur bones). Appendices describe the Mediterranean area fossil distribution and ancient testimony for encounters with fossils. *The First Fossil Hunters* is a serious discussion of the ancient testimony for cryptids that is usually discounted today. It may be of interest for paleontologists, classicists and others curious about classical fossil hunting.

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The Spontaneous Generation Hypothesis

David P. Woetzel*

Abstract

As our knowledge of life's microscopic secrets continues to advance it is instructive to reflect upon the history of the spontaneous generation hypothesis to contemplate whether scientific advancements are indeed progressing as an anti-creationist predicted nearly two decades ago:

If I have made my point, the next time you hear creationists talking about the "impossibil-

ity" of making a particular protein, ...you can smile wryly and know that they are nowhere near a consideration of the real issues. ... Given the rapid rate of progress in our understanding of molecular biology, I have no doubt that satisfactory explanations of the problem posed here soon will be forthcoming. (Doolittle, 1983, p. 96).

Concepts of Spontaneous Generation

Aristotle (384–322 B.C.), Greek philosopher and scientist, expressed the hypothesis that decaying material could be transformed by the 'spontaneous action of Nature' into living animals. Classical scientists as recently as 200 years ago believed in vitalism, the idea that non-living material like dirt, damp hay, or decaying meat had innate vitality such that "simple" life would spontaneously arise from it. Francisco Redi is best remembered for his 18th century experiments demonstrating that maggots did not come from the meat but from the flies that had laid their eggs upon it. In the 1860's Louis Pasteur conducted his famous scientific disproof of spontaneous generation in which he sterilized and sealed jars of nutrients, demonstrating that only life begets life—the law of biogenesis. In reflecting upon this, Wald (a proponent of spontaneous generation) notes:

We tell this story to beginning students of biology as though it represents a triumph of reason over mysticism. In fact it is very nearly the opposite. The reasonable view was to believe in spontaneous generation; the only alternative, to believe in a single, primary act of supernatural creation. There is no third position. For this reason many scientists a century ago chose to regard the belief in spontaneous generation as a 'philosophical necessity.' It is a symptom of the philosophical poverty of our time that this necessity is no longer appreciated. Most modern biologists, having reviewed with satisfaction the downfall of the spontaneous generation hypothesis, yet unwill-

ing to accept the alternative belief in special creation, are left with nothing. (Wald, 1954, p. 46).

Darwinists, in pursuit of this "philosophical necessity," naturalism, have invested great effort and significant finances into attempts to bridge the gap between nonlife and life, either in the field or in the laboratory. The hope throughout the end of the nineteenth and into the beginning of the twentieth century had been that "intermediates" would be found between raw chemistry and the cell. Evolutionary luminaries like Haeckel and Huxley offered unqualified support for *Bathybius*, the slime dredged from the ocean floor that was briefly thought to be living. *Eozoon*, a metamorphic rock product, also was once supposed to be organic. "*Eozoon* entered the fourth edition of the *Origin of Species* with Darwin's firm blessing: 'It is impossible to feel any doubt regarding its organic nature' (Gould, 1980, p. 239).

Then evolutionists shifted their efforts toward synthesizing life in the laboratory. J.B.S. Haldane's ideas in the 1920's inspired the phrase "the primordial soup," and origin of life experiments were designed to recreate primitive earth conditions. Even if scientists had been successful in this endeavor, it certainly would not have demonstrated that life could arise without intelligent intervention in a harsh natural environment. To date, they have failed completely. "Furthermore, no geological evidence indicates an organic soup, even a small organic pond, ever existed on this planet." (Thaxton, et al., 1992, p. 66). There was the short-lived euphoria over Miller's prebiotic soup experiments in the 1950's. Boiling and electrically sparking a mixture of methane, ammonia, hydrogen and water produced some basic amino acids. But follow-up work only illuminated new barriers between complex chemicals and

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the simplest conceivable life. Finding the building blocks does not solve the problem any more than finding stones could explain the naturalistic production of an ancient cathedral.

In the fall of 1976, despite grandiose predictions from astronomers like Carl Sagan, the *Viking* mission to Mars failed to detect any trace of life. The statistical difficulties finally began to be acknowledged. Wilson illustrates a tiny piece of the probability problem, focusing on the 10 enzymes that are involved in glycolysis:

The random, undirected polymerization of these enzymes from a mixture of the twenty amino acids is calculated to occur with a rough probability of 10^{-1000} . Even with relatively fast rates of polymerization and a billion-year time scale, it is argued, the likelihood that even one copy of each of these enzymes would be spontaneously produced is infinitesimal. The overall likelihood is not much improved even if only one of the ten enzymes is considered, and, of course it becomes preposterously small for the thousand or so different enzymes in a typical bacterium. (Wilson, 1983, pp. 95–96)

Intelligent Design Theory

As a result of such calculations, some scientists embraced Intelligent Design theory, predicting that complex biological systems never would arise naturally. Even leading evolutionists, like Hoyle, determined that the chances of abiogenesis (first life arising from non-life) occurring on this earth are so phenomenally unlikely that they instead postulated life coming from space (panspermia):

I don't know how long it is going to be before astronomers generally recognize that the combinatorial arrangement of not even one among the many thousands of biopolymers on which life depends could have been arrived at by natural processes here on the earth. Astronomers will have a little difficulty at understanding this because they will be assured by biologists that it is not so, the biologists having been assured in their turn by others that it is not so. The 'others' are a group of persons who believe, quite openly, in mathematical miracles. They advocate the belief that tucked away in nature, outside of normal physics, there is a law which performs miracles (provided the miracles are in the aid of biology). This curious situation sits oddly on a profession that for long has been dedicated to coming up with logical explanations of biblical miracles. ...It is quite otherwise, however, with the modern mathematical miracle workers, who are always to be found living in the twilight fringes of thermodynamics. ...The notion that not only the biopolymers but the operating programme of a living

cell could be arrived at by chance in a primordial organic soup here on the Earth is evidently nonsense of a high order. Life must plainly be a cosmic phenomenon. (Hoyle, 1981, pp. 526–527)

Yockey shows that Hoyle is not unique:

Faith in the infallible and comprehensive doctrines of dialectic materialism plays a crucial role in origin of life scenarios, and especially in exobiology and its ultimate consequence the doctrine of advanced extra-terrestrial civilization. That life must exist somewhere in the solar system on 'suitable planets elsewhere' is widely and tenaciously believed in spite of lack of evidence or even abundant evidence to the contrary. (Yockey, 1981, pp. 27–28)

More recent origin of life chemistry, from the "proteinoids" thought to have formed on the rim of a volcano, to the RNA-world preceding DNA, to novel ideas about inorganic mineral clays has been gamely pursued. The utter failure of these theories is highlighted by the evolutionists following Gould's lead, believing in a biochemical predestination that is vaguely reminiscent of vitalism. After reviewing evidence that life on earth started far earlier than previously thought Gould stated: "...I don't know what message to read in this timing but the proposition that life, arising as soon as it could, was chemically destined to be, and not the chancy result of accumulated improbabilities." (Gould, 1990, pp. 16–17). Since known processes plus chance failed to rationalize a naturalistic origin of life, naturalism proponents were forced (by the data and their philosophical predispositions) to retreat to untestable assertions that unknown deterministic processes were sufficient. Nobel laureate DeDuke concurs with Gould:

Another lesson of the Age of Chemistry is that life is the product of deterministic forces. Life was bound to swiftly arise under the prevailing conditions, and it will arise similarly wherever and whenever the same conditions obtain... Life and mind emerge not as the result of the freakish accidents, but as natural manifestations of matter, written into the fabric of the universe. (DeDuke, 1996, pp. xv–xviii)

Most recently Paul Davies imagined that

some sort of self-organizing physical processes could raise a physical system above a certain threshold of complexity at which point these new-style 'complexity laws' would start to manifest themselves, bestowing upon the system an unexpected effectiveness to self-organize and self-complexify. ...Under the bidding of such laws, the system might be rapidly directed towards life. (Davies, 1999, p. 259)

ReMine points out that "It merely replaces the old unknown mystical forces with new unknown 'naturalistic' forces. Either way it is not science." (ReMine, 1993, p. 95)

The aforementioned Hoyle citation refers to the laws of thermodynamics. These have been applied to biological

complexity in the growing field of information theory. Much like the complex instruction sets that drive computer systems, living systems are built using vast libraries of information stored in the genetic code. Information theory predicts that just as useful computer routines will not randomly arise, so increases in DNA information to code for biological functions will not happen without intelligent intervention. Even evolutionists like Davies acknowledge the problem:

Communication theory—or information theory, as it is known today—says that noise destroys information, and that the reverse process, the creation of information by noise, would seem to be a miracle. A message emerging on its own from radio static would be as surprising as the tide making footprints on the beach. We are back with the same old problem: the second law of thermodynamics insists that information can no more spring into being spontaneously than heat can flow from cold to hot. (Davies, pp. 56–57)

Behe argues that intelligent design theory need not invoke the supernatural to present a compelling argument for the creation of these biological systems. After discussing Sir Francis H.C. Crick's 1992 *Scientific American* interview exploring his belief in "Directed Panspermia," Behe explains:

The primary reason Crick subscribes to this unorthodox view is that he judges the undirected origin of life to be a virtually insurmountable obstacle, but he wants a naturalistic explanation. For our present purposes, the interesting part of Crick's idea is the role of the aliens, whom he has speculated sent space bacteria to earth. But he could with as much evidence say that the aliens actually designed the irreducibly complex biochemical systems of the life they sent here, and also designed the irreducibly complex systems that developed later. The only difference is a switch to the postulate that aliens constructed life, whereas Crick originally speculated that they just sent it here. It is not a very big leap, though, to say that a civilization capable of sending rocket ships to other planets is also likely to be capable of designing life—especially if the civilization has never been observed. Designing life, it could be pointed out, does not necessarily require supernatural abilities; rather, it requires a lot of intelligence. If a graduate student in an earthbound lab today can plan and make an artificial protein that can bind oxygen, then there is no logical barrier to thinking that an advanced civilization on another world might design artificial cells from scratch. (Behe, 1998, pp. 248–249)

Conclusion

It now becomes clear that, even for the committed naturalist, there is a more rational alternative than the spontaneous generation scenarios. But some might object that this solution involving intelligent design of earth's life still leaves the problem of initial life unsolved. Behe responds that time travel (allowing future engineers to seed life) has been seriously proposed by some physicists; or naturalists can postulate that alien life is so radically different than anything we have known that it would not exhibit the design features of empirical biology. For those whose philosophical predisposition does not preclude the consideration of supernatural intervention, the most reasonable conclusion to be drawn from the longstanding inquiry into the spontaneous generation hypothesis is that the phenomenon of life implies a Creator. Dembski notes that there are only "two options: Either the world derives its order from a source outside itself (a la creation) or it possesses whatever order it has intrinsically, that is, without the order being imparted from outside." In presenting his "Law of the Conservation of Information" he concludes: "the only coherent account of information is design." (Dembski, 1999, pp. 15, 99). After reviewing the creative action of God, the scriptures make clear that "In him was life; and the life was the light of men." (John 1:4). Regardless then of one's metaphysical worldview, the time has come for the hypothesis involving the spontaneous generation of life as we know it to die a natural death.

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Book Review

The Age of the Universe: What are the Biblical Limits? by Gorman Gray
Morningstar Publications, Washougal, WA. 2000, 192 pages, \$9.99

Evolutionists claim that the geological record represents millions of years of earth history. Creationists insist that God created everything in six solar days less than 10,000 years ago. And so the two groups have been at loggerheads for years, with little prospect of solving the controversy.

One recent book which attempts to clarify some of the problems involved is this biblical study by Gorman Gray. His thesis is that both groups have erred, evolutionists by trying to deny the plain evidence of earth's surface shaped by catastrophe, and creationists by misreading the very first sentence of Genesis. Many believers skim the first verses of the creation account rather quickly. But according to Gray, we should pause to examine "In the beginning God created the heavens and the Earth." In his opinion this is not a summary as is so often assumed. It is a description of an event.

It is not stated when the heavens and earth were created, and up to this point there has been no identification of their creation with day one. There has been an assumption (that heaven and earth were created as part of day one) but that idea is ill founded... (p.58).

The universe radiated its enormous energy as soon as God created the heavens in verse 1, but the surface of the earth... lay in total darkness under a thick cloud according to verses 2 and 6 as well as Job 38 where the Lord Himself describes the conditions (p. 59).

The planet continued "barren, waste, and dark," and may have been that way for multiple ages before a first day took place (p.60).

Day one begins the work of conditioning a deserted and empty planet for life... So, about 6,000 or

perhaps 7,500 years ago, God commanded light to shine on the earth... Light was not created on the first day. Light coexists with matter and had been beaming throughout the universe since the beginning creative fiat (pp. 61-62).

Beginning with the first day, the biblical text focuses on the local biosphere. A rotating planet existed and a light source of fixed orientation created day and night. The light became diffusely visible at first; later on day 4, the remaining clouds were parted and God "brought forth" the sun, moon, and stars, making them fully visible to provide signs and seasons for man (p.59).

The author points out that the Hebrew word *asah*, usually translated "made" expresses many shades of meaning, so that in verse 16 "brought forth" expresses God's action when he made the heavenly bodies fully visible on earth. The noun "heavens" may refer to the atmosphere, or to the visible universe depending on context.

Mr. Gray makes his arguments in a most irenic way, giving great detail in attempting to make these ideas clear. He rightly assigns responsibility for human error in biblical interpretation to our ancient enemy, Satan, who loves to see us in controversy over God's word.

This is a scholarly book, with a number of chapters devoted to methods of Bible interpretation and to answering various viewpoints in origins theory. There are several appendices, a bibliography, and subject and scripture indexes. The ideas herein expressed merit careful consideration by those engaged in the study of origins.

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Vertical Tectonics and the Drainage of Floodwater A Model for The Middle and Late Diluvian Period — Part II

Michael J. Oard

Abstract

A continued explanation of a model is presented for the erosional effects in the mid and late Flood due to vertical tectonics of the crust coupled with Flood water movement. The sediments eroded during the sheet erosion phase would be deposited as sheets along the edge of the continents forming the continental margin. As the Flood flow became more channelized during the Dispersive Phase, canyons

and valleys would be rapidly eroded. Water and wind gaps, as well as pediments—all mysterious within the uniformitarian paradigm—would form rapidly on land. Submarine canyons would quickly be cut on the continental shelves and slopes. The model has significant implications for other models and concepts concerning the Flood.

Introduction

In part I of this article, several Flood models were briefly discussed, pointing out that these models are a healthy sign according to the principle of multiple working hypotheses. The model developed in this paper is a further elaboration of the Whitcomb-Morris model using the terminology of Tas Walker (see Figure 2, Part I). Evidence for great upward vertical tectonics of continents and subsidence of the ocean basins was presented. The evidence for this mass vertical tectonics is ubiquitous in the form of sheet erosion, erosional remnants, erosion surfaces, and the long distance transport of resistant clasts.

Where Did All the Sheet Erosion Sediments Go?

If the continental erosion occurred by slow processes over millions of years as envisioned by mainstream geologists, this eroded material likely would form thick debris from the highest land to the coast, especially along river and stream valleys. The surface of the continents would be one large waste surface inclined towards the coasts. Once the debris enters the coastal zone, it would be spread away from river mouths as large deltas. Currents and slides would rework the material along the continental shelf and into the deep ocean. However, this debris from postulated slow erosion over millions of years is not observed on land. Although river deltas are observed, they are not nearly large enough for the

massive continental erosion that has occurred. Hence, the debris likely has been removed from the continents.

In the Flood model being presented, large-scale sheet erosion would deposit sediments in areas where waning currents existed. A good analogy would be the Portland Delta formed during the Lake Missoula Flood (Bretz, 1928, pp. 697–700). As the Lake Missoula Flood rushed through the Columbia Gorge at more than 30 m/sec, it slowed as it came to the wide mouth of the gorge in the Portland, Oregon and Vancouver, Washington area. The waning current deposited a giant sand and gravel delta up to 125 m thick and 500 km² in area. Later, this delta was dissected where the Columbia and Willamette Rivers are now located, probably as the flood subsided and the currents became more channelized.

So where would we expect sheet deposition from massive continental erosion? The answer is either in large, low elevation continental basins such as the Lower Mississippi River Valley (before being filled by sediments that have since lithified) or along the continental margins. The continental margins would have been at the edge of deep water in which the currents rushing off the continents would diminish. The eroded material from the continents, therefore, would form the continental shelves, slopes and rises. Much finer-grained sediment would likely be transported greater distances into the ocean and form some of the clay deposits of the abyssal plains.

