AN EVALUATION OF THE JOHN WOODMORAPPE FLOOD GEOLOGY MODEL—PART I

A. W. MEHLERT*

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Abstract

In a 1983 issue of the Quarterly, a creationist geologist published a carefully prepared and well-researched treatise on the stratigraphic separation of fossils (Woodmorappe. 1983, pp. 133-185).

In marked contrast to many previous Flood models which proposed mechanisms and processes that were rather simplistic and largely not compatible with the actual layout of the rocks and the fossils they contain, John Woodmorappe's concept appears to overcome most of these incompatibilities. It has been both surprising and disappointing that this model has been almost completely ignored by creation scientists and others, possibly because of its grand scope and consequent complexity.

This paper evaluates, simplifies to a limited degree, and elaborates on Woodmorappe's Flood concept and thereby hopes to encourage more debate and interest in the field of diluviology and geology, for unless creationists can suggest a reasonable and consistent explanation for the earth's rock systems and the undeniable separation of fossils, the evolutionary uniformitarian approach to geology will continue unchallenged in its domination of earth sciences. This paper (Part I) will discuss the precision of the geologic column. A later paper (Part II) will evaluate the Woodmorappe Flood model.

Introduction

There are two approaches to geology from a creationist point of view. The first and most obvious is to highlight the defects, weaknesses, contradictions, and serious problems which still persist in the uniformitarian or orthodox geologic paradigm. These difficulties form the first part of this paper along with a discussion of some of the elements which support the TAB model (Tectonically Associated Biological Provinces Model). The second approach is to present a reasonable and comprehensive alternative to the orthodox position, based on the concept of a global Flood of unique proportions, lasting approximately one year and with after-effects continuing on a much diminished scale over several thousand subsequent years. In the past, not enough emphasis has been placed on these after-effects and the impression has often been erroneously given that creationists believe that the whole global system was laid down in just one year. This incorrect view has been used by our evolutionist opponents to discredit diluviology. It is not enough just to criticize uniformitarian geology; Part II will reveal the positive side of the argument—a new way of thinking on geology.

When Morris and Whitcomb published their voluminous work (1961) little did they realize the tremendous implications for the post World War II creation vs. evolution controversy. Their epic work unleashed a surge of new interest in the subject of origins which still has not diminished but in fact has continued to grow. Since 1961 hundreds of creationist organizations have appeared, hundreds of books published, scores of university and public debates held, and thousands of journals printed containing articles and papers on origins. Many of these have been of excellent quality and some are really outstanding, but others have failed to impress because they have not, either directly or indirectly, coped adequately with one of the main problems facing creationism-the separation and positioning of fossil organisms entombed in the great rock systems of the world. Of course it can be argued that organic evolution and creationism can be debated independent of geology and to a degree this is true, but there is no doubt that an apparently lengthy earth history is more favorable to the evolutionist case than it is to creationism.

Many previous attempts to find a suitable diluvial process have foundered because while sound principles have been invoked in support of rock and fossil positioning such as ecological zonation, mass burials, hydrodynamic sorting, and differential escape factors, these have not in themselves been enough to explain why fossils generally are so differentiated and often appear in certain definite patterns. For instance, none of the above factors by themselves or as a whole, explain why different types of reptiles appear in the strata all the way from Carboniferous rocks to the uppermost formations. Why do we not find mammal or bird fossils in what are undoubtedly rocks laid down at the bottom of the geologic column (Figure l)? Why do the deepest layers contain so few fossil families that still exist today? Until we come to grips with questions like these, we will continue to fight a defensive battle.

It cannot be denied that there is a certain order in biostratigraphy and this fact must be faced. On the other hand, the precision of so-called fossil succession is much exaggerated and not nearly as clear-cut as we are led to believe. While it is true that many fossil beds contain an assemblage of totally extinct organisms, this does not mean that the only conclusion is that they lived long ago at a time when other forms had not yet come into being. As we shall see, there are other geological processes which can very effectively separate organisms from other forms which lived contemporaneously, and which can do this not once but many times and consistently give a similar pattern.

Woodmorappe's Tectonically Associated Biological Provinces Flood model (1983) is a noteworthy and reasonable idea which, when combined with the previously mentioned factors, goes a long way toward giving us the needed mechanism. A question which must be asked is whether the uniformitarian geologic column is as precise as claimed, and I will discuss

*A. W. Mehlert, Dip. Theol., P.O. Box 30, Beenleigh 4207, Australia.

