HISTORICAL PERSPECTIVES

SHIVA TEMPLE: ISLAND IN THE SKY?

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Abstract

This paper is a review of the history of the 1937 American Museum of Natural History expedition to Shiva Temple, a butte in the Grand Canyon. The purpose of that study was to search for evolutionary development of animals isolated on this "sky island," as it was called. Preparations for the work and the actual expedition itself were noted by global publicity regarding the expected, positive, evolutionary implications. When it was finally determined that no significant differences were observed in Shiva's population of small mammals, the isolation of Shiva and its status as a "sky island" were called into question. A sequel to this paper will examine preliminary research data consistent with significant and recent biological isolation of Shiva and the implications this has for the age of the Canyon itself.

Key Words: Grand Canyon, Shiva Temple, geographical isolation, biogeography, speciation, Anthony.

Background

As one stands on the Grand Canyon's North Rim across from Shiva Temple, the view is breathtaking. The panoramic visual sweep of the canyon is stunning. The emptiness is overwhelming as the lowering sun casts continually changing shadows across the red, tan, and gray strata which make up the walls, buttes, temples and precipices of the mile-deep canyon. On the opposite canyon wall, one can barely make out the thread-like Kaibab and Bright Angel trails. A tiny splotch of green marks the oasis at Indian Gardens. The only sound impinging upon one's ear is the turbulent wind capering along the precipitous North Rim, the faint cry of an eagle and perhaps the distant boom of thunder echoing across the mightiest canyon on earth, signaling the late afternoon development of an incipient thundershower. It is difficult to imagine that this lonely outlook was the jumping-off point for a world-famous expedition a half century ago in the fall of 1937.

The Shiva Temple Expedition

Barely a mile and a half away, across a vacuous chasm from Shiva Expedition Point on the North Rim of the Grand Canyon, stands Shiva Temple, an isolated sentinel outpost, separated from the North Rim by 1300 feet cliffs and capped by nearly 300 acres of vegetation (See Figures 1, 2, and 3). So named by an early employee of the Geological Survey enamored with Eastern mysticism, Shiva Temple was about to become the focal point for a major scientific expedition which was capturing the imagination of millions who fed on the exaggerated reports of the mass media. The isolation of Shiva Temple from the North Rim had become a point of fascination for Dr. Harold Anthony, Mammalogist from the American Museum of Natural History in New York City where he had been employed for 26 years. As a firm believer of evolutionism, he was committed to the importance of geographical isolation in phylogenetic development.

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Evolutionists often regard geographical isolation as critically important in speciation which is viewed as the first step in macroevolution. If a barrier, such as a mountain, a stream or an ocean divides a single population, it may restrict gene flow between the two new groups. Thus, mutation and natural selection might proceed in entirely different directions in the two new populations. Given sufficient time, significant genetic differences might develop in the two groups. If the isolation barrier is removed, the two new populations could again intermingle but would be sufficiently different that they would not interbreed and produce viable offspring. Since this inability to interbreed is one way of defining species, speciation would have occurred and the first step in macroevolution would have been accomplished. In much the same way that an island, cut off from the mainland by a rising ocean, would provide isolation, Shiva Temple as an "island in the sky," was suspected of providing isolation for its small mammal populations.

Anthony hoped to scale Shiva Temple, examine the mammals he found, and compare them with those inhabiting the North Rim. He fully expected to find significant differences in the two populations, thus providing substantial confirmation for the macroevolutionary model. Anthony was not a novice at scientific expeditions. Since his first employment with the American Museum in 1911, he had participated in 20 expeditions in North, Central and South America as well as Africa and the West Indies. As a specialist in mammals he had contributed considerably to the knowledge of both living and extinct fossil forms and his research papers had graced the pages of many prestigious scientific journals. He was clearly one of the world's foremost experts on mammals.