Continental shelves are enigmatic from a uniformitarian point of view. Figure 1 is an illustration of the continental margin showing the continental shelf, slope, rise, and abyssal plain. The continental shelf is very flat with a slope of less than 0.1 degree and a relief of less than 20 m

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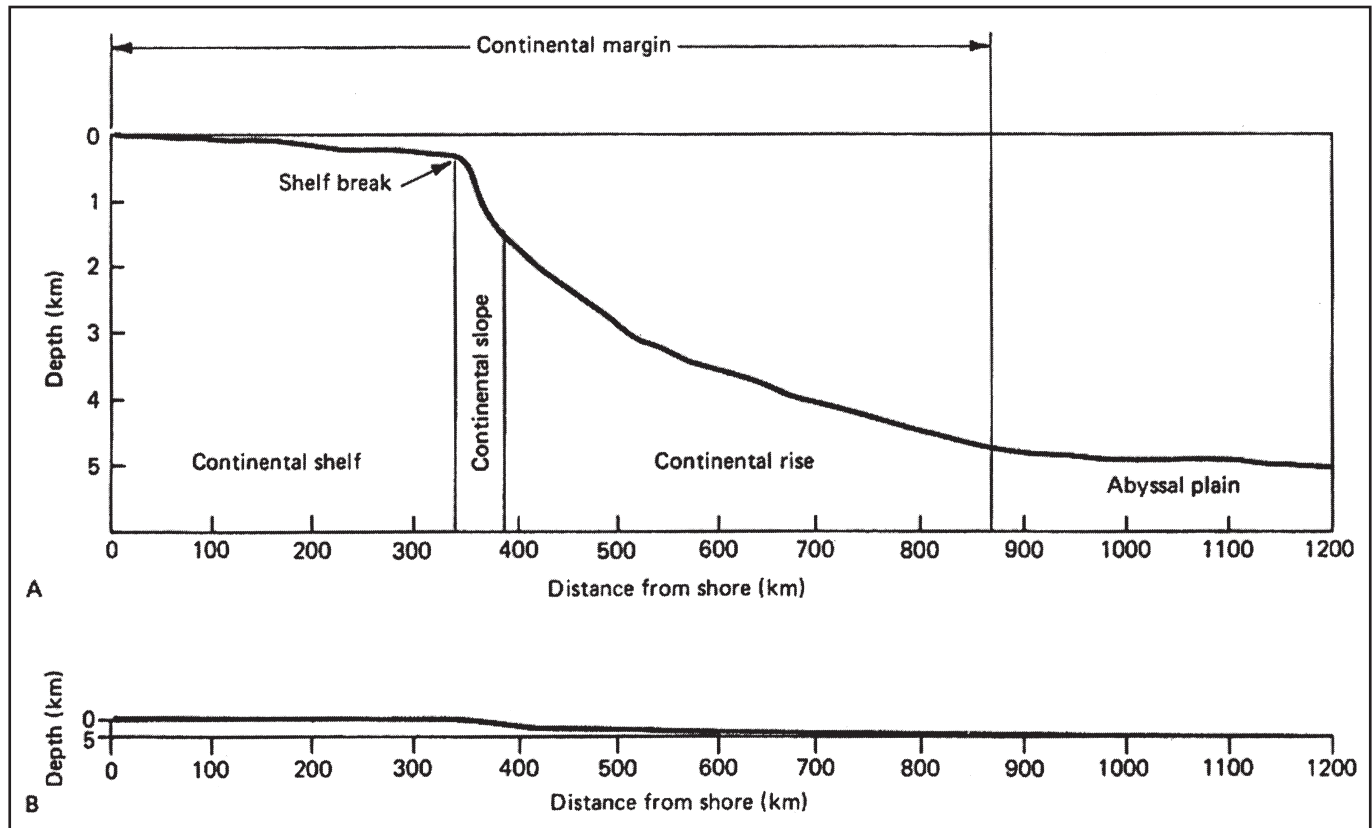


Figure 1. Principal features of the continental margin with a vertical exaggeration of 1/50 (A) and actual horizontal scale noted in scale (B) (from Kennett, 1982, p. 27; redrawn by Nathan Oard).

(Kennett, 1982, p. 29). It averages 78 km wide but varies from a few kilometers to over 400 km wide, i.e. on the Bering Sea shelf and the Grand Banks. Then suddenly at the shelf break at an average depth of 130 m, the gradient of the slope abruptly becomes significantly greater (approximately 4°). This narrow zone plunges to depths of 1500 to 3500 m below sea level to the 100–1000 km wide continental rise. The rise slopes gently downward to an abyssal plain. These features of the continental margin are mysterious because natural processes would favor a gradual descent to the ocean depths; there should be no continental shelf or slope. Seismic reflection profiles generally show delta-like features prograding seaward as well as gentle oceanward-dipping sediments with the slope of the sediments greater the deeper the sediment. Lester King (1983, pp. 199, 200) describes continental shelves and the problems they present to uniformitarianism:

There arises, however, the question as to what marine agency was responsible for the levelling of the shelf in early Cenozoic time, a levelling that was preserved, with minor modification, until the offshore canyon cutting of Quaternary time? Briefly the shelf is too wide, and towards the outer edge too deep, to have been controlled by normal wind-generated waves of the ocean surface...The formations and unconformities have been tilted seaward (monoclin-

ally) at intervals during the later Cenozoic. There have been repeated tectonic episodes: always in the same sense—the lands go up and the sea floor down... [emphasis mine].

Where have we heard a similar statement as the last phrase? In his book, *The Natal Monocline*, King (1982, p. 45) further adds in referring to the continental shelf:

We note that all the formations drilled dip offshore. The oldest and deepest formations dip at several degrees, the youngest and uppermost dip at less than one degree.

It is interesting to note that the sediments of the shelf and rise are planar with very few canyons cut into them until the sediments were deposited as sheets. Fulthorpe and Austin (1998, p. 262) notice in regard to the “Miocene”: “The rarity of middle-upper Miocene clinoform slope canyons contrasts starkly with conditions on the heavily dissected modern slope.” This lack of canyons cut in the planar beds of the continental margins until after nearly all the sediments were laid down is why King, in the quote above, refers to the offshore canyon cutting phase as occurring in the *Quaternary*, the last period of geological time. (This aspect will be developed further in the section on submarine canyons.)

The unnatural shape and seismic profile of the continental margin strongly indicates that the sediments were

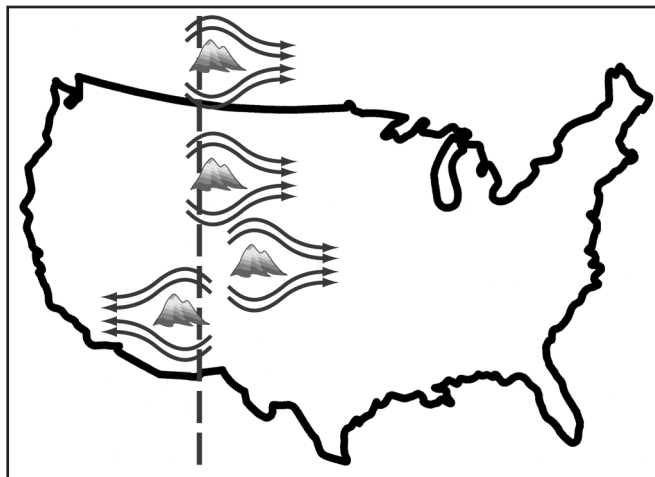


Figure 2. Schematic diagram illustrating sheet flow becoming more channelized as mountains and plateaus are the first to rise out of the Flood waters. The water is forced to flow away from an early “continental divide” (dashed line) (From a drawing by Peter Klevberg, re-drawn by Mark Wolfe).

deposited rapidly as sheets that were carried far out to sea. As the ocean basins sank and the continents rose, the sediments became less tilted the shallower the sediment depth. The evidence better supports the Abative Phase of the Flood and defies uniformitarianism.

Furthermore, it is likely that the continental margins were formed all over the world at the same time. The Recessive Stage is one event that likely would have affected all continents at the same time in the same way, mainly because of the similar shape and depth of the continental margins worldwide. If during the Recessive Stage of the Flood only Asia rose out of the Flood water, the continental shelves likely would be quite different, if formed at all, on the other continents. If continents rose sequentially out of the water after the Flood, there likely would be multiple “continental shelves,” some exposed on land. Thus, the similar geomorphology of the continental shelves worldwide indicates that during the Flood all continents rose together and that sea level assumed a stable position at the end of the Flood. Consequently, what Noah saw in his region after the Flood can reasonably be applied elsewhere around the world.

Evidence for the Dispersive or Channelized Phase of the Flood

As more and more mountains and plateaus became exposed during the Recessive Stage of the Flood, the Flood waters would have been forced to flow around these obstacles. The flow would have become more channelized (Figure 2). This is called the Dispersive Phase in Walker’s model. The transition from the Abative to the Dispersive

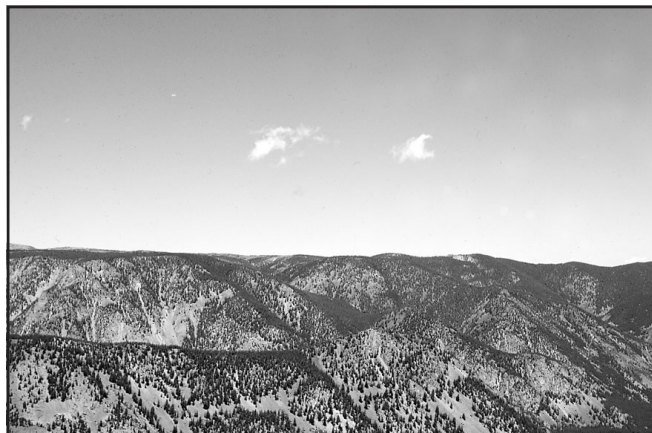


Figure 3. A lower erosion surface on the southeast Beartooth Plateau, north central Wyoming and south central Montana. The surface is at an altitude about 3000 m ASL. Note that the surface is dissected by canyons in granitic rock.

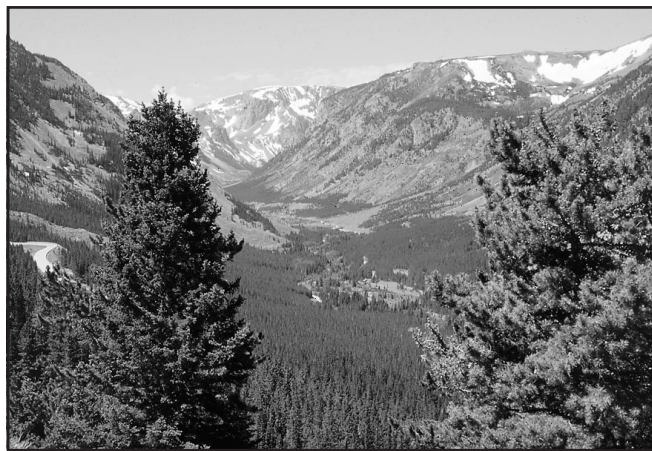


Figure 4. Rock Creek, northeast Beartooth Mountains southwest of Red Lodge, Montana. The 1500 meter deep U-shaped canyon has been modified by a glacier during the ice age.

Phase likely would have been gradual. The channelized flow would accelerate in many areas where the water movement became more restricted, like water flowing from a large pipe into a narrow one. As discussed previously, erosion would generally increase at about a power of two of the water velocity (Blatt, Middleton, and Murray, 1972, p. 93). Therefore, valleys and canyons would be rapidly carved during the Dispersive Phase.

The channelized flow would be the most impressive when it dissects a planar erosion surface formed during the Abative Phase. Such topography is observed in many places, for instance on the Beartooth Plateau of south central Montana and north central Wyoming where a second erosion surface in granitic rock at about 3,000 meter ASL (Figure 3) has been deeply dissected by canyons (Figure 4).

Sheet flow followed by channelized flow is a common theme in geomorphology. Herbert Gregory (1950, p. 166),



Figure 5. The Susquehanna water gap, north of Harrisburg, Pennsylvania, that cuts nearly straight through four flat-topped, even crested ridges. The strata below the ridges dip at steep angles, and the ridges represent an erosion surface. (In William Morris Davis's defunct "geographical cycle," this surface represents the uppermost Schooley Peneplain.)

writing within the uniformitarian paradigm, describes the general erosional features of Zion National Park that shaped the current topography:

For convenience in description these two long [erosive] periods have been designated (1) the precanyon cycle, which records the history of the region before it was stripped of its Cenozoic strata, and (2) the canyon cycle, during which the present landscape has been modeled. In the studies so far made it appears that each cycle was initiated by a regional uplift...

The precanyon cycle represents a large-scale, nearly planar erosion surface (Gregory, 1950, p. 167). The canyon cycle represents vertical cutting of this planar erosion surface with times of canyon cutting punctuated by times of deposition within the canyons. The youth of these canyons has inspired Gregory to date the canyon cutting cycle as post-Pliocene. The precanyon cycle transpired after regional uplift during a long still stand, according to the uniformitarian explanation, while the Canyon cycle developed during a later uplift with minor stillstands. Regardless, both are associated with vertical tectonics¹.

Water Gaps

Another mysterious phenomenon observed world wide are water and wind gaps. A water gap is: "A deep pass in a mountain ridge, through which a stream flows; esp. a narrow gorge or ravine cut through resistant rocks..." (Bates and Jackson, 1984, p. 559). A wind gap is defined as: "A shallow notch in the crest or upper part of a mountain ridge, usually at a higher level than a water gap" (Bates and

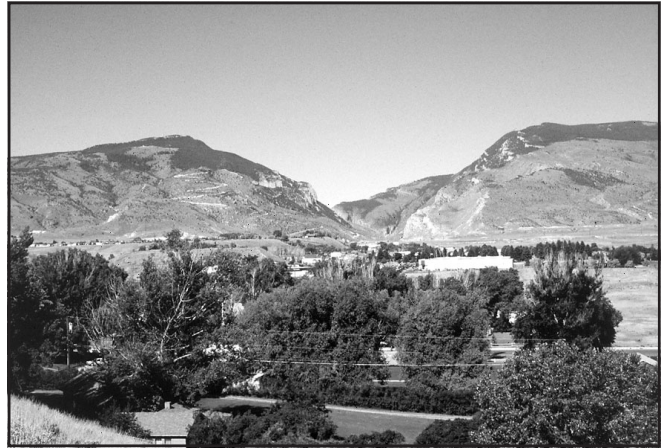


Figure 6. Water gap through the Rattlesnake Mountains west of Cody, Wyoming. The Shoshone flows eastward through the water gap.

Jackson, 1984, p. 564). A wind gap is considered an ancient water gap that was subsequently abandoned. There are many classic examples of wind and water gaps in the Appalachian Mountains, for instance on the Susquehanna River (Figure 5), that have perplexed geologists for many years (Ver Steeg, 1930). Williams et al. (1994) analyzed the Pine Creek gorge water gap in Pennsylvania. Unaweep Canyon, a narrow canyon cut about half way down through the Uncompahgre Mountains of western Colorado, is an example of a wind gap (Shaver, 1998; Oard, 1998a; Williams, 1999). Water gaps are only impressive if the stream could have chosen an easier path around a rock barrier *instead of cutting right through it*. Only the latter type of water gaps will be discussed further.

Water gaps are ubiquitous over the earth; there are well over one thousand of them. An example is the Shoshone River west of Cody, Wyoming, that cut a gap 300 meters deep through the granitic-cored Rattlesnake Mountains (Figure 6). The river could have easily gone around the Rattlesnake Mountains a few miles to the south in the past when the valley was at a higher level. Another example is the Yakima River that flows through Ellensburg and Yakima, Washington (Oard, 1996, pp. 270–271). The Yakima River could have easily kept flowing east from Ellensburg into the Columbia River, but instead it flows abruptly southward and cuts (with incised meanders) through at least four anticlines of the Columbia River Basalt Group. Hells Canyon is a water gap 80 km long and up to 2400 meters deep through the Wallo-

¹Editor's Note: In a later publication (*The geology and geography of the Paunsaugunt region, Utah*, U.S.G.S. Professional Paper 226), Gregory [1951, pp. 83–84] postulated a seven-stage model for physiographic "evolution" of the plateau country, including Zion National Park, Utah.

wa Mountains of northeast Oregon and the Seven Devils and Cuddy Mountains of west central Idaho (Vallier, 1998). Supposedly this water gap is only 2 to 6 million years old in the uniformitarian time scale. The Sweetwater River of Wyoming cuts through the nose of an exhumed, plunging anticline when it could have easily flowed around the barrier only one-half mile to the south (Thornbury, 1965, p. 359). Eleven rivers start on the Tibetan Plateau or the north slopes of the Himalaya Mountains and cut through the full width of the range in deep gorges (Oberlander, 1985). One of these rivers, the Arun River, has cut 15,000 meters through a transverse anticline east of Mount Everest.

The Zagros Mountains, southwest Iran, have peaks commonly in the 3,350 to 4,600 meter range with more than 300 water gaps (Oberlander, 1965). The deepest water gap is about 2,400 meters deep. These water gaps, cut through mountains that rose in the "Pliocene" and "Pleistocene" of the uniformitarian geological time scale, seem to defy rationality. Here is a brief sampling of some of Oberlander's (1965, pp. 1, 9, 16, 21, 89) description of the amazing Zagros water gaps:

The Zagros drainage pattern is distinctive by virtue of its *disregard* of major geological obstructions, both on a general scale and in detail...the unusually precipitous defiles created by southwest-flowing streams and their tributaries, large and small, whose course appear to be developed in *almost uniform disregard* of their physiographic and structural matrix... [In the central Zagros] major streams utilize longitudinal valleys to a *minimum* degree, despite the presence of the greatest structural barriers to be found in the orogenic system... In a surprising number of instances plunging fold noses are crossed by engorged transverse streams although open valley paths pass the ends of the ridges less than a mile away...Certain streams ignore structure *completely*; some appear to "seek" obstacles to transect [emphasis mine].