THE GEOLOGIC (STRATIGRAPHIC) COLUMN			
ERAS	PERIODS AND EPOCHS	BEGAN - (YEARS)	APPEARANCE OF LIFEFORMS
CENOZOIC	QUAT. RECENT	10 000	—
	QUAT. PLEISTOCENE	2 MILLION	HOMO (MAN)
	TERTIARY PLIOCENE		HOMINIDS
	TERTIARY MIOCENE		PONGIDS (APES)
	TERTIARY OLIGOCENE		MONKEYS
	TERTIARY EOCENE		HORSE TYPES
	TERTIARY PALEOCENE	65 MILLION	PRIMATES
MESOZOIC	CRETACEOUS	135 MILLION	WHALES MARSUPIALS MONOTREMES FLOWERING PLANTS
	JURASSIC	190 MILLION	BIRDS MAMMALS
	TRIASSIC	220 MILLION	DINOSAURS CONIFERS
PALEOZOIC	PERMIAN	280 MILLION	CYCADS (TRUE PINES?) MAMMAL-LIKE REPTILES
	PENNSYLVANIAN (CARBON.)	310 MILLION	COAL PRODUCING FORESTS PRIMITIVE REPTILES
	MISSISSIPIAN (CARBON.)	350 MILLION	AMPHIBIANS
	DEVONIAN	400 MILLION	SHARKS JAWED FISH FERNS VASCULAR LAND PLANTS
	SILURIAN	420 MILLION	INSECTS MOSSES
	ORDOVICIAN	490 MILLION	JAWLESS FISH CEPHALOPODS GRAPTOLITES CRINOIDS
	CAMBRIAN	570 MILLION	ANNELID WORMS SPONGES MOLLUSKS TRILOBITES STARFISH
PROTEROZOIC ARCHAEN	(PRECAMBRIAN)	3 BILLION	JELLY FISH BACTERIA ALGAE

Figure 1. The geologic column as depicted in many textbooks.

various difficulties and problems which detract from the validity of uniformitarianism.

The Law of Superposition

No one with knowledge of earth sciences will deny this fundamental principle—in normal circumstances a layer of rock which is overlain by another, arrived in that position before the higher one. Apart from forces such as intrusions, folding or overthrusting, the Law of Superposition always holds true.

We shall be dealing almost exclusively with sedimentary layers—those strata which have been laid down in water; lake and stream beds, flood plains, seas or oceans. An example is the Grand Canyon where a number of formations lie atop one another like layers on a cake. One can clearly see the parallel lines which distinguish them.

Deceptive Conformities (Paraconformities)

Because paleontologists often rely on the fossil content in a stratum to determine the geologic 'age' of the rock, they frequently find that a layer overlain by another, perfectly conformably, is much 'older' than it may first appear because of the differences in the fossilized organisms between the two. Without these fossils, the geologist would usually consider the two were laid down contemporaneously. Yet because he 'knows' that certain organisms lived millions of years before others, he often assigns a date millions of years older to the underlying layer. Thousands of these cases are known globally and they present a possible weakness in the uniformitarian paradigm.

An excellent example of multiple paraconformities exists in the limestone formations near Nashville, Tennessee (Figure 2). Although all the layers are conformable, the top of the Pegram Limestone of alleged mid-Devonian age is separated from the parallel deposits of Chattanooga Shales (upper Devonian), by a supposed time-gap of over 15 million years. Underneath, the Pegram is separated from the mid-Silurian Lego Limestone by a supposed gap of 40 million years. Thus at a site where, to the eye, the strata were neatly deposited one upon the other quickly and without erosional relief, a total of nearly 60 million years' accumulation of deposits are allegedly missing, the reasoning being dependent on fossil data. Further, the Chattanooga Shales of the Upper Devonian lie flat and parallel on layers of many different 'ages' such as on Ordovician rock in central Tennessee—another gap of 90 million years, yet apart from fossils, no physical evidence indicates any long time-gap.

Science researcher Corliss finds this problem serious:

> . . . large chunks of geologic history are missing, even though the strata on either side . . . are perfectly parallel and show no evidence of erosion. Did millions of years fly by with no discernible effect? A possible though controversial inference is that our geological clocks and stratigraphic concepts need working on (1980, p. 219).

It is difficult to believe that millions of years could pass with no erosional effects at the interfaces. While it is true that in some cases there is obvious evidence of erosion, there are too many occasions where the evidence is totally lacking, except for the fossils. Now if we knew that evolution was true, it would be legitimate to accept the time-gap between the rock layers, but what if there was another reason for paraconformities? We shall examine this further in Part II.