It was thus with high expectations that he approached Shiva Temple. Nor was he alone in his optimism. Krutch (1958, p. 199) quotes another member of the expedition as saying:

> There is no reason why small animals isolated aeons ago should have become extinct . . . If we are able to compare this flora and fauna with that of the Canyon's main rim, we would have a time clock telling us approximately the number of years

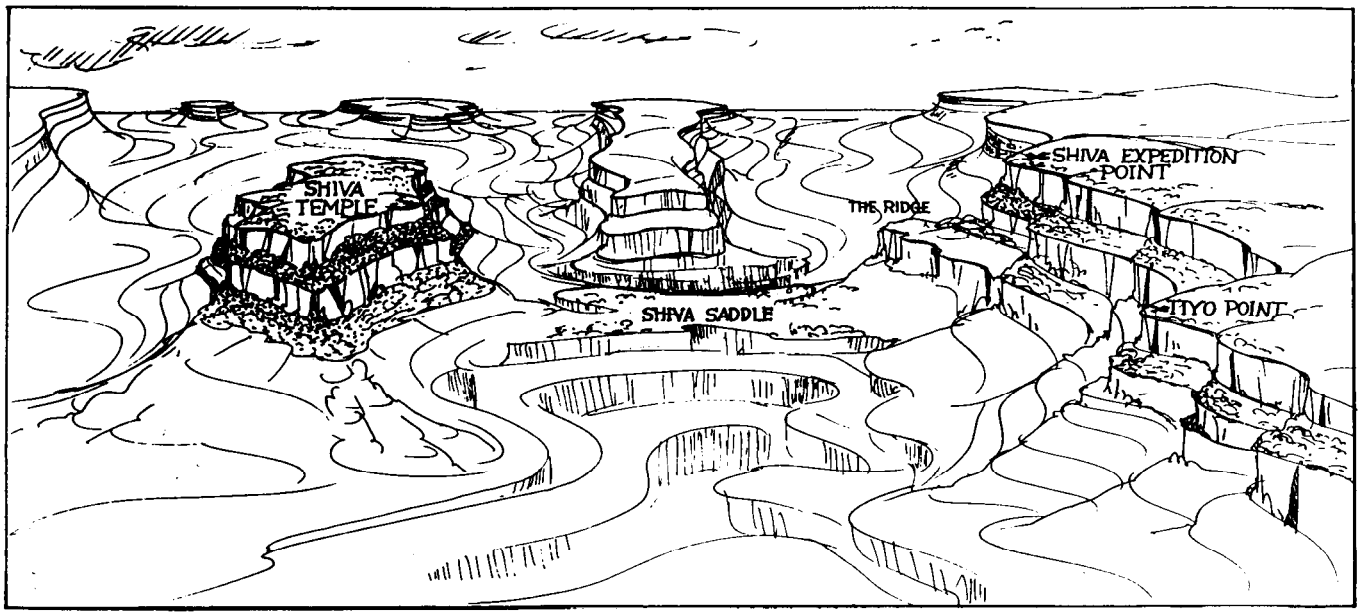

Figure 1. Sketch of Shiva Temple and Shiva Expedition Point area. The view is almost directly to the west from a point high over the colonnade.

> it has taken to bring about structural change. It will be rolling back the curtain of time to glimpse life as it was in prehistoric days.

What evolutionary biologist would not sense a shiver of excitement at the very prospect?

A Note on Research Sources

While newspaper reports of scientific endeavors should not be considered as primary resources for scientific data, they are often the only source available for *historical research.* Because this paper involves a review of the history of the expedition and an analysis of the media response to it, the following sections quote extensively from the news media.

Insofar as I have been able to determine, the newspaper quotes and the references in the bibliography of this paper represent the bulk of the important material written about the Anthony expedition. Research for this paper has included extensive searches of the University of California, Los Angeles Biomedical Research Library and the general Research Library, the extensive historical holdings of the Huntington Library, the Grand Canyon National Park Research Library, and the library at the American Museum of Natural History. Since Anthony reported using young Mormon packers from Kanab, Utah, I spent several days in both Kanab and Fredonia, Utah, looking at records from historical societies and newspapers and interviewing "old timers," several of whom worked in the Canyon at the time of the Anthony expedition. Interestingly, no documents relating to the expedition could be found and no individual was encountered who even remembered the expedition. The extensive *Bibliography of the Grand Canyon and the Lower Colorado River, 1540-1980* has been consulted and only two entries by Anthony are noted. The first relates to his paper referenced in the bibliography of this paper and the second to a short, apparently non-technical paper in a magazine I have been unable to locate. No other entries in that bibliography appear to relate to Anthony's work.