There are several occurrences of a stream that cuts through the *same* transverse ridge anywhere from two to five times. This would be like the Willamette River of western Oregon cutting through the Cascade Mountains to the east and then back again—twice! The Zagros drainage system is distinctive, but similar water gaps are found in other mountain ranges:

The drainage history of this region is as obscure as is that of most of the Cenozoic and older mountain systems of the world whose transverse streams have been deduced, in the absence of evidence to the contrary, to be antecedent, superimposed, or the result of headward extension under unspecified controls." (Oberlander, 1965, p. 149)

There are three major uniformitarian hypotheses to account for water gaps: antecedence, superposition, and

piracy (Williams, Meyer and Wolfrom, 1991, 1992a,b; Austin, 1994, pp. 85–92). It is rare that there is any evidence for any of these hypotheses:

Large streams transverse to deformational structures are conspicuous geomorphic elements in orogens of all ages. Each such stream and each breached structure presents a geomorphic problem. However, the *apparent absence of empirical evidence* for the origin of such drainage generally limits comment upon it. Transverse streams in areas of Cenozoic deformation are routinely attributed to stream antecedence to structure; where older structures are involved the choice includes antecedence, stream superposition from an unidentified covermass, or headward stream extension in some unspecified manner. Whatever the choice, *we are rarely provided with conclusive supporting arguments* [emphasis mine] (Oberlander, 1985, pp. 155, 156).

Therefore, water gaps are:

...one of the more perplexing and ubiquitous enigmas of regional physiography; the anomaly of through-flowing drainage that is transverse to the structure of an orogenic system (Oberlander, 1965, p. 1).

Their hypotheses are desperate attempts to explain a most-confounding uniformitarian mystery.

Water, as well as wind gaps, could have been formed rapidly and easily during the massive erosion of the Recessive Stage of the Flood, especially within the Dispersive Phase. The gaps can be cut by currents flowing transverse to the structure either while there is a "covermass" over the structure or after the ridge became more exposed. The initial notch in a transverse ridge could have been initiated during the Abative or Sheet Flow Phase. It is not unusual for a sheet flow to have areas of enhanced flow (Schumm and Ethridge, 1994, p. 11), which would locally be more erosive. The initial notch also could be eroded in a "soft" portion of the transverse ridge. Once the notch forms, higher velocity flow with abrading material could cut out the water gap rapidly. Post-Flood erosion, especially associated with the ice age, could eroded the water gap a little deeper. Emmett Williams (1998) postulated that the Black Canyon, Colorado, water gap formed during late Flood channelized erosion followed by further erosion by high water during the Ice Age. Figures 7a–d represent how I visualize the formation of water and wind gaps during the Flood. The Dispersive Phase of the Recessive Stage of the Flood can explain these ubiquitous and mysterious geomorphic features found worldwide.

Pediments

Pediments are another one of those ubiquitous, geomorphic features that have evaded explanation for over 100 years. A pediment is:

Figure 7. Schematic diagrams of suggested origin of wind and water gaps (drawn by Peter Klevberg).

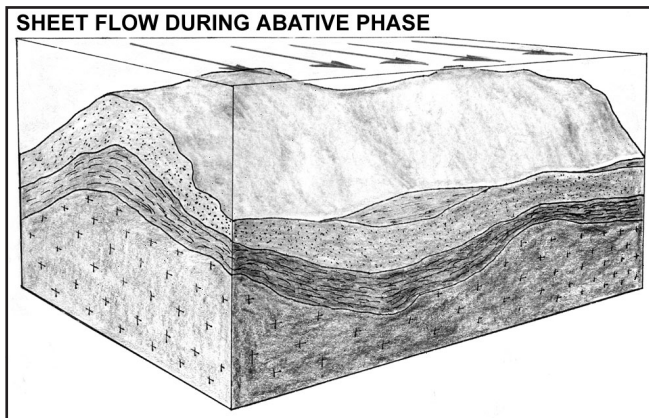


Figure 7a. Sheet flow of Flood transverse to a ridge. Faster flow within the sheet flow or more-eroded softer rocks cause saddles in the ridge.

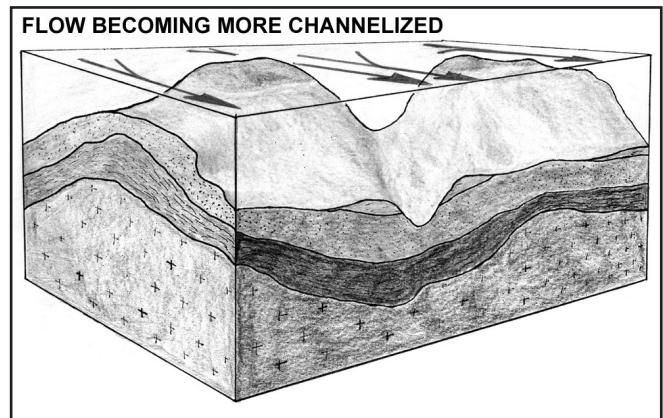


Figure 7b. The water level lowers and becomes more channelized in the low areas where the ridge is exposed.

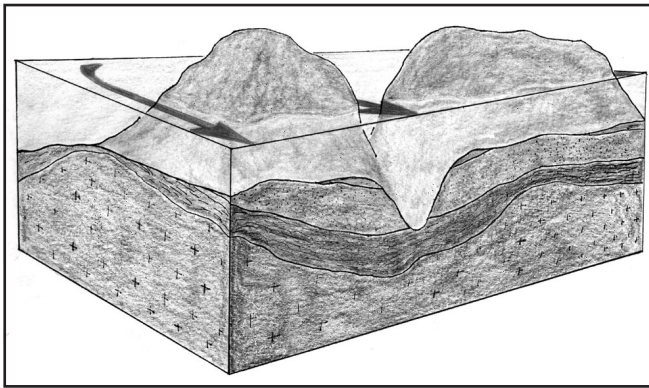


Figure 7c. The water level continues to lower. Faster currents loaded with abrasive material or presence of easily erodible rocks cause a deeper cut in the middle of the ridge.

...a broad gently sloping erosion surface or plain of low relief, typically developed by *running water*, in an arid or semiarid region at the base of an abrupt and receding mountain front; it is *underlain by bed-rock* that may be bare but is more often mantled with a thin discontinuous veneer of alluvium... [emphasis mine] (Bates and Jackson, 1984, pp. 372–373).

Pediments are commonly observed as generally flat surfaces at the foot of mountains in relatively dry areas (Figure 8), as well as in wetter climates. They are observed *world-wide*. John Dohrenwend (1994, p. 321) states: “Clearly, pediments are azonal, worldwide phenomena...” Pediments are erosion surfaces cut mostly in hard sedimentary or plutonic rocks and often capped by a veneer of water-worn debris. Pediments usually form a sharp angle with the mountain front. Figure 9 shows a pediment in the Ruby Valley of southwest Montana cut *against* the dip of the sedimentary rocks. Figure 10 shows the veneer of generally rounded rocks (indicative of water action) that mantle the pediment.

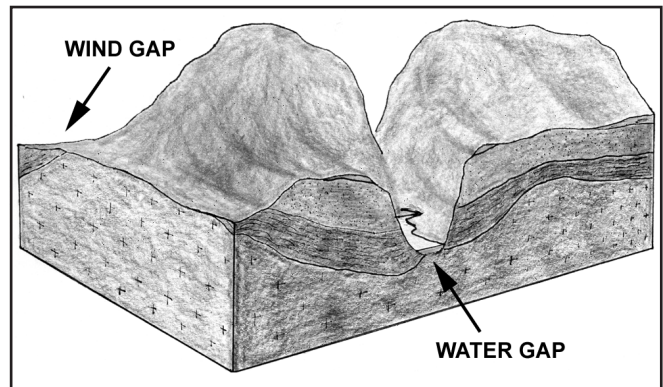


Figure 7d. The ridge is completely exposed. After the Flood a river flows through the deep cut, a water gap, while the abandoned cut to the left is hanging, a wind gap. Both were formed by Flood water movement.

Pediments can be eroded in soft rocks or sediments, which is difficult to imagine by naturalistic means.

Pediments can be of fairly large scale. Figure 11 shows a gravel-capped pediment from the Jefferson Valley of southwest Montana that is about 16 km long, 5 km wide, and 300 meters high from the Jefferson River to the base of the mountains. Early workers thought pediments were coalesced alluvial fans, called *bajadas*, but were shocked to find that the gravel was simply a *veneer* on top of hard, eroded rock. It can be visualized as the side of a mountain range being eroded to a nearly flat surface with a carpet of mostly rounded rocks left behind.

When analyzing pediments there are complications with depositional sediments and post-formational erosion. Sometimes an alluvial fan does overlie a pediment, but the pediment formed first and was later covered by the erosional material from the adjacent mountains. Occasionally streams from the adjacent mountains have eroded a channel or channels into the pediment.



Figure 8. Pediment along base of mountain, 10 km southeast of Hoover Dam, Nevada (photograph by Ray Strom).

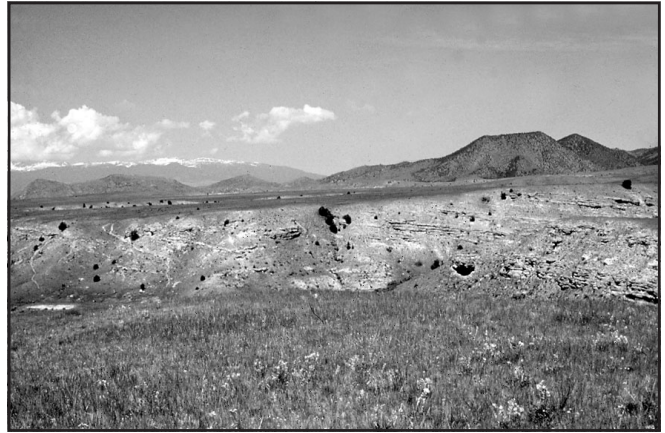


Figure 9. Gravel-capped pediment near Ruby Reservoir, southwest Montana. Note that the valley fill sedimentary rocks dip right (eastward), while the pediment dips west, truncating the sedimentary rocks.



Figure 10. Close up view of the gravel on the pediment shown in Figure 9. Note the rounded to sub-rounded rocks.

Except for small-scale examples along a few rivers (Crickmay, 1974, p. 205), pediments are *not* observed forming today; they are observed being dissected (Figure 11 in Part I). However, some researchers cannot conceive of pediments as relics from a past condition, so they believe and write as if they are continuing to develop today.

There are two main hypotheses for the formation of pediments: sheet erosion by rainstorms and lateral planation by streams emerging from the mountains. These hypotheses have many problems. Water moving as a sheet over a pediment is rare and as several geomorphologists have noted, the planed surface must *first* exist before water from heavy rain can flow as a sheet over the surface (Crickmay, 1974, p. 211). Lateral planation is mostly seen as inadequate because streams and rivers flowing out of the mountains either dig moderately deep valleys on the pediment or dump alluvial fans on existing pediments. The erosion from these streams destroys, rather than creates a pediment. The idea that these streams can sweep all over a



Figure 11. Gravel-capped pediment on the western edge of the Tobacco Root Mountains, southwest Montana. The distance from the river (foreground) to the base of the mountains (background) is 5 km.

rough slope at the side a mountain range forming a smooth surface is beyond reason. The origin of pediments is still a mystery that has fueled much controversy and imaginative thought:

Pediments have long been the subject of geomorphological scrutiny. Unfortunately, the net result of this long history of study is not altogether clear or cogent and has not produced a clear understanding of the processes responsible for pediment development (Dohrenwend, 1994, p. 321).

I believe Crickmay (1974, pp. 211–213) comes closest to the actual mechanism that formed pediments. He observed that pediments have great lateral continuity and often contain exotic rocks, indicating that the “super-flood,” as he calls it, flowed *laterally* and did not emerge from the mountains:

Many pediments of this type are carpeted with thin gravel deposits that include among their pebbles

Figure 12. Postulated origin of mountain valley pediments during the Dispersive Phase of the Flood (drawn by Peter Klevberg).

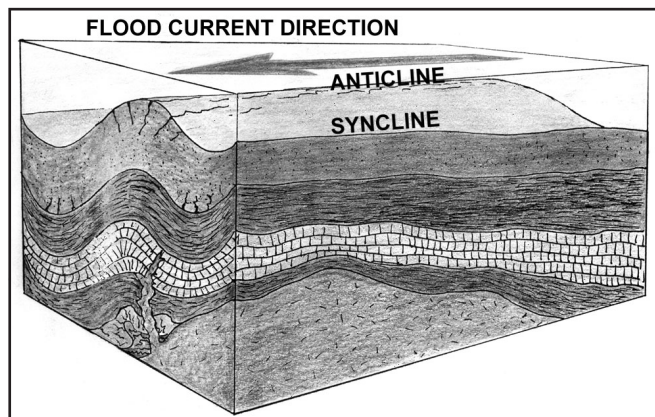


Figure 12a. An anticline rises as the Flood waters flow parallel to the ridge. Because of the stretching of sedimentary rock, the top of the anticline is much faulted.

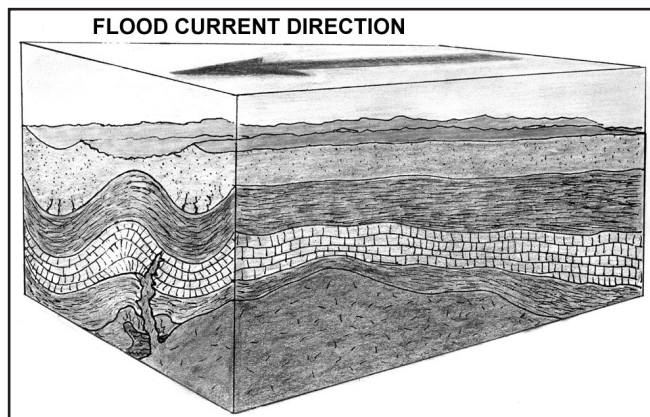


Figure 12b. Erosion is especially strong on top of the anticline because of faulted and broken rock.

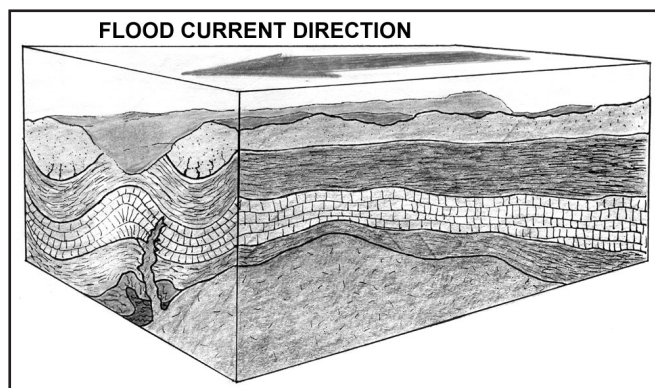


Figure 12c. Anticlinal valley and synclinal ridges form (a rather common geomorphologic and structural form).

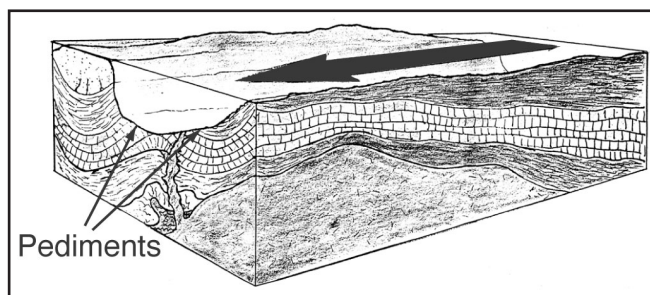


Figure 12d. As the ridges become exposed with falling base level, the water becomes more channelized into a smaller region causing rapid valley excavation with pediments forming at the base of the ridge.

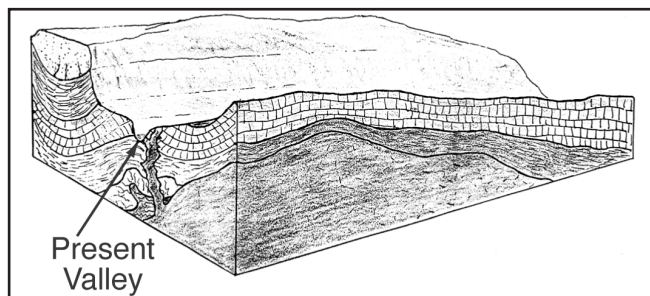


Figure 12e. The area completely exposed. Note the generally flat areas at the base of both ridges that truncate the strata at an angle. A river now flows in the valley below the pediments.

a greater variety of rock types than is represented in the bed-rock of the immediate vicinity. These facts, together with the peculiarly continuous, linear form of the pediplains [pediments], suggest that perhaps one should look in an entirely different direction for the mode of origin of the features. Rather than looking to the small streams...that now run *down the slope* of the pediplain [pediment] as the possible agent of its making, one should perhaps visualize a stream that formerly *ran the lateral length* of the pediplain [pediment]...These suggestions raise a suspicion that such a pediment is not an active surface, that its shaping has been achieved in the past, and that the agent of its shaping has migrated to a situation where we can not readily recognize it [emphasis in original] (Crickmay, 1974, p. 213).

There is one basic problem with Crickmay's super-flood idea: such a flood, viewed as possibly a one-in-a-900 year event, has never been observed, as he admits. Moreover, such a large flood would likely both erode and de-

posit sediment as cut and fill structures and terraces on the side of a mountain. But, pediments are large-scale, *smooth* features.

I believe Crickmay's "superflood" must be the Genesis Flood at the time mountain valleys were being carved during the Dispersive Phase. It is likely that the pediment represents remnants of the valley bottom formed by the last waning of high velocity currents that *filled the whole* valley.