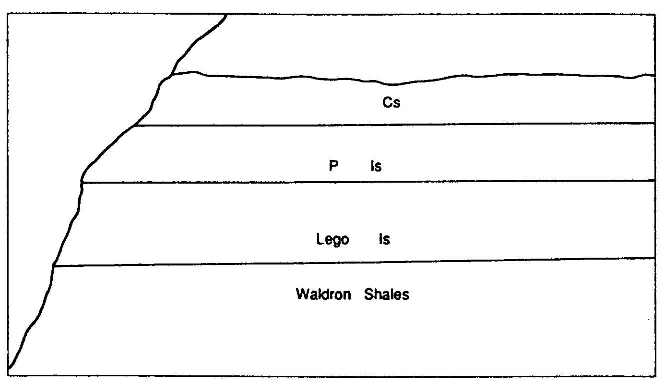

Figure 2. A simplified example of a double 'deceptive' conformity (paraconformity). Although there is a perfectly conformable contact between the Chattanooga shales (Cs) and the Pegram limestone (P ls), and between the Pegram and the Lego limestone (Lego ls), millions of years allegedly separate these formations, the only 'evidence' being the missing fossils (Whitcomb and Morris, 1961, p. 210).

Intertonguing, Interbedding, Interfingering

There are quite a number of these interesting phenomena around the world. The terms are used to describe cases where rocks of different ages and/or texture interbed or interfinger with each other. We are not talking about genuine intrusives which often occur when hot magma is presumed to have been forced into older sedimentary rock. A notable example is found below the North Rim of the Grand Canyon and is well studied in the field and described by Waisgerber et al. (1987, pp. 160-167). According to orthodox geology there is a 155-200 million year time-gap between the base of the Mississippian Redwall limestone and the top of the Cambrian Muav limestone, where Ordovician, Silurian, and Devonian deposits are missing—it is one of the biggest deceptive conformities in the world.

Waisgerber, Howe and Williams examined and mapped a remarkable site on the North Kaibab Trail—a site where the ancient Muav of Cambrian age interbeds quite clearly with the much younger Redwall, not once but three times within less than 50 feet vertically. Waisgerber et al. comment,

> We found however, that beds of both (Cambrian Muav and Mississippian Redwall) were deposited in exactly the same horizontal fashion and there were no signs of the Muav having eroded before the Mississippian Redwall Limestone was laid down. In one place, Muav and Redwall clearly graded laterally into each other and they also manifested a vertical intertonguing at other localities (p. 162, emphasis added).

There is no sign of any faulting in the area, and no metamorphosed rock, and the authors state they could find no evidence of relief such as undulating channels (p. 165). Their conclusion is that—"The unconformity supposedly separating the Redwall limestone from the underlying Muav limestone *does not exist.* Consequently there cannot be any 200 million year hiatus" (p. 166, emphasis added). The question is, how can solid rock from two formations 155-200 million years apart be interbedded with each other unless both formations were deposited at approximately the same time? Australian geologist Snelling studied this site recently and reports that ". . . the actual observational evidence in the field supports the contention that *continuous deposition* occurred as the Redwall limestone was deposited on top of the Muav limestone . . ." (1992, p. 34, emphasis added).

Another good example of interbedding is illustrated in *The Genesis Flood* by Whitcomb and Morris (1961, p. 202). Here we see undisturbed Cretaceous chalk interfingered with Pleistocene glacial till twice in one area. To the eye there is no question of unconformity and the naive view is that once again, this great bed was laid down as one. The claim of geologists is that glacial action transported great segments of the ancient Cretaceous chalk on top of much younger Pleistocene till, but the undisturbed condition of the chalk with its horizontal lenses of flints does not support this idea. The fact that the chalk intersects the till twice also makes such a claim unreasonable. Therefore creationists are entitled to deny the orthodox explanation and to insist that there is no physical evidence of a 70 million year hiatus. The whole deposit was laid down at the same time, just the way it looks. These are only two of the many serious objections to historic geology and its corollary, organic evolution.

Fossils, Subjectivity and Taxonomy

The key to orthodox/historic geology is of course the correlation of fossils—locally, regionally, and globally, but accurate correlation depends on absolute objectivity when determining just what is a fossil species or a fossil genus. If we have great difficulty now in accurately defining living species and genera, how much more difficult it is when the objects of paleontologists' attention are the osteological remains of extinct forms of which we have no direct knowledge. The point is, how do we know that a species of gastropod found in so-called Triassic beds is the same as (or different from) those found in some other fossil location of a later/earlier time?