Evolutionary Philosophy and the Expedition

It is clear that a great deal of evolutionary enthusiasm surrounded the plans for the Shiva Temple Expedition. Butchart (1976) indicates "The museum men . . . made their plans and announcements with an unscientific amount of fanfare." (p. 27) *The New York Times Magazine* for September 19, 1937, declared:

> If the theory that moved the expedition is confirmed by findings, the explorers should come down from Shiva Temple with living proof not only of evolution but with animate, breathing confirmation of the rate of evolution. The premise is that complete isolation on Shiva's island in the sky has preserved animal life (if it exists) as it was ages back, with allowance only for inbreeding . . . If the mission is successful, and living creatures representing some intermediate stage in evolution are brought down, biologists will hail the news with great joy. It is not often that man can reach back into an ancient yesterday and find animate wild things of a bygone era which have been protected from contamination by the creatures of our own world. (pp. 14-5).

The *New York Times* for Monday, September 20, 1937 (p. 14), stated that Anthony was studying ". . . the evolutionary effects of isolation on small animals" and quoted him as saying, "The success of the expedition is assured." On September 21 the same paper indicated that "A message brought down by packers and relayed by radio reported today that Dr. Anthony had trapped rabbits, squirrels, chipmunks and mice, but not 'the specimens I want'." (p. 29)

By Wednesday, September 22, Anthony (p. 29) excitedly reported that the animals on Shiva appeared "extremely pale" compared to the North Rim species. On September 24, the *Los Angeles Times* (p. 8)

Figure 2. Sketch of Shiva Temple showing general vegetational patterns. View is to the northeast. Background structures such as North Rim and wall are not included.

indicated that Anthony was "highly pleased" with the results of the Expedition and the *New York Times* (p. 23) indicated ". . . eight day's work atop Shiva Temple, the wooded plateau towering above the Grand Canyon's arid depths, tonight has yielded close to 100 animals to scientists searching for the evolutionary results of isolation."

On September 26, the *Los Angeles Times* (p. 11) again reported:

> . . . Dr. Anthony has collected a number of interesting animal specimens, including rats, mice, chipmunks, rabbits, squirrels and similar small mammals, all of which he said appeared 'pale' in color . . . Some idea as to the value of these specimens may be determined when he returns to the mainland with his collection tomorrow, Wood said. 'The really important biological questions,' Dr. Anthony said, 'may take months to work out . . . It will require much time and scientific study, involving comparisons with mainland species of the same animals to determine their value,' he said.

The *London Times* (p. 11) for September 30 reported:

> The object of the expedition was to study animal life on the wooded plateau in order to discover whether isolation produced any marked changes in appearance and habits of creatures in the hope of gaining useful knowledge of the effects of inbreeding and evolution in general. The animals found on the Temple were chipmunks, three or four species of mice which were extremely numerous, cottontail rabbits, rock squirrels which resemble the common grey squirrel, and pack rats, of which one species may be peculiar to Shiva. Dr. Anthony expressed the belief that the colour of all these animals was lighter than their fellows on the north and south rims of the canyon . . . but this remains to be proved by careful comparison. While no positive results can be yet announced, Dr. Anthony believes that it will be possible as the result of the expedition to reach an approximately accurate date for the separation of Shiva from the main land, and hopes that at least one distinct species of animal may be discovered to exist there.

In addition, throughout the expedition reports, runs a thread of optimism regarding significant physiological changes in Shiva's small mammal residents. The expedition quickly confirmed their suspicion of lack of water on Shiva. This naturally led to the question of how small mammals obtained adequate water; and true to their evolutionary expectations, members of the expedition suggested that the animals had *developed* ways of dealing with the problem. The September 17 *New York Times* (p. 1) reports:

> How deer or any other animal could live on the plateau will be a subject of study of the expedition. Mr. Tillotson said it seemed apparent that there was 'absolutely no water on Shiva' and that animals living there probably had developed the ability to exist on the moisture from plants and rainfall.

Thus, expectations for confirmation of evolutionary theory and of finding living examples were indeed high.

A Touch of Intrigue

The original idea for scientific studies on Shiva Temple had apparently been suggested by park officials. Park Superintendent Tillotson had put his support firmly behind the expedition and was in fact