This would be a *lateral current* spreading rocks from both the adjacent mountains and upstream onto the flat eroded surface. With water filling an entire valley and the current moving at high velocity, dissection and depositional (cut and fill) structures likely would not form. The pediment can be viewed as the last major valley bottom in the erosional process just as the currents were finally waning or thinning near the lowest point in the valley. This is the time when erosion was ending and the deposition of the clasts, which greatly aided the erosion, began. Figure 12 is a series of schematic diagrams illustrating the probable origin of valley pediments during the draining of the Flood waters through a valley.

Submarine Canyons

What would have happened when these accelerated, channelized currents moved off the continents? Instead of being depositional, they likely would have eroded the sheet deposits, especially as the depth of the Flood water decreased. These channelized currents would have carried copious debris with the larger clasts moving along at the lower depths. These clasts would be like cutting tools that would have aided the generally linear erosion. Thus, submarine canyons would have formed rapidly.

Submarine canyons are ubiquitous on the continental shelves and slopes, not only off of the continents, but also off of large islands, such as western Corsica. Submarine canyons would have been excavated similar to deep valleys cut into erosion surfaces on land, as shown in Figures 3 and 4. The likely dissection of the Portland Delta (Bretz, 1928) as the Lake Missoula Flood was waning and the flow in the area became more channelized in a smaller region provides a good analog. Hence, another major mystery of the earth's surface, this time underwater, can be explained by the Recessional Stage of the Flood.

Submarine canyons resemble river-cut gorges on land and nearly all are eroded in *hard* rock with *surprisingly steep* walls that are sometimes overhanging (Shepard and Dill, 1966). Submarine canyons are common and average 1000 m deep and 50 km long. They are cut on the continental shelf starting at an average depth of 107 m (the depth can vary from about one meter to 300 m). Many canyons are *deeper* than Grand Canyon. Several large submarine canyons have been discovered at the edge of the very wide Bering Sea Shelf (Carlson and Karl, 1984). Bering Canyon, 495 km long, is the longest canyon in the world, even longer than the Grand Canyon (Karl, Carlson and Gardner, 1996, p. 309). Of these submarine canyons, Zhemchug Canyon is the deepest in the world—100 km wide and 2,600 m deep at the shelf break and extending 160 km with an average width of 30 km (Karl, Carlson and Gardner, 1996). The canyon represents an excavated volume of 5,800 km³.

There are several hypotheses to account for the origin of submarine canyons—all with serious problems. The most popular idea is that submarine canyons were cut by turbidity currents, especially during lower sea level throughout the ice age. Tom Waters (1995, p. 47) writes:

Over millions of years, most geologists now believe, turbidity currents have carved undersea canyons as surely as the Colorado River has cut the Grand Canyon.

We know how well the Colorado River has cut the Grand Canyon! There are many problems with the turbidity current hypothesis, one being that according to the uniformitarian time scale, the canyons are much older than the duration of the ice age (Shepard, 1981). Furthermore, some canyons start on the continental slope, too deep to be caused by any process acting on the shelf or due to a postulated sea level fall during the ice age (Pratson et al., 1994; Pratson and Coakley, 1996).

The origin of these ubiquitous canyons is still a mystery. In a new book on the continental margin of the United States, O'Leary (1996, pp. 47, 58) notes:

The origin of submarine canyons of the U.S. Atlantic continental margin remains a subject of controversy and speculation...A new model of canyon evolution and activity is required that takes GLORIA data into account.

(GLORIA is a side-scan sensor that picks up the shape of ocean bottom features.) A new model has yet to be developed. Talling (1998, p. 89) reiterates:

At present, there are few studies of the processes by which submarine canyons are initiated and grow (Pratson and Coakley, 1996), and further work is needed to document how shelf-indenting submarine canyons form and how they interact with subaerially incised valleys.

Submarine canyons commonly are reflections (homologies) of the topography of the adjacent land. For instance, submarine canyons seem to extend landward as a canyon or valley. Lester King (1983, pp. 197, 199) states:

Geomorphic homology between coastal hinterland and continental shelf...Pleistocene gorges are continued as submarine canyons of the same age...In this way coastal hinterlands and shelf areas show remarkable geomorphic homologies throughout a long history.

In other words, the geomorphology of the coastal area is reflected on the continental shelf and slope.

Especially interesting is that submarine canyons are sometimes cut through *hard crystalline or metamorphic rocks*, and they occur off arid coasts (Shepard and Dill, 1966; Shepard, 1981). For instance, San Lucas Canyon off the southern tip of Baja California is a steep-walled gorge cut up to 1000 m deep in granite. I believe these facts sug-

Figure 13. Postulated origin of the submarine canyons during the Dispersive Phase of the Flood (drawn by Peter Klevberg).

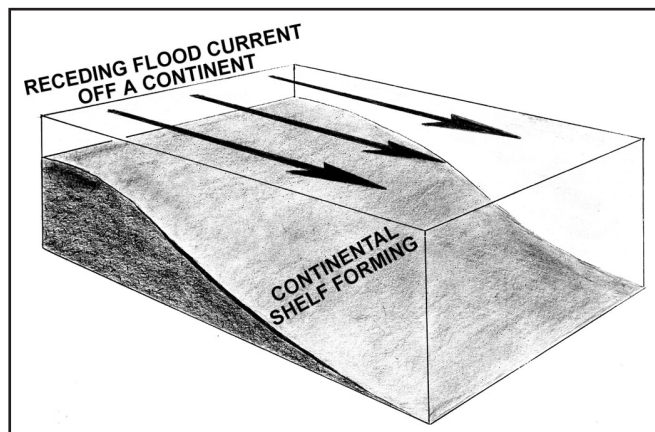


Figure 13a. Deposition on the continental shelf which is being formed during the sheet flow sequence of the Abative Phase of the Flood.

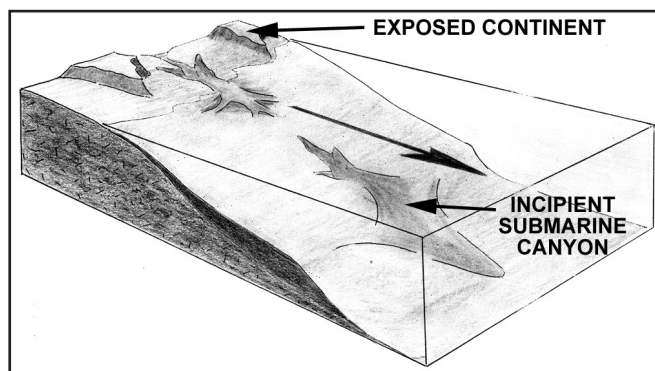


Figure 13c. Flood Dispersive Phase erosion of submarine canyons as land becomes more exposed.

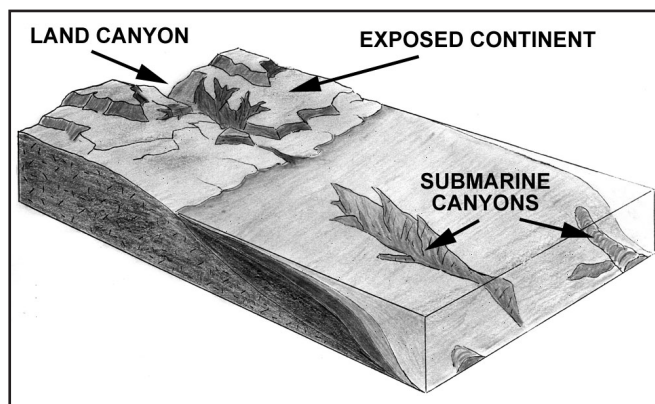


Figure 13e. Flood has ended. Note that submarine canyon reflects topography on the land. Other submarine canyons could form by slumping and sliding on the oversteepened continental slope.

gest the mechanism for the cutting of submarine canyons, and not by normal naturalistic means but by the channelized flow during the Recessional Stage of the Genesis Flood. In other words, the canyons were cut during the

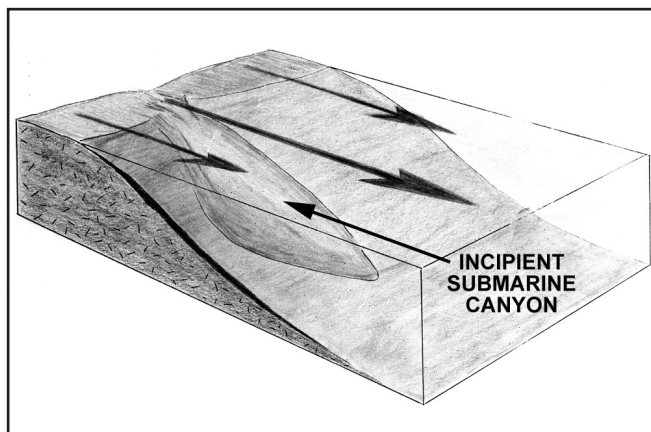


Figure 13b. Sheet flow off the rising continents becomes locally stronger out from the more channelized flow moving off the continent. This could have happened either during the Abative Phase when little sediment had accumulated as shown or during the Dispersive Phase after most of the sediment of the continental shelf had been deposited.

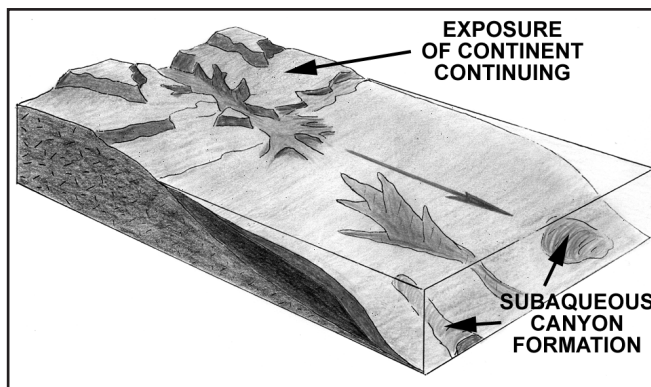


Figure 13d. Submarine canyon erosion continues during the Dispersive Phase.

great vertical tectonics at the end of the Flood, which helped power the strong, channelized currents. Lester King (1983, pp. 208,209) relates submarine canyons to vertical tectonics:

Following the great monoclinical tiltings of the continental margin towards the sea, the rivers of the mainland have been entrenched by 350–550 metres. These entrenchments are continued (by turbidity current action) across the shelf, and submarine canyons are numerous along the edge of southeast Africa.

During the Flood, these mysterious submarine canyons would have been cut rapidly during the channelized erosion of the continental shelves by “super turbidity currents”. The deep, submarine canyons eroded in crystalline rocks are little different from Rock Creek cut into the

Beartooth erosion surface (Figures 3 and 4)—both in *crystalline rocks*. Figure 13 illustrates how I postulate that submarine canyons were rapidly cut during the Dispersive Phase of the Flood. The debris eroded from submarine canyons likely formed the great submarine fans, which contain a much greater amount of sediment than the volume of the canyons. Much of the fan debris likely came from the continents during the Dispersive Phase erosion. Some of the eroded debris continued to flow seaward and form the coarser sediments of the abyssal plains.

Model Summary

Based on the Bible, Tasman Walker (1994), Carl Froede (1995), and Whitcomb and Morris (1961) have worked out a general sequence of events for the Flood. Focusing on the Recessional Stage from Day 150 to Day 370, great vertical changes of the crust occurred as the continents rose out of the water and the ocean basins sank. There is copious evidence for this effect of the Flood.

During this great vertical tectonism, massive erosion of the continents would have occurred, first as sheet erosion (the Abative Phase), followed by channelized erosion (the Dispersive Phase), leaving the following geomorphic features on the continents: large-scale erosion surfaces, valleys, canyons, pediments, water gaps and wind gaps. All of these are considered mysteries within the “slow processes over millions of years” model.

The eroded continental sediments during the Abative Phase would collect as huge sheet deposition at the continental margin as the water flow decelerating upon reaching deeper water. Later, the Dispersive Phase water flow of the Flood would carve gigantic submarine canyons in the deposited sheet sediments. Both continental shelves and slopes, and the submarine canyons formed after their deposition, are problems in the uniformitarian paradigm.

Indeed, the results of the Recessive Stage of the Flood with its two phases, the Abative or Sheet Flow Phase and the Dispersive or Channelized Flow Phase, are a *world-wide geomorphic theme*, attesting to a *global deluge* as described in the Bible.

Implication for Other Flood Models and Hypotheses

The above model has a number of implications for other Flood models and ideas. There are many positive aspects to these other models. However, they cannot all be correct in every aspect. They need modification. Also, I am open to feedback on the model presented in this series and anticipate the need to modify it in the future.

The Cenozoic is not a Chronological Flood or Post-Flood Sequence

The first implication is that the upper part of the uniformitarian geological column, the Cenozoic, is *not chronological* within the Flood or post-Flood sequence on a worldwide basis. The Cenozoic is usually considered late Flood or post-Flood by many creationists. During the Recessive Stage of the Flood, a huge thickness of sediment was eroded from the high continental areas as sheets creating erosion surfaces. During the Dispersive Phase, erosion scoured valleys. The consolidated sediments, therefore, that *remain* in higher continental areas after the erosion of the Recessional Stage likely were laid down in the Inundatory Stage of the Flood during the first 150 days.

By Day 150, all land mammals had died, based on Genesis 8:22: “...and all that was on the dry land, all in whose nostrils was the breath of the spirit of life, died.” Many mountain valleys and regions of the high plains of North America contain Cenozoic sediments, dated mostly by fossil mammals, that were left over after the great erosional event of the Recessive Stage. Some of the dates for the left over erosion surfaces are as young as *Pliocene*. Baulig (1967, p. 925) states:

In middle latitudes there are, however, almost everywhere locally planed surfaces that bevel moderately resistant terrains even as young as *Pliocene*.

This would imply that even the youngest Cenozoic sediments, such as the *Pliocene*, were *deposited during the first 150 days of the Flood* in these regions, because these sediments remained after the great planing and erosion of the Recessional Stage. This is also consistent with preserved Cenozoic mammal tracks (Lockley and Hunt, 1995, pp. 243–281), as well as Mesozoic dinosaur tracks, found within sedimentary rocks, especially in the intermountain west and high plains (Oard, 1998b, pp. 79–81). Both the dinosaur and the mammal tracks were produced during the Inundatory Stage of the Flood.

Cenozoic mammal fossils are found within sand interbeds of the Cypress Hills and the Flaxville Gravels. They are dated from the middle Eocene to the early Pleistocene (Oard and Klevberg, 1998, pp. 427, 428). These mammals likely died earlier during the first 150 days of the Flood and were either reworked or were floating in the Flood waters after Day 150 because of bloating (Froede, 1996), and were entombed in Recessional Stage deposits. Therefore, some mammals finally were buried *between Day 150 and Day 370 of the Flood*.

The continental shelf deposits, according to the model presented, would have been deposited during the Recessional Stage of the Flood. There would be very few if any mammal fossils, exposed and removed from the rising continents, that would remain intact to be deposited on the continental shelves since the violence of the receding

waters would destroy the remains. The continental shelf deposits would instead entomb mostly microorganisms. (Continental shelf deposits are mostly dated as “Cenozoic,” based on these microorganisms.) In general, mammal fossils are not found in the strata that contain microorganisms along the coast and on the continental shelf and slope. Johnson, Opdyke, and Lindsay (1975, p. 5) affirm this general separation of various continental and marine index fossils:

The correlation of continental and marine strata is difficult because these mutually exclusive environments of deposition preclude the frequent interdigitation of diagnostic faunas and floras.

Thus the “Cenozoic” from the continental shelf and slope formed during the Recessional Stage of the Flood.

Some sediment would be deposited well out in the ocean in the deep abyssal plains. These sediments also would contain microorganism fossils deposited during the Recessive Stage of the Flood. However after the Flood, fairly rapid sedimentation of microorganisms would likely continue forming carbonate and siliceous oozes (Oard, 1990, pp. 180–186). These microorganisms also are dated mostly as “Cenozoic.” However, some of these oozes likely contain ice-rafted debris as old as Oligocene and Miocene (Oard, 1998b, p. 81). Ice rafting would occur late in the post-Flood ice age (Oard, 1990), so these oozes would have been deposited well after the Flood. Thus, much of the Cenozoic oozes likely would have been laid down in the *post-Flood* period. This concept also supports Larry Vardiman’s (1996) use of Cenozoic oozes as a general record of post-Flood oceanic cooling during the ice age.

So we have the situation in which some Cenozoic fossils were deposited during the first 150 days of the Flood, some between day 150 and day 370, and some after the Flood. How then can the “Cenozoic” represent a *specific* time related to the Flood? The “Cenozoic” on a worldwide scale is essentially meaningless as part of a chronology of the Flood and post-Flood events. It mainly represents strata that contain certain fossils believed to be young according to the theory of evolution. If a modeler incorporates the Cenozoic as part of a Flood chronology, he likely will come to misguided conclusions.

The reader is cautioned that even though the Cenozoic is meaningless, it does not follow that the remainder of the geological column has no chronological value for the Flood. How the geological column relates to the Flood, if at all, needs to be developed and demonstrated with a copious amount of geologic data.