The paleontologists must rely on anatomical comparison; there is not much else to guide them. Naturally the authorities themselves sometimes publicly recognize this handicap, especially when working over long geographical distances. Woodmorappe has documented a considerable number of these admissions (1978, pp. 100-101). One example given is that of Shaw who radically advocated that the designation of fossil species be abandoned and replaced with a stratigraphy of morphological attributes because the designation of fossil species depends on what individual paleontologists consider as significant (1969, p. 1085).

Woodmorappe notes that in the case of fossil genera the problem is even worse: "It is not uncommon for genera to be recognized, named and allowed to define (time) zones on the presence of but *single* specimens. . . ." (p. 100, emphasis added).

He indicates that "Twenty years of study have reduced the number of Lower Lias (Jurassic) ammonite genera from 106 to 76" (p. 100). There is case after case where dubious theories of descent have led to unnecessary multiplication of generic names. In another instance 70 ammonoid species of the genus Sonninia have been now reduced to only two (Donovan, 1973, p. 2). The practice of taxonomic hair-splitting is not uncommon where tiny differences in form or structure turns one species or genus into several, thus establishing more time-zones and making generic successional order rather exaggerated both in precision and repetitive consistency.

Woodmorappe cites Koch who wrote "The published fossil record has significant bias in favor of common and biostratigraphically important taxa . . ." (Koch, 1978, p. 367). Woodmorappe also says that "Simultaneously, there is an artificially high diversity of short-range taxa caused by taxonomic oversplitting by stratigraphers" (1983, p. 136). When one considers that correlating these forms over far-flung areas is the means by which stages and time-zones are established, one is entitled to be skeptical of such methods. In most cases, unless the osteological comparisons reveal that two or more fossils are identical, *we cannot tell* whether we are dealing with juvenile/adult, macroevolution, variation, or simply sexual dimorphism in any particular instance. Paleontology by its very nature must inelude a large element of subjectivity. If we found a group of fossils as diverse as the modern breeds of dog, we would not recognize that they were all of one species. This degree of bred-diversity would not be generally expected under non-controlled conditions.

Redfern in his 1983 work on the Grand Canyon admits (p. 86) that

> Geologists commonly must interpret the environment and age of sedimentary rocks from imperfect fossil fragments . . . moreover, geologists commonly have to segregate the cluster of *extraneous* fossils from those which are pertinent to the strata being investigated (emphasis added).

This means that no fossil can be accepted at face value; if it does not fit in with the successional dogma, it must be rejected by the expert and the implications are obvious. Creationists are not bound by this dogma and can accept fossils at face value unless it can be shown beyond doubt that some other influence was at work, such as reworking. Sometimes identical, but 'out-of-place' fossils are given different names. Not uncommonly, geochronological 'stages of strata' (evolution over time), are little more than abstractions not dependent on the occurrence or the absence of any particular species, but only 'recognized' by the general grade of evolution as a whole. That is, although the particular fossil species are not present, it is assumed that evolution must have occurred.

Further, there are many cases where the stratigraphic range of an index or chosen fossil is found with further exploration to be more than originally believed and therefore it loses its significance in correlation and time value. The art of correlation, whether by index fossils alone or by the type of fossil assemblage found at various sites is indeed a tricky one. In the case of index fossils, where short stratigraphic range and geographically wide distribution is essential, some degree of circular reasoning is unavoidable because fossils are relied upon to indicate a geologic age, yet age is accepted as a criterion in determining taxonomic status.

While some degree of fossil separation and correlation is useful in local areas, the process becomes very subjective and less precise in large-scale and/or global proportions. As geologists move from local to regional, to continental, and then global concepts ranging over hundreds of thousands of kilometers, the exercise becomes more and more doubtful and complex, and becomes more dominated by preconception. The process becomes less empirical and more conceptual because of progressively greater differences in the lithology; in the local fossil succession; and in the overall faunal character.

The key to this process is not based primarily on empirical superposition but rather on *the conceptual basis* which links the so-called index fossils as time equivalent. To put it another way, correlation by index fossils has meaning only if they arose (evolved) at a certain definite time and became extinct at an equally certain definite time over a widespread area (Figure 3). Woodmorappe, in his voluminous research (1978, 1980, 1982, 1983, 1986), found that fossil horizons have regional and local correlation value and this is independent of whether the organisms evolved or were