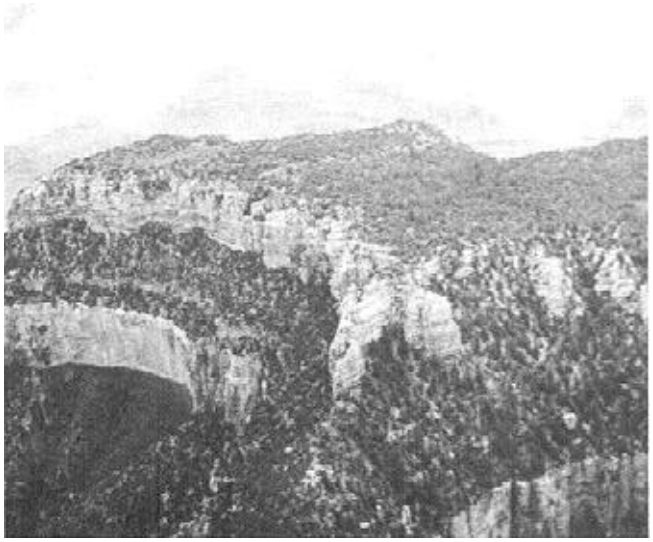

Figure 3. Aerial photograph of Shiva Temple showing the eastern two-thirds of the "sky island." The view is to the southwest from directly over the saddle area. The inner gorge of the Colorado River is seen along the top of the photograph.

directly involved in parts of it. It was clear that the climb to the top of Shiva should involve an experienced climber, but who should this be? Emery Kolb who operated a photographic studio on the South Rim volunteered. He had the appropriate credentials. Thirty-five years of climbing and hiking experience (much of it in the Grand Canyon) and previous exploration of the base of Shiva Temple from the river to the North Rim, placed him and his brother as perhaps the most knowledgeable individuals of the Canyon at that time. Anthony, however, chose not to use Kolb as climbing leader or even as a participant. Apparently Anthony avoided Kolb because ". . . he did not want to give Kolb any more recognition than he already had" (Butchart, 1976, p. 28). Instead he chose Walter Wood of the American Geographical Society, certainly a more prestigious individual than a simple photographer and much more in keeping with the elite scientific society of the American Museum.

However, while Anthony was laying plans for his publicity and preparing details of the expeditions, Kolb was not idle. He quietly trekked to the base of Shiva Temple and proceeded to climb it at least twice, once with his brother and once with his daughter. As evidence of conquest of the summit he left behind an empty box of Eastman Kodak Panchromatic film—a box which Anthony subsequently found but never publicly acknowledged, apparently since it would deprive him of the honor of a first ascent. Anthony (1937, p. 709) hedges on this point: "We had every reason to believe that no one had made a collection of the animals that might live on the Temple. We had no knowledge that a white man had even climbed it." Here Anthony is writing several months after the expedition about his knowledge of events before the climb. While the precise nature of the comment may be true, the entire article clearly leaves the impression that his was the first modern ascent of Shiva. Kolb was likely hesitant to publicly claim priority for the ascent of Shiva since he needed to stay in the good graces of the park superintendent if he wanted to keep his photographic studio concession on the South Rim.

Park officials apparently were anxious to help Anthony secure priority on the ascent. The Shiva Temple file at the Research Library at the Grand Canyon National Park includes official reports of another individual who attempted to scale Shiva from the river on the southeast side but was apprehended by park officials before he could begin his climb.

The ascent of Shiva was not the only goal of the expedition. Anthony wanted to scale Wotan's Throne a dozen or so miles to the east, near Cape Royal. This butte was also isolated and similar to Shiva in being flat topped and possessing vegetation similar to the North Rim. Once the expedition had reached the top of Shiva, Walter Wood who actually led the climb, descended Shiva and prepared for the next ascent. Wood indicated to Anthony that Wotan's Throne was considerably more difficult than Shiva and strongly discouraged him from trying it. Consequently, Anthony never attempted that climb, but controversy surrounds Wood's claim to have scaled it.

In his report to the *American Alpine Journal*, Wood (1938, p. 141) reported using a signal fire to indicate reaching the top. Later, however, Wood denied this (Buchart, 1976, p. 30), saying he "would not have endangered the forest on Wotan by lighting a fire." In addition, no one could be found who had, in fact, seen the fire. Furthermore, the climbing team appears to disagree on the difficulty of the climb. Wood (1938, p. 141) states, "The climbing was harder than on Shiva, but nowhere really difficult." Elsewhere, however, Andrews, another member of the party states (1937, p. 723), "I had climbed in Wales and Switzerland, Wood was a veteran of the greatest mountains in Alaska and the Himalayas, but never did we have a more dangerous climb than getting down the base of Wotan's Throne." In view of these irregularities it is not possible at this juncture to determine whether or not the prime motivating force for the expeditions was the quest for publicity, prestige, and confirmation of evolutionary presuppositions or if it was genuine search for objective, scientific data.