Practically all of the current sedimentary rock in the intermountain west and high plains of the United States, as well as most continental areas of the world, would have been deposited during the Inundatory Stage of the Flood. Much of the rock eroded during the Recessive Stage and deposited along the continental shelves would have been

first deposited during the Inundatory Stage. Hence, most of the sedimentary rocks of the world were first eroded during the first 150 days of the Flood. (A small amount of un-reworked volcanic material would have been added to the sedimentary rocks during the Recessional Stage.) Thus, the implication for a Flood model of the Inundatory Stage is that we need to explain much more erosion and sedimentation during the first 150 days than most models currently envision. We require a very powerful mechanism to generate all this sediments within this time period. What was that mechanism? I do not know. At the moment, I am leaning towards meteorite impacts as the cause of the Flood and for the phenomenal erosion and deposition during the first 150 days (Spencer, 1998a,b; Faulkner, 1999). Multiple impacts could have generated copious sediments and caused worldwide tectonics. They could possibly have caused 40 days and nights of heavy rain. Obviously, the impact model must be refined, but it has the potential to explain the volume of eroded sedimentary rock and many large-scale features resulting from the Flood.

Massive erosion during the Recessional Stage may also explain why we find very few human fossils. If the remains of humans were mostly deposited in the highest sedimentary layers by Day 150, the layers could have been eroded during the Recessive Stage. As this area was reeroded by strong currents, the humans, as well as any other organisms, would be mostly pulverized (Austin et al., 1994, p. 614).

A Late “Cenozoic” Flood/Post-Flood Boundary

A second implication is that for those who believe the geological column is a more or less exact Flood sequence, the Flood/post-Flood boundary on land is in the “late Cenozoic” and possibly even in the early to mid “Pleistocene” where not related to the ice age (Holt, 1996). This implication follows from what was stated above in that practically all the sedimentary rocks were formed in the Flood. Copious evidence has previously been provided to support this view (Coffin, 1983; Holt, 1996; Morris, 1996; Oard, 1996, 1998b, 1999; Roth, 1998, p. 209; Froede and Reed, 1999).

In the catastrophic plate tectonics model of Austin et al. (1994, p. 614), which is said to be in its formative stage, they assumed the Flood/post-Flood boundary is tentatively at the Cretaceous/Tertiary (K/T) boundary of the geological column. One criterion given for this assignment is: “For our purposes here we would like to define the Flood/post-Flood boundary at the termination of global-scale erosion and sedimentation” (Austin et al., 1994, p. 614). This assignment neglects regional and local scale erosion and sedimentation, and likewise neglects some of the Abative Phase and *all* of the Dispersive Phase of the Flood. It seems more reasonable that the last stages of the Flood would have more regional-scale and local-scale channelized cur-

rents after mountains and plateaus appeared out of the Flood waters. There is another reason why Austin et al. (1994) need the Cenozoic to be after the Flood, and this will be discussed below. This example shows that the placement of the Flood/post-Flood boundary is not simply an academic exercise within Flood geology. Rather, it affects many aspects of a particular model and how the geological data are interpreted.

Very Little Post-Flood Catastrophism

A third implication is that there was very little “post-Flood catastrophism” relative to some of the other models. Simply, the above model would account for practically *all* major geological events that have been postulated as “post-Flood catastrophism” as occurring *during* the Flood. All major vertical tectonics and volcanism would have ended. Local “catastrophes” could have occurred after the Flood, such as the ice age, smaller-scale volcanism, local tectonics, landslides, and events such as the Lake Missoula Flood.

Those who postulate “post-Flood catastrophism” believe that most, if not all, the Cenozoic strata were laid down after the Flood. The Austin et al. (1994, p. 614) model *requires* post-Flood catastrophism because the basalt of the new ocean floor must cool and sink, while the continents isostatically rise. This would require much more than one year. Roy Holt, John Woodmorappe, Carl Froede, and I have previously presented copious evidence against the idea of “post-Flood catastrophism.” If the Cenozoic was post-Flood, advocates of this hypothesis would not only have to explain the supposed “order” of the fossils *after* the Flood (since they believe strongly in the geological column), but also would need to account for the *enormous* geological activity during that period. According to the evolutionary paradigm, most of the mountains of the earth were raised, eroded, and raised again *during the Cenozoic*. Within the context of the uniformitarian paradigm, King (1983, p. 19) states:

Most of the world’s orogenic ranges, folded in the mid-Cenozoic, were obliterated and the terrain reduced to a plain by Miocene and earlier erosion.

Massive volcanic activity would have totally shrouded the earth in dust and aerosols for years, resulting in “nuclear winter” (Holt, 1996). Since the continental shelves are mostly Cenozoic, tremendous erosion and deposition would have occurred on the edge of the continents. How would these massively catastrophic events occur after the Flood?

Another argument against post-Flood catastrophism is the thick early Cenozoic coal seams, such as found in the Powder River Basin of Wyoming (Holt, 1996, pp. 153, 154; Oard, 1996, pp. 266, 267). For instance, the extent of the early Cenozoic Big George coal seam is approximately 100

km north-south, 40 km east-west, and 61 m thick. It is almost pure, low ash, low clay coal! Just think of the post-Flood scenario needed to gather all this vegetation into one place after the Flood and form this huge volume of almost pure coal.

Those who advocate Cenozoic post-Flood catastrophism have published few reasons for their beliefs and have not addressed the criticisms of their ideas. Advocates of post-Flood catastrophism accept immense vertical tectonics, huge earthquakes, and massive subaerial, continental landsliding after the Flood. Besides the obvious question of how man and beast would survive, Klevberg and Oard, 1998; and Oard and Klevberg, 1998 have shown that for the Cypress Hills, the Flaxville Plateaus, and other regions that the last event on the high plains was a massive *erosion by huge watery flows coming off of the Rocky Mountains* and not by landsliding.

The Breached-Dam Hypothesis for the Grand Canyon not Likely

The dam-breach hypothesis for the Grand Canyon postulates that after the Flood, three large lakes were impounded by water in the Colorado River Basin, being blocked by the Kaibab Upwarp (Brown, 1995; Austin, 1994). Then about 200 years after the Flood, the lakes gave way, catastrophically forming the Grand Canyon. I was favorably disposed toward the hypothesis at one time—until I considered the geological evidence of the Lake Missoula Flood. I wrote an article to the effect that there would be enough rainfall during the ice age to fill and/or sustain and even overflow the postulated lakes (Oard, 1993). I also noted five potential geological problems that should be addressed in the future. Since then, I have discovered more geological problems, and now I lean 98% against the hypothesis.

The geological problems with the dam-breach hypothesis at the Grand Canyon are numerous, some more serious than others. Perhaps one of the most serious problem is the lack of shorelines for the putative lakes. Although Holroyd’s (1994) sophisticated analysis of the Colorado Plateau using satellite pictures showed a preferred elevation for cliffs close to the highest levels of the lakes, the study is only suggestive. Abundant shorelines and high deltas from adjacent valleys *should be obvious*, as they are around glacial Lake Missoula, the pluvial lakes in the southwest U.S., and other ephemeral pro-glacial lakes during the ice age. As far as I know, there are no shorelines or raised deltas associated with these postulated lakes, and advocates of the dam-breach hypothesis have been unable to identify any.

The Biddahochi Formation is claimed to be sediments from “Lake Hopi” in the Little Colorado River Valley. However, the Biddahochi Formation extends about 300 m *higher* than the top of the postulated lake outlet. Further-

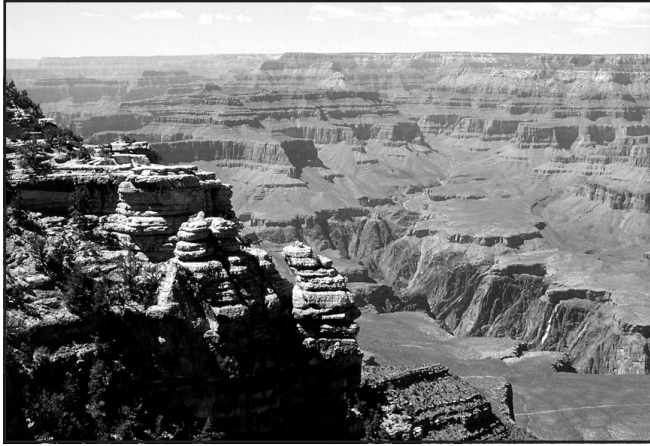


Figure 14. Grand Canyon. Note the flat top of the canyon geography.

more, one would expect lake sediments to mostly be deposited in deltas and at the bottom of the postulated lakes, such as occurred with glacial Lake Missoula. The sediments would be deposited in the deeper parts of the lake by turbidity currents and the sinking of fine-grained suspended sediments. As “Lake Hopi” supposedly drained through its narrow outlet, one would expect that much of this bottom sediment would have remained uneroded due to weak currents in the postulated lake. Except for the high altitude Biddahochi Formation, very little, if any, sediment remains in the bottom of the presumed lake.

One would also expect to find an outlet for what is called Grand or Canyonland Lake trapped northeast of the Kaibab Upwarp. This lake should have overflowed north of the Kaibab Upwarp and into the Virgin River. This overflow should have cut a fairly deep canyon, especially in view of the much higher rainfall and significantly less evaporation during the ice age (Oard, 1993). However, no canyon is observed.

Another major problem is that side valleys into the Grand Canyon should be *hanging valleys*, such as seen associated with the Lake Missoula Flood in eastern Washington and even with submarine canyons (Shepard and Dill, 1966). Several long canyons slope *gradually* down to the Grand Canyon, such as the Havasu Valley. This is not what would be expected from a catastrophic breach.

One wonders about the sufficiency of piping to start the breach and whether the release of water by three lakes would be synchronized to provide enough erosive power. Is there a huge gravel delta at the mouth of the Grand Canyon, similar to the Portland Delta from the Lake Missoula Flood? Canyon cutting by water is normally by headward erosion, such as occurred at Palouse Canyon during the Lake Missoula Flood. The water from the breached dam was released *upstream*, similar to the Lake Missoula Flood. What is to prevent the water from spreading out laterally, as observed during the Lake Missoula Flood when the water extended laterally 160 km in eastern Washington? Wa-

ter that spreads laterally is less concentrated and less able to dig a deep canyon. Is the amount of water postulated from the lakes of sufficient quantity to carve the Grand Canyon?

I have concluded that the dam-breach hypothesis is simply an *outgrowth* of the belief in post-Flood catastrophism, which is related to catastrophic plate tectonics. Those who advocate the hypothesis believe that most, if not all, the Cenozoic is post-Flood. Since the Grand Canyon was cut in the “Cenozoic,” that would make the carving of Grand Canyon automatically a post-Flood event. From my study of geomorphology, the Grand Canyon is simply one more, although very impressive, water gap. The formation of Grand Canyon fits in nicely with the sheet flow and channelized flow phases of the Recessional Stage of the Flood, which is a simple hypothesis. The flattened top of Grand Canyon would develop during the Abative or Sheet Flow Phase of the Flood (Figure 14). Red Mountain (Figure 7 of Part I), just south of Grand Canyon, is 300 m above the rim of Grand Canyon and capped by basalt, indicating that the upper sediments in the Grand Canyon region were removed by erosive processes. The canyon development fits quite well into the Dispersive or Channelized Phase near the end of the Flood. There is no need to postulate either post-Flood catastrophism or a synchronized dam breach for the origin of the Grand Canyon.

Catastrophic Plate Tectonics not Likely

Simply put, many of the key features used to support plate tectonics, such as trenches and mid-ocean ridges, likely developed during vertical tectonism in the middle and at the end of the Flood. I am one of several creationists who have become critical of plate tectonics and its creationist offspring, catastrophic plate tectonics (Reed, 2000). There are many anomalies associated with plate tectonics that are either swept under the rug or minimized by advocates (Oard, 2000b). Supporting evidence for plate tectonics can likely be explained by other mechanisms, of which vertical tectonics is a prime candidate.

To be brief, I will focus on trenches as evidence of subduction zones. There really is little evidence in support of convergence of plates, but there is ample evidence for extension, in subduction zones (Oard, 2000a). Without subduction, neither plate tectonics nor catastrophic plate tectonics can occur, unless the Earth expands. I will attempt to explain “subduction zones” within the model presented above.

During the Recessive Stage of the Flood, continental margins would be areas of great differential vertical tectonics in which the continents rose and the ocean basins sank. They would also be regions of very rapid sedimentation and lithification. Sediments likely would have lithified rapidly due to compression and/or the presence of copious cementing agents in the debris, since many carbonates

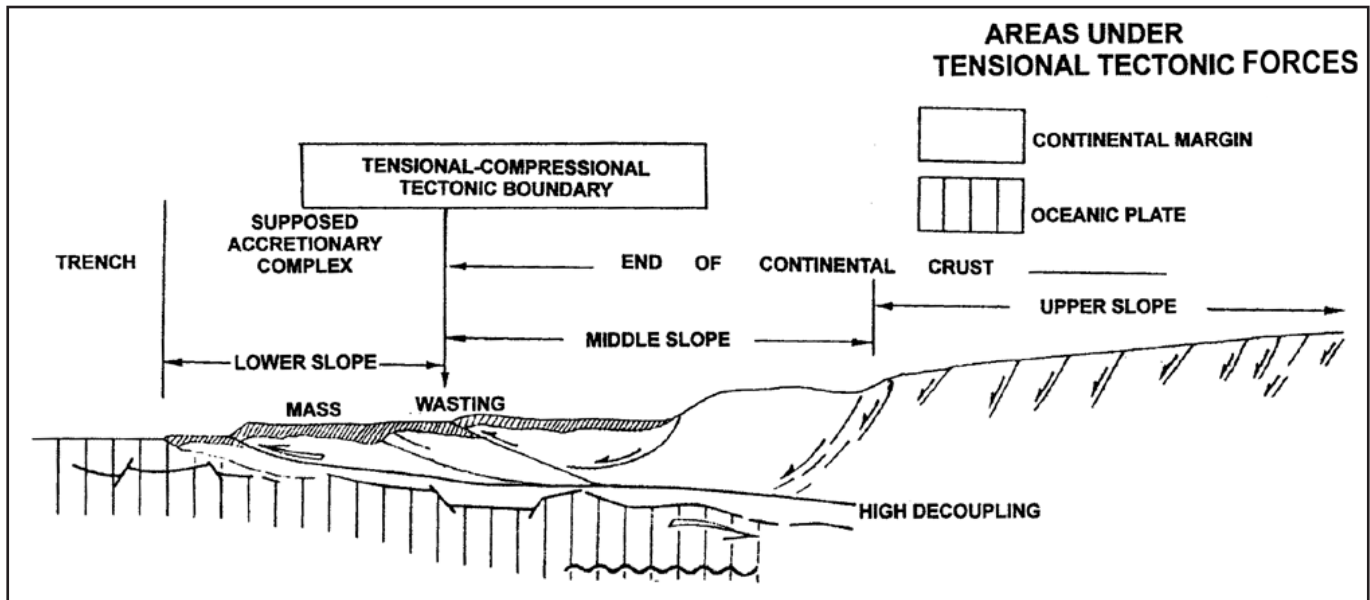


Figure 15. Schematic diagram of the Andean margin off Peru in the Paita area (from Bourgois et al., 1988; redrawn by Nathan Oard).

(one of several cementing agents) were eroded from the continents. Thus, one would expect great normal faulting on the continental shelves and upper slopes with huge slumping and mass wasting on the middle and lower slopes of continental margins, such as offshore of western North and South America where trenches are located. It is interesting that normal faulting is now observed to be common on the continental shelves and upper slopes. McNeill et al. (1997, pp. 12,123) state that normal faulting and margin subsidence are *common on passive margins and forearcs of convergent margins*:

Listric normal faulting is a common feature of passive margins, where fault movement contributes to crustal thinning and margin subsidence. Extension and normal faulting are also *a fairly common phenomenon on convergent margins throughout the world...* Discovery of these extensional structures requires a reevaluation of structures previously interpreted as folds and faults related to plate convergence (emphasis mine).

The evidence of extension in the form of normal faults is now considered common for the mid and upper continental slope. However, the features on the lower slope have been interpreted as compressional features related to plate subduction. Can one tell the difference between subductional accretion or slumping features on the lower slope? No! Figure 15 is a schematic diagram of the continental margin off the Peru-Chile Trench. This drawing indicates that convergent margins are locations of slumping and mass wasting, as expected during the great vertical tectonics occurring during the Recessional Stage of the Flood. They are not accretionary wedges due to plate subduction.

Summary of Flood Model Implications

All of these implications are controversial and merit further investigation, but the vertical tectonics model for the mid and late Flood would note:

1) That at least the Cenozoic has nothing to do with Flood or post-Flood chronology on a worldwide scale: the "Cenozoic" can be either early Flood, late Flood, or post Flood.

2) For those who do assume the "Cenozoic" is part of a Flood or post-Flood chronology, the Flood/post-Flood boundary is in the late Cenozoic.

3) Large-scale catastrophism immediately after the Flood, including the dam-breach hypothesis for the formation of the Grand Canyon, likely did not occur.

4) Many of the features crucial to plate tectonics and catastrophic plate tectonics, like subduction, are better explained within mid and late Flood vertical tectonics. This implies that plate tectonics and catastrophic plate tectonics are not likely.

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Notes from the Panorama of Science

Hotspots and Hotspot Tracks:

New Issues for Plate Tectonics and Catastrophic Plate Tectonics

Carl R. Froede Jr.*

Plate tectonics (PT) is the dominant geotectonic framework in the earth sciences. Statements such as “for geologists, plate tectonic theory is the central organizing principle and framework for studying and understanding Earth” (Applegate, 2000) reveal the importance of this paradigm. However, as an “organizing principle” and “framework,” its explanations reside largely outside of the bounds of any real geological science, but rely on only a few examples to support the entire construct (much like uniformitarianism [Morris, 2000, pp. 25–28] and evolution [Johnson, 1998, pp. 57–66; Wells, 2000]). Fortunately, despite its preeminence in the geological sciences it continues to come under scrutiny. Although it is little challenged its predictive power has been insubstantial and some of its crucial older explanations have resurfaced with nagging questions. One such area that was touted as resolved is that of hotspots and hotspot tracks. New information casts serious doubt on existing theories regarding hotspots, their point of origin, and their fixity within the earth’s mantle.

Hot Spots

Hotspots and hotspot tracks have long been thought to result from rising plumes of hot magma formed near the core-mantle boundary. These plumes rise and erupt at earth’s surface. The purported movement of the crustal plates over these hotspots throughout millions of years supposedly explains linear volcanic features (e.g., the Hawaiian Islands). Recent investigations by uniformitarians question some of these theoretical assumptions. Initial results of these new investigations indicate that hotspots likely originate in the *upper* mantle and that they may be more mobile than previously thought. If true, this raises serious questions about the origin and duration of hotspots and hotspot tracks, and their place within plate tectonics as a means to document plate motion. Of particular interest to creationists is the possibility of mobile hotspots and fixed (or less mobile) plates. Advocates of catastrophic plate tectonics should examine this new information and develop concepts about hotspots and hotspot tracks that work within their own framework, as they currently interpret these features in the same manner as plate tectonics dictates.

Dr. J. Tuzo Wilson (1963) proposed the existence of hotspots in order to solve an apparent problem that he noted with the origin of the Hawaiian Islands (Figure 1).

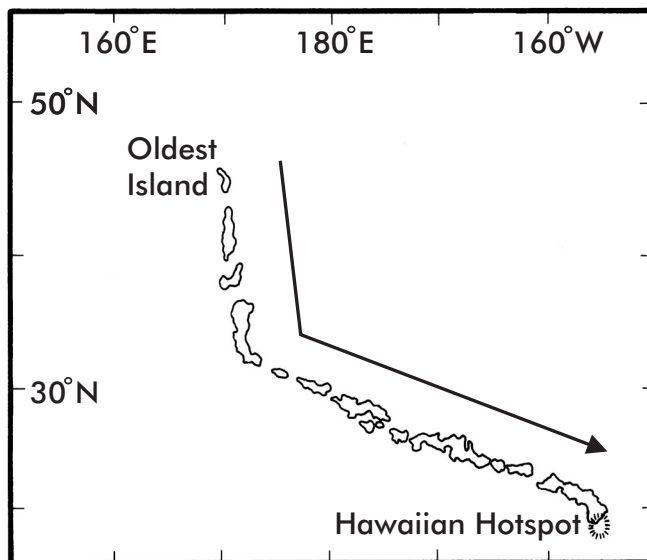


Figure 1. Hotspot track of the Hawaiian islands and Emperor seamount chain. Modified from Condie (1989, p. 159, Figure 5.22). Pacific Plate motion over long periods of time is inferred based on the radiometric age progression of the islands from oldest (top-left) to youngest (bottom-right). Arrow to right of the islands shows the age progression of the islands from oldest to youngest. If the mantle source is shallow then one must ask two questions, is there more than one hotspot track, and are we really seeing the Pacific Plate move or are we seeing a moving hotspot?

Wilson hypothesized that hotspots formed as small-scale features, associated with the terminus of a convection cell fixed in its location within the underlying mantle. Wilson’s hotspot concept was modified by Morgan’s (1971; 1972) plume hypothesis, which itself has undergone further refinement (Davies, 1999).

Morgan proposed that hot material rises from the lower mantle at a fixed location. Instead of a small plume linked to a convection cell, Morgan envisioned a large independent plume head rising from near the core/mantle boundary. The rise of the molten magma manifests itself at the earth’s surface as volcanic hotspots and hotspot tracks. As a plate moves across a fixed hotspot it creates a volcanic track that results in the formation of linear volcanic features (Figure 2). However, despite the appealing simplicity of the theoretical model, much remains unexplained about how hotspots or plumes fit within PT theory (Anderson, 1981).

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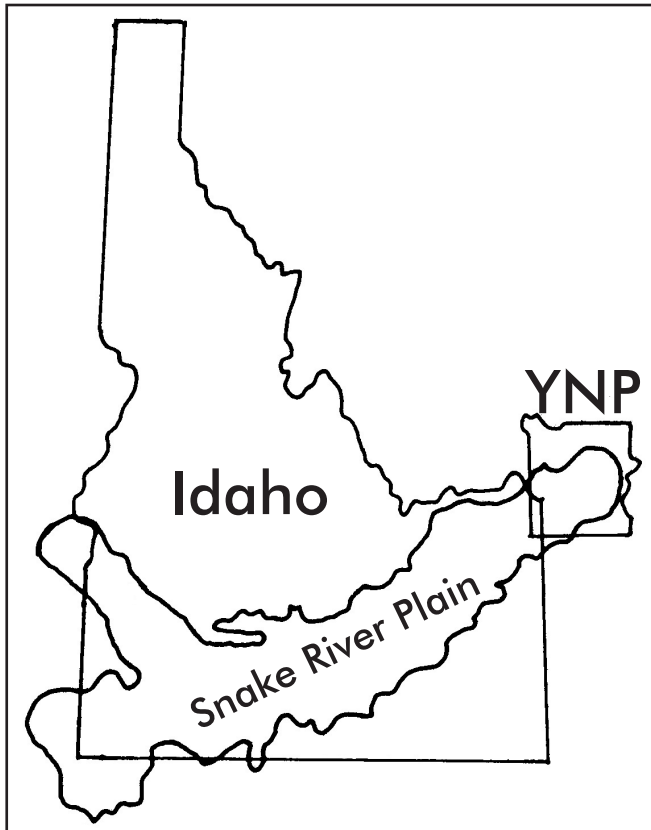


Figure 2. The Yellowstone hotspot track. Modified from Hackett, Moye, and Bonnicksen (1989, p. 161, Figure 15). It starts at two different locations and converges into one track. It tracks east-northeast across Idaho and currently resides under Yellowstone National Park (YNP). This hotspot is now believed to be linked to a hotspot located in central Oregon (see text). Hotspot theory appears to be proceeding in an *ad hoc* manner and further investigation is required. If hotspots can suddenly appear and disappear then can geophysicists state that we truly understand the processes that occurred in the past or are occurring presently in the upper mantle?

According to Davies (1999, p. 57), a volcanic hotspot can best be defined as:

...persistent volcanism in a location that is relatively independent of plate motions and moves only slowly relative to other hotspots, often with an associated topographic swell.

Humphreys, Dueker, Schutt, and Smith (2000) also explain that:

...conduits rooted deep in the stable lower mantle supply relatively undepleted mantle that feeds the surface expressions of hotspots.

The number of hotspots has been estimated from 40 (Crough and Jurdy, 1980; Duncan and Richards, 1991; Morgan, 1981) to over 100 (Burke and Wilson, 1976). As hotspots are believed to be linked to lower mantle plume sources, Davies (1999, p. 295) believes that the number of

hotspots is closer to the lower value. However, the number of hotspots may move higher if the source is determined to occur within the upper mantle.

Recently, several geoscientists working on three of the best known hotspots (Iceland, Yellowstone, and the Hawaiian Islands) have determined that these hotspots, which are believed to originate from the lower mantle, are actually derived from much shallower depths, around 250 miles beneath the earth's surface (Figure 3). This equates to a point of origin in the upper mantle that is believed to be linked to lithospheric motion and extension and not to deep mantle convection or plumes (Cande, Stock, Müller, and Ishihara, 2000). Questions about the structural control of the earth's lithosphere on hotspots have also been raised elsewhere without resolution (Fretzdorff, Stoffers, Devey, and Munsch, 1998). Currently, scientists investigating the Yellowstone hotspot have postulated that it and the Newberry hotspot (located 528 miles east in central Oregon) are related and likely originate in the upper mantle (Humphreys, et al., 2000, p. 2). These investigations are far from complete, but the initial findings are challenging established theory.

Previously, Anderson (1981), had proposed that lavas generated from hotspots, continental and ocean island basalts, and mid-oceanic ridge basalts all likely originate in the upper mantle based on the similar trace element chemistry. Traditional PT hotspot theory rejected this initial hard evidence with its required deep origin of the purported magma plumes. Now however, PT theory appears to be crumbling in the face of these new investigations.

In addition to a possible shallow point of origin, several marine geologists have noted that the overall track of the hotspot associated with the Hawaiian Islands does not fit with the motion generally assigned to the Pacific Plate (Gordon, 2000; Wright, 2000a; 2000b). This infers a disconnection between plate motion and the fixity of the Hawaiian island/Emperor seamount hotspot track. Either plate motion is not consistent or (more likely) the hotspot is not fixed in its location within the mantle. Clearly, more investigation is required to determine what is actually moving (i.e., the plate or the hotspot).

Problems With Hotspots

A shallow source for three of the best known hotspots on Earth creates more problems than it solves. The foremost issue would be to explain how they stayed so hot for tens of millions of years from such a shallow setting. For example, it has been proposed that the Hawaiian island volcanic track formed over the course of 90 million years (Davies, 1999, p. 296). If this hotspot was not associated with a plume or convection cell from deep within the mantle then its heat source appears enigmatic. What forces are in operation within the upper mantle that generates heat

which fuels this and other long-lived hotspots within the uniformitarian understanding of deep time?

The idea of mobile hotspots might change the theory of plate motion and speed. This new concept would reduce the amount of time necessary to form volcanic hotspot tracks, or possibly not require any plate motion. The general linear pattern of volcanism, interpreted as the sudden start-up of a hotspot and its track across the surface of the earth (such as has occurred along the Snake River Plain and Yellowstone Plateau) might not be tied to plate motions at all. Needless to say, this concept could revolutionize hotspot theory, since most geologists accept a firm link between plate motion and hotspot tracks.

Catastrophic Plate Tectonics

The supporters of CPT ought to examine this new evidence and explain how hotspots and hotspot tracks originate within their model, and how they can explain these features within the framework of the young-earth Flood model. This new information might present an opportunity for advocates of CPT to present a superior model as opposed to merely duplicating and accelerating existing PT explanations. At present, young-earth creationists should remain cautious of the many ideas (and some conflicting!) that PT and CPT advocates espouse (Reed, 2001)¹.

Conclusion

PT theory will change as its supporters discover differences between what has been assumed to be true based in theory and what is found in actuality. The old and broadly accepted theoretical ideas regarding volcanic hotspots and hotspot tracks are beginning to come into question as workers compare scientific findings against theory.

The discovery of the shallow origin for at least three of the larger and better known hotspots has come as a surprise to many PT advocates. New speculation and theory may be offered to explain the manner in which they formed and

¹Advocates of catastrophic plate tectonics (CPT) suggest we adopt the uniformitarian PT model without explaining how to jettison its uniformitarian and evolutionary baggage. They propose that young-earth creationists only need to accelerate PT rates so that everything occurs within the one-year period of the Flood of Genesis (Austin, Baumgardner, Humphreys, Snelling, Vardiman, and Wise, 1994). Several young-earth geoscientists have questioned this approach (Reed, Bennett, Froede, Oard, and Woodmorappe, 1996), even challenging some CPT assumptions (Froede, 1998; 1999). Nothing to date has been offered in print by CPT advocates to further advance the specifics of their theory or to distinguish it from existing PT theory which is linked to evolutionary and uniformitarian philosophy.

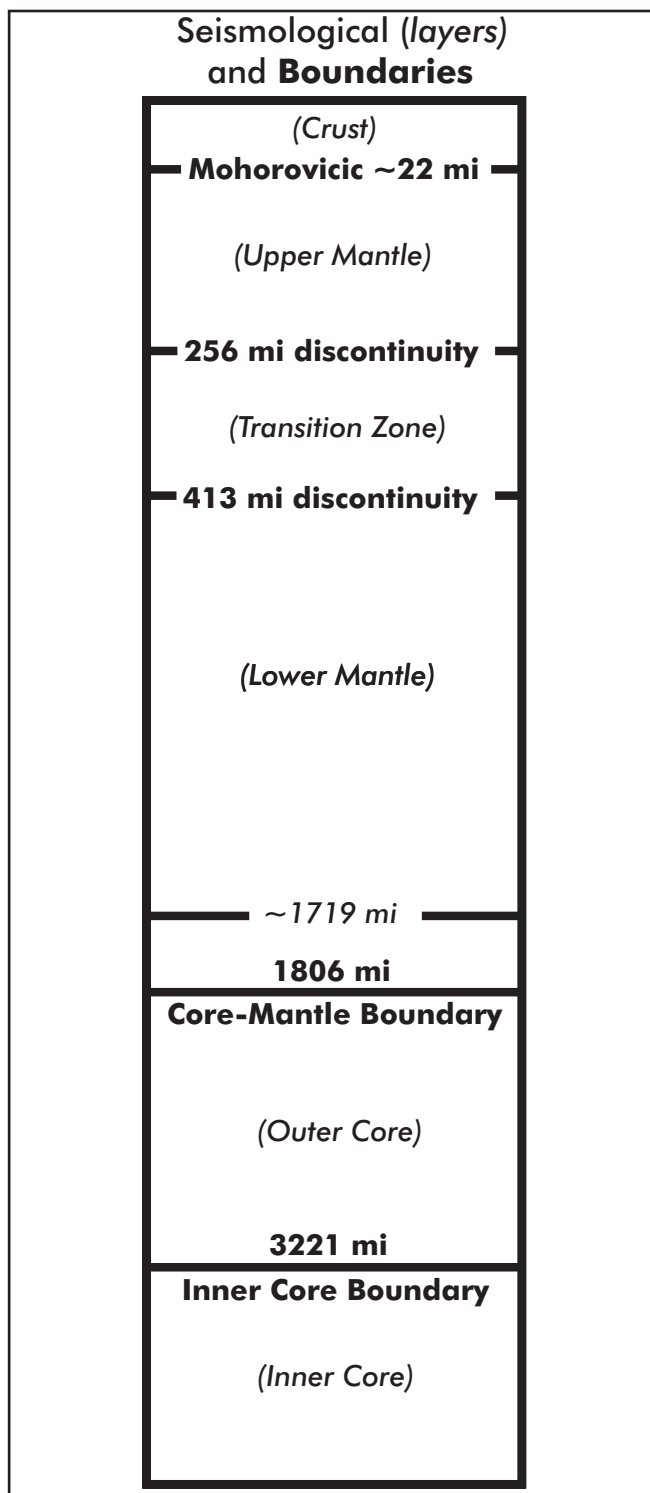


Figure 3. Cross-section showing the various seismic layers of the earth. Modified from Davies (1999, p. 94, Figure 5.2). Current PT theory proposes that hotspots originate in the lower mantle due to hot plumes rising from the outer core–lower mantle. New findings suggest that hotspots form in the upper mantle. Two problems arise for PT theory if this new information proves true, 1) explain how they form and remain active so long within this shallow setting, and 2) explain how they move.

how they existed for the many millions of years required by the uniformitarian model.

The possibility of mobile hotspots can change the age-dating relationships and purported plate motion for many of the hotspot tracks across the earth's surface. Less time and reduced plate motion would be implied if mobile hotspots are real.

CPT can only advance as its proponents break from the evolutionary and uniformitarian assumptions imposed by PT theory. New discoveries such as mobile hotspots and their shallow origin can open new possibilities in understanding the tectonics of the earth's surface during, and following the Flood.

Mobile hotspots and static or near-static continents become another possibility in understanding the history of the earth's surface within the young-earth Flood model. Much work needs to be conducted to determine if these discoveries can replace existing PT theory regarding the origin and fixity of hotspots. Hopefully, young-earth creationists will formulate ideas supported by science and not become entangled by the deep-time or evolutionary assumptions of existing PT theory.

Acknowledgments

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Symmetric Variation, Mendel, and Garther

Colin Brown*

This letter is in response to certain questions about my coining and using the term “symmetric variation”. My real interest in creation started in 1970 and among the many subjects I selected to study was the question of why life forms remained within their kinds. After considering many options I came to my present views in 1978, but had nowhere to publish them since I was unaware of the existence of the CRSQ at that time. I got my first paper published in 1980 thanks to John N. Moore and the late Harold Armstrong. As my ideas developed, I eventually published another paper (Brown, 1987).

As far as I am aware I am the only creationist to adopt the view that the arrangement of codons for amino acids (and the family groups into which these codons are arranged) is the main reason why life forms will remain within their kinds. A change from one codon for valine, for example, to another valine codon will produce only symmetric changes or variations within the kind. Other papers speak of mutations producing variations and not evolution, but their authors do not tell why such changes fall short of yielding evolutionary change.

I adopted the word “symmetric” after I heard it being used in particle physics and realized that in biology there was something about all dogs for example that was the same, despite all variations among dogs. I needed to find this at the chemical level in terms of the code. From this basic example I have come to the conclusion that the Genesis kind is a broad plan which consists not only of that which we can see, namely the phenotype, but also the life form’s genetic potential. I prefer the term “symmetric” because the “silent” implies that nothing has happened, whereas something has happened, but the result remains the same.