Value of the Expedition

Of what scientific value was this expedition? Anthony's single sentence retraction of previously-stated, marked differences in Shiva Temple and North Rim animals appears as a footnote at the end of his report (1937) and is easily overlooked or mistaken as a caption for a picture in the adjacent column. It reads as follows: "As this article goes to press this comparison has been made and reveals no noticeable differences between the animals of Shiva and those of the Rim."

Creationists familiar with current evolutionary bias in the media will not be surprised when they compare the extensive world-wide press coverage of Anthony's evolutionary optimism to the single sentence admission published after the expedition.

A definitive species list of animals collected apparently was never published by Anthony. Thus, while the actual collection of the specimens and their accessibility to future workers is of importance, the only paper by Anthony describing the study is popular in nature, glamorized in content and limited in scientific

value. In addition, this publication is not even mentioned in the detailed technical work of Cockrum, *Recent Mammals of Arizona* (1961). Nor is the expedition listed in a paper on the history of Grand Canyon research (Wertheimer and Overturf, 1975. At best it would seem that the expedition was of primary interest to the popular media because of an evolutionary bias which later proved to be invalid and was only scantily corrected. Rarely has a scientific expedition gained so much popular attention accompanied by so little substantive data.

Anthony's Conclusions

Anthony appears to attempt to give himself maneuvering room if his observations proved invalid and confirmation of evolution on Shiva was not forthcoming. He suggests in the 1937 paper (p. 776) mentioned previously that:

> . . . the expedition has been successful for it has surveyed the mammal fauna and secured an adequate sample of the life to afford a basis for research . . . We did not know in the beginning what these specimens would disclose, if mammals proved to be on Shiva we knew they might be identical with those on the North Rim. If this were so, we would still have done something constructive because, until the specimens were taken, no one could say whether they were different or not. It was hoped that some species of mammals on Shiva had been completely isolated and would show significant differences from their mainland relatives . . . The present mammal denizens of Shiva are all active, climbing types and, as far as physical barriers are concerned are capable of crossing from the rim to Shiva as conditions exist today. When the Shiva specimens are compared with the series of similar species from the Rim (something that will be done very shortly in cooperation with the U. S. Biological Survey which has material from both rims), then it will be possible to discover whether there are measureable differences or if these creatures disregard the hostile environment of the saddle and travel back and forth.

After comparing and contrasting North and South Rim isolation to the isolation of Shiva Temple, he continues (p. 776):

> We do not yet have a Grand Canyon between Shiva and the North Rim, only a vertical interval of 1300 feet as contrasted with, roughly 5000 feet. If the forces of evolution have begun to produce visible effects, then one of our hopes will have been realized . . . We may have been several thousand years too early to find tangible evidence of evolutionary changes; these will most certainly appear sooner or later, with a set up such as that on Shiva, and I hope that they have already begun to appear.

The general conclusion by evolutionists is that the exploration of Shiva Temple was either several thousand years too early to find evolutionary changes or that Shiva temple was really not that well isolated and that animals freely communicated between Shiva and the North Rim. The suggestion has been made that the animals found by Anthony were mainly climbers, at home on rocky terrain and that geographical isolation did not in fact occur to any significant extent.

Krutch suggests (1958, p. 200), "In other words, the 'isolation' of Shiva was a myth. Animals had found it no more difficult to climb than the scientists had. And except for this fact nothing new was discovered." Corle (1981, pp. 52-3) agrees stating:

> . . . As far as the fifty-thousand year inaccessibility of Shiva was concerned, that myth was destroyed forever. Animals of all kinds seemed to have no trouble in making yearly ascents and descents. There was no difference whatever between the species on the isolated Shiva and those of the Kaibab Plateau.

Thus, Shiva's status as an isolated "sky island" was called into question to explain the embarrassing lack of support for evolutionary theory.

I agree that there has been a "myth" associated with the Shiva Temple research but suggest there is reasonable evidence that the myth is in the evolutionary presuppositions rather than in the lack of isolation. I believe there is an alternative hypothesis which must be considered. Is it possible that Shiva *is* climatologically and biologically isolated from the North Rim, at least for some of its residents, and that lack of detectable differences when compared to North Rim counterparts results from a much more recent isolation of Shiva Temple than the time allotted for even microevolutionary development? Could Shiva Temple really be an "Island in the Sky," after all? This possibility is not only in conformity with the creationist model but appears to be in agreement with preliminary field research data. Thus, the very recent isolation of Shiva would be consistent with a comparatively recent origin of the main canyon itself (See Meyer, 1985, for a review of theories of Canyon formation and evidence for its recent origin). This possibility and its implications will be examined in detail in the sequel to this paper which will contain a review of recently collected, preliminary field data on the Shiva Temple area and integrate them with existing geographical, geological, and biological information.