At this point I would like to give a few examples from history. Mendel is the founding father of genetics, but how many of us actually know that Garther separately described nearly all of the phenomena associated with Mendelian Laws of Heredity, except for numerical segregation ratios? How many of us know that Mendel had in fact access to Garther’s work and had made his own notes on the pages and flyleaf (Orel 1984, pp. 38–39)? Mendel clearly saw something in Garther’s work that Garther himself did not see but Garther was ignored. Even Mendel’s work was neglected in his lifetime. But the fact that he used something already known and added something to it and gave it a new interpretation may have led to Garther’s work being bypassed.

The model of DNA produced by Crick and Watson is a similar story. Chargaff gave them the pairing of bases; Franklin’s work helped them realize it was a double helix; and Donohue told Watson about the right shapes the bases would be in (the “keto” form) which led Watson to arrange the already familiar data into a model of which they had the best overall view (Watson, 1970, p. 149). While Watson did little in science after this event, Crick went on to become a great research scientist who carried on with studies about the genetic code. Crick said that there was more than one form of RNA and that amino acids were coded for by a three-base system and both turned out to be true. All I have done is to take this code and put an interpretation on it in a certain way. Those that take a different view are at liberty to do so. One of my prized possessions is a signed copy of one of Crick’s more recent books, *The Astonishing Hypothesis*. Newton was correct when he said everyone stands on someone else’s shoulders.

George Howe (1965, p. 19) published a paper on plants and in it he said that the shared features between different kinds were the result of the Creator having created those similar features in separate created kinds. This view in plants is similar to my view in animals in what I have called the “gene-theme” model, where the Creator either created all the shared features among different kinds or He created some of them while others came about by means of the organism’s variational potential (Brown, 1987). I recommended the use of the term “symmetrical variation” and “gene-theme” model as noted here and I invite comments from others.

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The Slumgullion Earthflow

A. Jerry Akridge and Emmett L. Williams*

A significant scar on the Colorado landscape is visible from State Highway 149 about four miles south of Lake City in Hinsdale County (Figure 1). This impressive landslide (Figures 2 and 3) in the San Juan Mountains is known as the Slumgullion Earthflow. This feature originated on the western slope of Cannibal Plateau along Mesa Seco (Fandrich, 1968, p. 3) (See Figures 4–6).

The San Juan Mountains (Figure 7) are one of the six major chains of the Rocky Mountains. The San Juans cover an area of 8,000–10,000 square miles with a massive Tertiary-age volcanic complex extending over 6,000 square miles of the region (Luedke and Burbank, 1968, p. 177). The Slumgullion Earthflow lies in the western portion of this volcanic complex¹.

Past Local Volcanic Activity

According to uniformitarian geologists, the western San Juan Mountains were covered by a quantity of successively layered, calc-alkalic volcanic ejecta, with a thickness of almost 1.5 miles and a volume of more than 1,000 cubic miles. A widespread volcanic plateau now surrounds a complex of nested cauldrons that resulted from this activity.

Regional subsidence followed after several hundred cubic miles of tuff breccia and lava were ejected, resulting in the formation of the San Juan volcanic depression covering an area 30 miles long and 15 miles wide. Eruption of ash flows radiating outwardly from central locations within the depression caused the development and subsidence of two major features, the Lake City and Silverton calderas. These structures are nearly circular in shape, each with a diameter of about 10 miles (Luedke and Burbank, 1968, p. 175). The Slumgullion Earthflow is located on the north-eastern margin of the Lake City caldera. According to the uniformitarian model, this volcanic activity occurred from 40 to 10 million years B. P. (Chronic, 1980, p. 219).

The exposed Tertiary-age volcanic units within the main scarp of the Slumgullion Earthflow are the Hinsdale Formation, the Sunshine Peak Tuff, and Uncompahgre Peak volcanic units, listed in order of the youngest through the oldest. The Hinsdale Formation (Miocene) is made up of unaltered vesicular basaltic lava flows. The Sunshine Peak Tuff (Miocene) is composed of welded ash flow tuffaceous material. The Uncompahgre Peak volcanics (Oligocene), which form the foundation for the others, are composed of andesitic flows (Diehl and Schuster, 1996, p. 13).

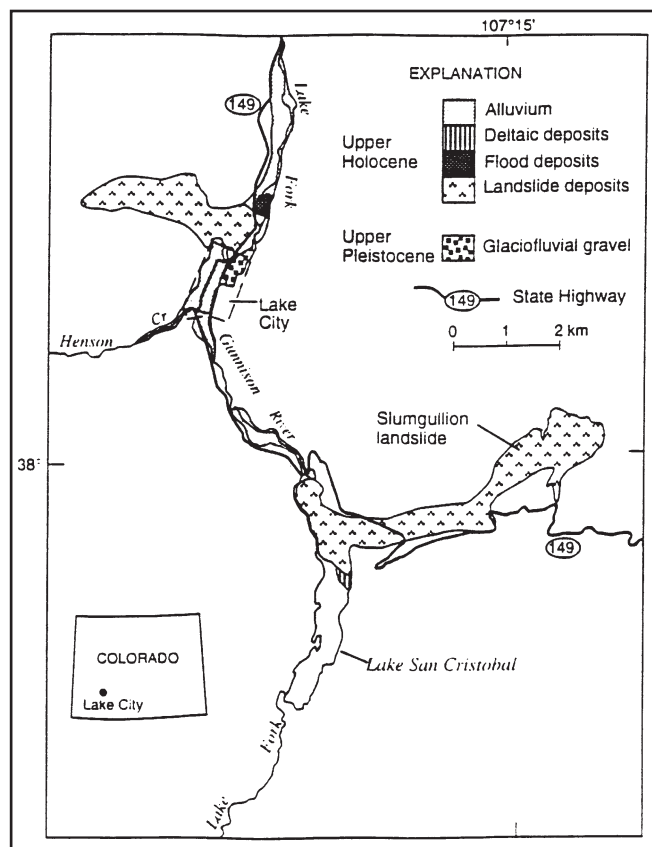


Figure 1. Location of the Slumgullion Earthflow near Lake City, Colorado (from Madole, 1996).

Description of the Slumgullion Earthflow and its Cataclysmic Origin

As suggested by geologists who have studied the site, thousands of tons of volcanic deposits broke loose from its original placement approximately 700 years ago and slid down the western side of Cannibal Plateau. Much of the slide material came to rest in the valley containing the Lake Fork of the Gunnison River. These deposits dammed the Lake Fork and formed Lake San Cristobal (Figure 2), the second largest natural lake in Colorado (Schuster, 1996).

The source area for the earthflow is cirque-shaped with an approximate diameter of 4,500 feet (Figure 4). Cliffs that resulted from the initial landslide outline the source area and stand 400 to 600 feet high (Fandrich, 1968, p. 3). From the source area, the earthflow drops from an elevation of 11,400 feet to 8,800 feet with an average gradient of 650 ft/mi. From its origin or source area to the terminus, the Slumgullion Earthflow (Figures 2 and 3) is about four miles in length.

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¹For a uniformitarian perspective on the geology of the western San Juan Mountains, see Baars and Ellingson, 1984; Luedke and Burbank, 1968; Steven and Lipman, 1976.

The Slumgullion Earthflow is made up of an older, stable flow that is being overridden by a younger, active flow. While the older earthflow covers the distance from the source area to its terminus across the valley containing the Lake Fork of the Gunnison River, the active flow (Figures 2 and 5) extends from the common source area downslope for 2.4 miles. The active flow varies in width from 500 to 1,000 feet and descends from an elevation of 11,400 feet to 9,700 feet, with an approximate gradient of 700 ft/mi. Movement of the active earthflow occurs along lateral cracks that separate it from the older flow. Open cracks cut across the active flow and capture surface drainage. The active flow has a steep and unstable toe (Figures 2 and 5), which along with the body of the flow, is sprinkled with trees (Figure 8) which lean and have crooked growth patterns (Crandell and Varnes, 1961, p. B-136)².

Landslide Activity and its Implications

Landslides have been and continue to be common occurrences in the San Juan Mountains (Howe, 1909). Assuming only 10 million years of erosional and landslide activity in the San Juans, why has the landscape not reached some type of “equilibrium” so that landslides would be rare occurrences (Williams, 1996)? As young-Earth creationists, we suggest that the volcanic formations have only been in place for a few thousand years and the terrain has not yet reached a “stable situation” where the occurrence of landslides would be highly improbable.

Thus, we offer an interpretation for the volcanic origin of the San Juan complex within a young-Earth Flood model. We postulate that deposition of the volcanic materials probably took place during the Upper Division of the Flood Event Time Frame and extended into the Ice Age Time Frame³ within the last few thousand years B. P. (See Williams, 1998, for another discussion of the regional volcanic activity in relation to the formation of the Black Canyon of the Gunnison River). The features remaining after volcanic structuring of the Earth’s crust in the vicinity of Lake City would have provided the high-relief mountainous topography, unstable volcanic deposits, and landform disequilibrium necessary for the recent formation of the Slumgullion Earthflow. The high relief along the edge of Cannibal Plateau (Figure 3) suggests the possibility of additional earthflows. We predict that more flows will occur in the future since the volcanic strata along the plateau remain in a state of disequilibrium.

²Chronology of the inactive and active earthflows can be found in Crandell and Varnes, 1961; Gombert et al, 1996; Jackson et al, 1996; Madole, 1996; Savage and Fleming, 1996; Smith, 1996; Trench, 1978.

³For a discussion of a creationist geological timescale, see Froede, 1995; 1998



Figure 2. The Slumgullion Earthflow. The landslide is visible from the source area at the scarp (A) to the terminus of the inactive toe (B) at the shoreline of Lake San Cristobal (C). The active toe (D) is the rounded light-colored area just upslope from Colorado State Highway 149 (E). Photograph by Dave Varnes, USGS.

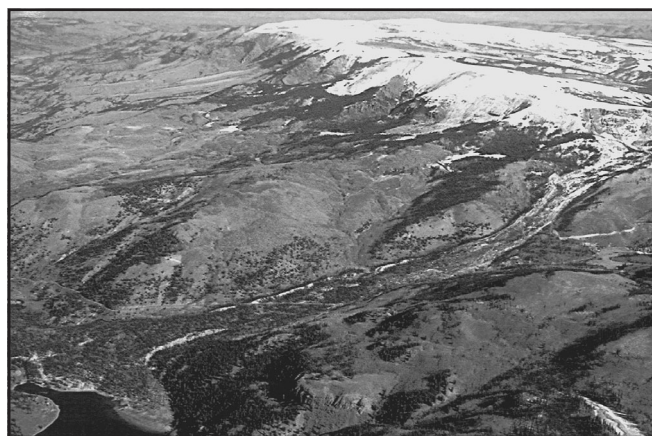


Figure 3. The Slumgullion Earthflow viewed looking north. Lake San Cristobal is visible in lower left. USGS photograph.



Figure 4. The “headwaters” of the Slumgullion Earthflow on Mesa Seco as seen from the Windy Point Overlook on Colorado State Highway 149, southeast of Lake City, Colorado.



Figure 5. The active toe of the Slumgullion earthflow is visible in the center of the picture. The scarp is seen in the top of the photograph. Note leaning trees resulting from active earthflow.



Figure 6. The Slumgullion earthflow viewed from Colorado State Highway 149 looking upslope to the scarp or source area.



Figure 7: A view of the San Juan Mountains as seen from the Windy Point Overlook. The highest mountain in the photograph is Uncompahgre Peak, tallest of the San Juans at 14,309 feet.

Appendix

The dictionary definition of ‘slumgullion’ is a stew composed of meat, vegetables, potatoes, etc. It is likely that miners in the San Juan region were often “treated” with slumgullion for meals. Occasionally, it may have been an unappetizing, foul-smelling, yellow-colored mixture (Fandrich, 1968, p. 2). The color and odor of the decomposed volcanic material making up the earthflow may have reminded the miners of their “favorite” dish and the name ‘slumgullion’ fit both their food and the geologic feature.

Another name in the area has a bizarre and ominous origin. Cannibal Plateau is named after the events surrounding the only man in the United States ever convicted of a crime related to cannibalism. Alfred Packer was hired by several gold seekers to lead them through the Colorado mountains. During extreme weather conditions in the early

part of 1874, the group composed of Packer and five others met a strange, yet unresolved fate with the five being murdered and Packer admitting to cannibalism for survival (Massengill, 1997). Interestingly, in his second confession concerning the events, Packer said, “Then the snow began to have a crust and I started out up the creek to the place where a big slide seemed to come down out of the mountain (sic) of yellowish clay...” (Brockman and McDanal, 2000). Packer was describing the Slumgullion Earthflow. A marker to the slain men is placed not far from the earthflow on the spot they are said to have met their deaths.

Acknowledgments

The authors thank the many donors to the Creation Research Society Research Fund, interest from which financed a portion of these studies.



Figure 8. Within the Slumgullion Earthflow are unstable as well as dead trees affected by the landslide. Trees lean and have “drunken” growth patterns as a result of continuing earth movement.

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Erosion Rates of Hawaiian Rock Samples Are Consistent With Young Earth Postulates

The rate of erosion in a stream of water of six groups of rocks, namely basalt, ironstone, slate, limestone, mudstone and corallite from the Haleiwa area in northern Oahu Island were measured. The experimental rig and test procedure were described in Chui, 1998, p. 40. Four samples of each rock type were tested. Since there are variations of composition, porosity and hardness from sample to sample of the same rock type, the loss in mass differs slightly from specimen to specimen. The rock samples are shown after 24 hours under a stream of water in Figure 1. The percentage of mass loss after 24 hours of testing is given in the second column of Table I.

Data Analysis and Conclusions

Assuming an exponential loss of mass with time because of erosion, the time needed for an individual sample to lose approximately 99.99% of its mass was calculated. The re-

Table I: Mass loss after 24 hours under a stream of water and time needed for complete erosion.

Rock Type	Percent Loss of Initial Mass	Years Needed for Complete Erosion
Basalt	2.02–4.79	0.33–1.55
Ironstone	0.42–2.25	1.36–7.29
Slate	0.77–2.26	1.13–3.71
Limestone	0.88–2.01	1.26–3.16
Mudstone	1.14–2.88	1.09–2.68
Corallite	0.65–10.86	0.26–4.42

sults are presented in column 3 of Table I. All experimental conditions and methods of calculation are available in detail from the author.

The maximum time necessary to completely erode a rock sample in a stream of water was calculated to be about 7.3 years! Yet the uniformitarian age for the islands is supposed to be three million years. However my experiments and erosion rate calculations indicate that likely the islands may be much younger since flowing water should have accomplished considerably more erosion in three million years.

Acknowledgments

Grateful thanks are given to many of my friends who reviewed the manuscript and provided many suggestions for further experiments.

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Figure 1. Rock samples after 24 hours of exposure to flowing water.

Keyword Index for Volume 37 2000–2001

Emmett L. Williams

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Letters to the Editor

CCC Model—An Opinion

The June 2000 issue of the *CRSQ* contained an article by Robert Gentet describing his Creation/Curse/Catastrophe (CCC) model of earth history. The next issue (September, 2000) contained four letters to the editor which I would describe as highly critical. The last issue (March, 2001) contained another such letter. While I think certain sections could have been reworded for clarity, and there are certain sections that I would have omitted if I had written the article I would like to point out what I believe are important features of the CCC Model.

The world today has many environments or ecosystems, marine and continental, tropical to polar, humid to arid, lowlands to highlands, plains to mountains to name a few very general categories. Each of these is occupied by difference kinds of animals and plants each created (not adapted) to thrive where they live. Each of these environments or ecosystems is present at various parts of the earth today. The boundaries of these environments can and do change as time passes. That is why ecologists worry so much about “global warming.” If this changes take place slowly it is viewed as natural because that is how the changes are taking place today. If this changes would take place rapidly the scientific community would call it a catastrophe. Gentet’s CCC model recognizes this. I believe this is one of the strong points of the CCC Model. Most Flood models, as well as other uniformitarian models, don’t or are at least are silent about them.

Table I on page 13 is a masterful comparison of two interpretations of the fossil record. It provides a “quick and dirty” description of how the fossil record fits with the interpretation of earth history as represented by the geologic calendar. Perhaps I haven’t done my homework as well as I should have but I’ve not seen such an attempt in connec-

tion with other “Flood” models. I find this a plus for this model.

As with all models, which are human inventions, “the devil is in the details.” I have trouble with the details of all models of earth history, from the oldest to the most recent Flood models including the CCC model. It is my opinion that all attempts at recreating the geologic history of the earth are nonscientific in that these models are not subject to replication. They are all more or less believable interpretations of either the observations of things and processes of nature or the words of the Holy Scriptures. Therefore, while they are interesting and apparently fun to invent and debate, they do little if anything to forward the cause of creationism or cause most geologists or biologists to doubt the theory of evolution.

St. Paul’s admonition to the Colossians comes to mind. “See to it that no one takes you captive through hollow and deceptive philosophy, which depends on human tradition and the basic principles of this world” (Col. 2:8 NIV).

A minor point that seems to have been a stumbling block for some. The expression “stratigraphic column” is equated with the expression “geologic column.” To me the stratigraphic column is the sequence of rocks found at a specific place. In that sense it is a reality. The geologic column is a fictional column of rock that is unusually identified with the geologic calendar made up of time intervals named, eons, eras, periods, and epochs. It is fictional because there is no one place on earth where the entire sequence of time intervals is found.

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Telomeres and Cloning

I read your article by Jeny Bergman in the December *Quarterly* (*CRSQ* 37:176–183) about the aging done on the mammal cells because of the telomerase gene in the cells. The process works in all the cells except the sperm cells and the blood cells. Now and then we hear on the news about a certain disease where a baby is born and is already aged, growing up as an old human. Perhaps this happens because the sperm cell was “aged” by this process.

Since the DNA of grown mammals are affected by this aging process, any mammal that is cloned should be as old as the DNA inserted in the cell. Is this not true for the sheep that was cloned recently? I remember hearing one time on the news that the sheep were as old as the parents. If this is

true, the news medium is not talking much about this aspect of cloning.

We always hear the news that human cloning is going to happen sooner or later. If human cloning is actually possible, the child would be as old as the parent. Besides all the other things that go wrong with a cloned animal, this would be tragic and the public at large should be aware of this, because sooner or later somebody with enough money will have the “scientist” attempt cloning.

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Origin of Clays — HTW (Hydrothermal Water) Still the Most Viable

I have read Mr. Froede's reply (Froede, 2001) to mine (Bowden, 2000) on the subject of the origin of clay. Mr. Froede claims that: "...the answer is very simple. Most of the clay-sized particles... were derived from pre-existing clay-sized particles originally formed during the Creation Week."

I regret that I cannot accept this as a mechanism that could result in the present formations of clay. May I make the following points?

(1) My main criticism of having the clay already in position from Creation Week and merely redeposited by the Flood is that in order for this to take place a very great turbulence is required. Let us imagine the action. We have a great depth of clay with various strata above and below. Flood water then pours over these strata and moves them to a new location, whether nearby or distant. I cannot for one moment imagine that this could be achieved without a very great proportion of the clay, if not the entire body becoming very badly mixed with the enclosing strata.

Yet this is not what we find in the strata. There are pure volumes of clay without the slightest intermixing of any other material and completely homogenous throughout. These deposits also often have sharp boundaries between them and other strata deposited alongside or above or below. Indeed, almost all deposits have these sharp boundaries which indicates little turbulence during their deposition. Most of the upheaval would be near the surface of the sea. I am afraid that Mr. Froede's explanation does not agree with what would happen in the real world of a turbulent Flood or what we find today.

(2) I note that Mr. Froede proposed that the clay was "formed during the Creation Week." I would ask, "How did it get there?" I presume that he is accepting that this came from the depths of the earth and was formed by a chemical precipitation as he agrees that friction cannot produce it. With the viability of an HTW source admitted, if he accepts an HTW source before the Flood, it is a small step to accepting that they could have been deposited by the same HTW mechanism but during the Flood.

(3) I am somewhat puzzled by the whole of his paragraph referring to inclusions of "metals and silicates".

(a) He mentions "hydrothermal vents" by which I presume he is referring to "black smokers". I think we need to be careful not to mix these two quite separate subjects.

(i) HTW would have welled up in huge volumes and covered the strata around over vast areas.

(ii) "Black smokers" are quite small and very localized today, giving fairly small and specific types of "smoke". I do not think that the emission of one can be compared in any way with the other. He later refers to hydrothermal vent sites as providing negligible clay deposits. I regret that he is confusing these vents of today with HTW. They are quite

different mechanisms and this confusion arises throughout much of his reply. His criticisms of the HTW model by claiming these vents do not support it is to look for evidence in a situation that is not relevant.

(b) He refers to the inclusions of "metals and silicates" and "precious metals" appearing in HTW deposits, thus seemingly accepting this activity during the Flood period. He even admits that "most of the precious metal ore bodies are believed to have formed in HTW settings." This is in precise accord with Stanton's paper. What may or may not be included in an HTW clay deposit will depend entirely on what was contained within the upwelling material in the HTW at the time, and any such inclusions have no bearing upon the viability of the HTW mechanism. This would also apply to any fossils that it overwhelmed.

(4) Mr. Froede contends that Stanton is using the HTW theory "within the context of uniformitarianism". I would agree that he is, and I would applaud his warning on this, for I have consistently maintained that creationists must be very careful when using material that has been supplied by evolutionists. However, there is no problem in extracting any facts they present while ignoring their evolutionary speculations upon those facts. Stanton's paper actually presents a wide range of very interesting material, for it explains the deposition of clay as well as much else, such as ore deposits, etc. As few would have access to his paper, I have extracted a number of important paragraphs in my "True Science Agrees with the Bible."

Mr. Froede contends that Stanton had to use HTW to explain the rapid burial of fossils which would normally take "hundreds of thousands of years" to settle out. This is not correct. Stanton showed that what were classed as "metamorphic" rocks could not be so, and that HTW could explain them fully. To give some idea of the scale he is dealing with, he claimed that HTW deposits flowed across virtually the whole of North Scotland. The HTW clay deposits were almost casually mentioned in passing, but I realized that this model explained many features of these huge clay strata.

Although Mr. Froede says that Stanton used the HTW source to overcome the settlement problem of clay, he then makes added difficulties for his own model. He calls upon the hugely turbulent waters of the Flood to redeposit the clay, but then appeals to "flocculation" to provide its sudden settlement and rapid burial of any fossils. If he can appeal to flocculation to achieve rapid deposition of clays, then the HTW model can also. But this is where the HTW model is far superior, because it would be coming from the depths, perhaps as a creamy liquid if the chemical reactions producing clay had already taken place, whereupon it can spread over the sea floor, whether shallow or deep, and even over dry land if necessary. It would already be in

position on the sea floor and no vast periods of time are needed for it to settle through great depths of water.

In reviewing Mr. Froede's reply, I am a little surprised that in his original article (Froede and Reed, 1999) he should declare, "We believe that a new approach to creationist stratigraphy is required", yet when the HTW model is proposed, which can solve all the problems that he has encountered with the conventional erosion/deposition model, he rejects it.

May I reiterate my conviction that Hydrothermal Water is still the most viable mechanism for the formation of most strata.

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 Bowden, M. 2000. Assessing creationist stratigraphy (CRSQ 36:51–60) and the formation of clay. CRSQ 37:59.
 Froede, C. R. 2001. Questions about clay-size particles formed during the Flood: A reply to Mr. Bowden. CRSQ 37:257–258.
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Book Reviews

The Horned Dinosaurs: A Natural History by Peter Dodson
 Princeton University Press, Princeton, NJ. 1996, 346 pages, \$35.95

Peter Dodson is Professor of Veterinary Anatomy and also Geology at the University of Pennsylvania. He has done considerable field work at dinosaur fossil excavations on several continents and is a co-editor of the standard reference book, *Dinosauria*.

Dodson blends the rather esoteric world of comparative horned (ceratopian) dinosaur skeletal anatomy with the history of fossil discovery. He details the fine points of anatomical differences among such huge horned dinosaurs as *Triceratops*, *Torosaurus* and *Pentaceratops* as well as such medium-sized worthies as *Chasmosaurus*, *Centrosaurus* and *Monoclonius* and oddities like *Styracosaurus* and *Pachyrhinosaurus*. He also covers the non-horned ceratopians such as *Protoceratops* and *Psittacosaurus*. He weaves together a historical survey of ceratopian discovery and the contributions made by early fossil hunters such as Othniel C. Marsh, Edward D. Cope, John B. Hatcher, Barnum Brown, Roy Chapman Andrews, and Charles H. Sternberg. Dodson updates dinosaur finds and even adds to it with his discovery of *Avaceratops*, a small ceratopsid from Montana.

For the creationist reader interested in dinosaurs the last two chapters are especially worth reading. "Sisters, Cousins, and Aunts" (Ch. 8) deals with supposed ceratopian evolution. Dodson describes "phylogenetic reconstruction" as representing "some of the highest intellectual endeavors of the paleontologist today" (p. 244). He admits that the fossils do not show the process of macro-evolution concerning the horned dinosaurs. "A family of dinosaurs

cannot simply be read from the rocks, particularly for horned dinosaurs. The fossil record simply doesn't permit it. Clear ancestor-descendant relationships are not unequivocally preserved" (pp. 245–246).

Dodson then goes on to compare the supposed evolution of the horse and rhinoceros that span fifty million years of evolutionary time to that of the ceratopians that covers a mere eleven million years. His problem, "The time available is simply too brief for the observed diversification of dinosaurs. Ancestors and descendants—or rather sisters, cousins, and aunts—are commingled in the same faunas." One solution he suggests is that evolutionary change happened "off stage." The new dinosaurs came from areas close to mountain uplifts which were not preserved in the fossil record. Dodson observes, "This is an interesting model, but one for which there is as yet little empirical evidence" (p. 245).

Dodson suggests that cladistics may provide some answers to this dilemma. However, he cautions, "Cladograms never specify ancestor-descendant relationships. This highly prized goal is regarded as unattainable. A closely linked pair of taxa is said to constitute a sistergroup. The authorized, conservative inference is that members of such a pair of taxa are more closely related to each other than either taxon is to a third. This cautious statement lends itself nicely to paleontology, where the record is notoriously incomplete" (p. 253). The ceratopsia cladogram (p. 256) bears out Dodson's statement where only the genus "leaves" (non-ancestral) of the phylogenetic tree are shown.

The last chapter, "The Life and Death of Horned Dinosaurs" contains several fascinating sections. The first section is on dinosaur bonebeds. The author points out two types of dinosaur bonebeds or graveyards. First is the multi-species sites that he attributes to being "formed more or less slowly and represent the accumulation of carcasses of various kinds of animals, for instance on a river bar, as the animals die over a period of several years" (p. 260). The other type of bonebed "contain only a single species of animal, possibly overwhelmed by a natural catastrophe such as drought, flood, volcanic episode, or unidentified cause." Dodson does not present any reasons why multi-species environments could not be catastrophically overwhelmed. Nor does he address the question of why the past forces of decay and erosion were any less potent for destroying exposed animal remains including bones than they are now.

Dobson and Canadian paleontologist Phillip Currie visited bonebed 143 in Alberta's Dinosaur Provincial Park in 1984. This bonebed contains "scores or even hundreds" of individuals of *Centrosaurus*. Over the succeeding decade more work was done on this bone bed. The bonebed now stretches for nearly 10 km "almost horizon to ho-

rizon" (p. 261). This deposit averages twenty bones per square meter and in some quadrants the density reaches sixty bones per square meter. Dodson initially offers the explanation that it was produced by a river flood that drowned a herd of animals. However several sentences later he seems to doubt his own explanation. "Today, it is clear the catastrophe, whatever it was, brought down a herd of ten thousand or more individuals. There is not volcanic ash associated with the deposit to suggest that that sort of cataclysm played a role. Not to belabor a cliché, this is a mystery" (p. 261).

Dodson has a real love for his subject. In the closing paragraphs of this book he writes, "Ceratopian dinosaurs were magnificent animals by any standards. ...No animals on earth have ever had larger skulls, nor more interestingly appointed ones.... They were colorful, noisy, gregarious, belligerent, feisty, loveable creatures.... How keenly I regret their passing. Why did it have to end this way?" (p. 281). Why indeed!

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A Fish Caught In Time by Samantha Weinberg Harper Collins Publishers, New York. 2000, 220 pages, \$24

Every few years another book appears about coelacanths (Smith, 1956; Thomson, 1991; Ward, 1991). This famous living fossil fish was found near the Comoros Islands, Indian Ocean, in 1938. Author Weinberg is a novelist, not a scientist, and had never heard of coelacanths until seeing a museum specimen in 1992. Thus began her research into the colorful personalities involved in the 1938 discovery. Ichthyologist J.L.B. Smith (1897–1968), who did initial studies of the coelacanth, later took a fatal dose of cyanide (p. 112). Eric Hunt (1915–1956), who located the second coelacanth in the Comoros, died in a shipwreck. Weinberg gives good information on Comoros island culture and fishing techniques (p. 118).

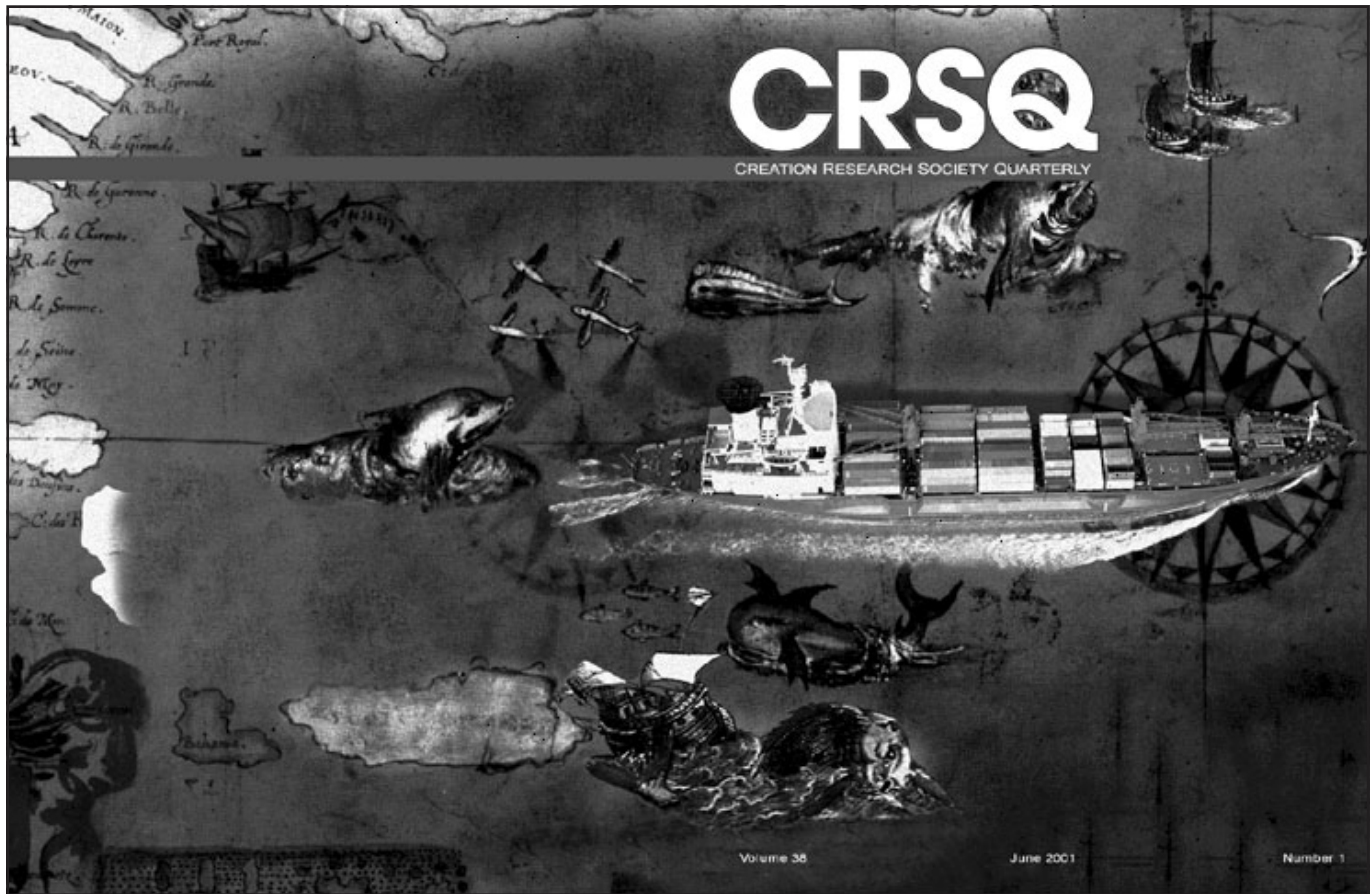
The book assumes that the coelacanth is closely related to "the first fish to crawl out of the sea to conquer the land" (p. 196). The author appears not to recognize several of her own contradictions to this assumption. For example, living coelacanths look exactly like fossils with no measurable evolutionary change. The fish boasts an advanced electroreceptor (p. 198), and an oil-filled bladder unlike other fish (p. 199). The fish has somehow survived in the Comoros area for over 65 million years, even though the islands themselves were "pushed up from the sea only 5.5 million years ago" (p. 91). And coelacanths do not use their lobed fins as legs to walk on the seabed, as evolutionists predicted (p. 140).

Author Weinberg also discusses the 1997 discovery of coelacanths in Indonesian waters, 6000 miles from the Comoros. About 175 specimens now reside in museums worldwide. Also, at least 108 distinct live coelacanths have been photographed underwater. None too soon, the Coelacanth Conservation Council, Cape Town, South Africa, seeks to protect remaining coelacanths. These magnificent creatures are a direct contradiction to evolutionary change and extinction. Learn more about them at <http://www.dinofish.com>.

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Ward, Peter Douglas. 1991. *On Methuselah's Trail*. W.H. Freeman, New York.

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Erratum: June Cover

The June, 2001 CRSQ cover should have had the following credits:

Cover design by Michael Erkel

Illustration by Ethan I. Erkel

Sailors have told stories of sea monsters throughout the ages. On p. 19 is a documented report on one of them.

Addendum: Holocaust Article

CRSQ 38(1), June, 2001: Jerry Bergman, author of "Influential Darwinists Supported the Nazi Holocaust" (pp. 31–39) is concerned about the possibility of one of his sentence being taken out of context. He asks that the following clarification be made:

It is known widely that the Nazis were influenced profoundly by Darwinism, hut it is somewhat less well

known that the Nazis enjoyed widespread support from most of the German scientific community, especially biologists (Stein, 1988; Tobach, 1974; Jackel, 1972; Haas, 1995; Haller, 1971; Clark 1958; Beyerchen, 1977; Sime, 1996). The Nazi beliefs about race were also widely shared by the world wide scientific community, and, again, especially by biologists.

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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.

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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.