Acknowledgement

Dr. George Howe has provided encouragement and many fruitful hours of discussion and suggestions during the development and pursuit of this project and the writing of the paper. Lois Hinchliffe, librarian at the Grand Canyon National Park Research Library, greatly assisted in obtaining materials from their valuable collection. Ross Marshall provided the art work.

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MINISYMPOSIUM ON OROGENY—PART III

MOUNTAINS, METEORITES AND PLATE TECTONICS

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Abstract

The concept of plate tectonics with its corollary, continental drift, have been espoused by various creationists who have adapted them to fit the short time-span of young-earth catastrophism—Northrup (1968, 1970, 1977, 1979, 1980), Austin (Nevins) (1978), Tippetts (1979), Elliott (1977), and Hansen (1983). Dwelling on the evidence that the continents at first were united, with the sea floor later spreading, these workers and I have envisioned an abrupt continental drifting and separation occurring much more rapidly than our uniformitarian colleagues would allow. My conclusion is that the physical evidences for rapid plate movement are found practically universally.

Introduction

The scenario of plate tectonics has also been applied to the creationist view of plant origins and distribution—Howe (1979) and Northrup (1979). Northrup (1977, 1979) and Hansen (1983) also evaluate human racial divisions in terms of rapid continental movement.

While I shall discuss the role of plate tectonics after the Flood in forming mountains, I believe there was a very important period of orogeny during the third day of creation (Genesis 1:9-11) and am presently preparing a paper to deal with those earlier events.

Did Continental Rifting Occur During the Flood or Afterwards?

In turning to this creation literature on tectonics, the reader must realize that some creation theorists — *e.g.* Nevins (1978) and Barker (1977)—have postulated that the rifting of continents took place during the Flood. I believe, however, that it occurred sometime *after* the Flood, as I indicated earlier:

> Identification of continental division with the Flood ignores the obvious evidence in Africa, Israel, Lebanon and Turkey that the African Rift and its northern extension were formed long after the emergence of that area from the sea. Whether Job be properly identified with Jobab (Genesis 10:29) or not, as I have suggested, the book of Job nevertheless contains a remarkable amount of references to rifting, diastrophism, massive tidal activity and similar phenomena. I insist that this requires man to be present in Palestine during the later stages of continental rifting. And we must not ignore the fact that the Jordan Rift rends Paleozoic and Mesozoic structures. It separated long after they were deposited by the Noahic Flood and its gradual retreat. The Paleozoic deposits in Israel indicate that the sea transgressed and retreated repeatedly for late Paleozoic strata reoccur between terrestrial rocks. The same is true for Mesozoic deposits, but here the transgressions of the sea are less frequent and are interbedded by wind and surface erosion deposits in the Nubian sandstones. Both deposit series must relate to Genesis 7:21-8:3. Northrup (1977), pp. 2-6.

I must add, the Mesozoic gives evidence of relating to the long period of the retreat of the Flood which, I conclude, lasted for several centuries. Another paper on the unlikelihood of orogeny occurring during the Flood is being prepared.

If the continental separation transpired at the same time as the Flood event, we would expect the ocean floor now to contain Paleozoic (Flood) deposits. Since there are very few Paleozoic sediments in ocean basins, the rift must have occurred well after the Flood. Since what uniformitarian geologists call "Paleozoic" are the Flood deposits, I use the terms "Mesozoic" and "Cenozoic" to refer to relatively short postFlood periods of sedimentation, lasting only hundreds of years and involving such events as tidal waves, wind storms, mountain formation and glacial action—Northrup (1977). "Precambrian" beds thus relate to preFlood events.

Possibly the Resulting Subterranean Heat Helped Make Mountains

There is a tremendous amount of subterranean heat that has been released through the crust in earth's great volcanic upheavals. When one examines the extrusives which blanket millions of square miles of the continental surfaces, erected enormous mountain ridges and built vast plateaus and island platforms, one must ask where it originated. Mesozoic and Cenozoic entrenchments, uplifts, overthrusts, extrusions and explosions are a powerful testimony to the fact that something generated enormous heat at about the middle of the

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