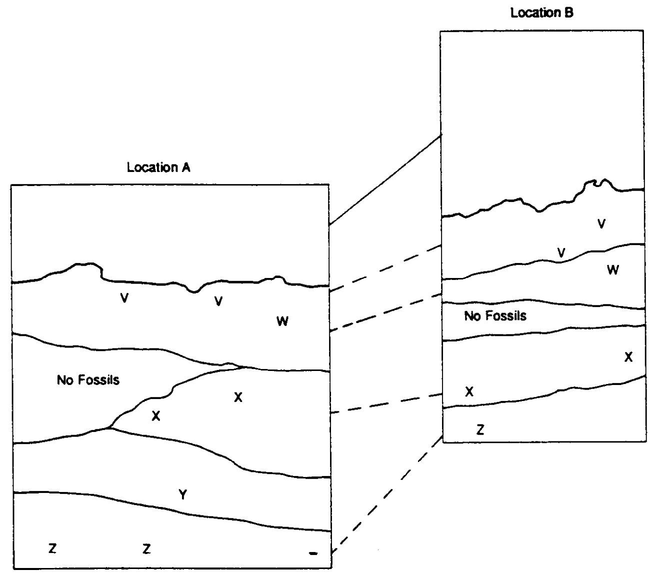

Figure 3. A simplified diagram of correlation by fossils between two different locations. The examples v, w, x, and z are assumed to be time-equivalent. In Location B no 'y' fossils are present and thus it is assumed that the particular formation was never deposited or if it was, it has since been eroded completely away.

created. In Part II we shall see the reason for this from a creationist perspective.

Woodmorappe agrees that there is an artificially high diversity of short-range taxa (the index fossils), and that taxonomy is biased towards producing the short-range 'species' and 'genera' (1983, pp. 135-136). He cites Harper as stating that ancestor-descendant lineages should be constructed which leave ". . . fewer or shorter stratigraphic gaps" (1978, p. 96). Yet despite this, large gaps between the higher categories such as family level and above are virtually universal, no matter what the stratigraphic position. Matthews makes it clear that while lithologic correlation is useful at the local level, when it comes to global scale, only biostratigraphy is reliable; i.e. total dependence on fossils (1974). He states "The basic book-keeping unit of biostratigraphy is the range of the species" (1974, p. 96). But if these forms attained their position in the rocks by a means other than long-term evolution, their value as time indicators is zero.

The Actual Stratigraphic and Successional Tendencies of Fossils

To avoid possible bias in using fossil species or genera, Woodmorappe based his approach at the family level of fossil organisms. A further excellent reason is the virtual lack of transitional forms and/or lineages between families, and between the even higher categories such as orders, classes and phyla, except for a handful of disputed or doubtful types. From his study of 2617 fossil families covering the entire Phanerozoic Era (Cambrian to Quaternary), Woodmorappe found that the fossils are indeed highly differentiated stratigraphically, yet he also found that many fossils overlap many geologic periods. In fact, a small minority of all fossil families span the entire column. For example 2.5 percent of all recent families are also represented in Cambrian rocks, 29 percent of Carboniferous families are represented in Cretaceous beds, and 25 percent in Tertiary deposits. In all cases, from Cambrian to recent, the highest percentage of fossil families in common was found in adjacent periods such as Cambrian/Ordovician, and Triassic/Jurassic.

One-third of all fossil families span three or more of the geologic periods and furthermore, one third of families are stratigraphically confined to only a single geologic period. From this it can be seen that the great majority of fossils are useless as rock-time indicators. Because in most cases 'older' periods have more of their forms in common with 'younger' periods than the 'younger' ones have in common with 'older' ones, Woodmorappe believes that the trend, going stratigraphically upward, is the addition of 'new' forms rather than the disappearance of 'old' organisms. This may be because stratigraphic conflicts are usually resolved by allowing stratigraphically older taxa to range into younger strata in preference to the reverse. This then means that more fossil groups appear later in the column, helping the evolution cause and distorting the actual stratigraphic differentiation.

Do the Fossils Really Overlie One Another?— The Question of Juxtaposition

To research this in detail, Woodmorappe went to the enormous length of pinpointing every location on the earth where each of the index fossils is found (Table I). These 'time-marker' fossils range from six groups of Precambrian fossils to six types of Ordovician graptolites, five genera of Devonian ammonoids, right up to the Tertiary mammals and foraminifers. The total number of genera involved is 182, covering 9560 fossil sites over the whole of the column. Woodmorappe then constructed locality maps for each type of fossil and superimposed the maps over a light table to determine the actual superpositions of these fossils. He was generous on the side of evolution to eliminate bias and allowed fossils occurring several tens of kilometers apart but in different strata levels to be recognized as superposed. At some sites fragments were allowed, even if they were questionable as true index fossils.

Table I. Some of the 34 index fossils used in Woodmorappe's TAB Model to establish actual locations where fossils of different Periods superpose or juxtapose within the 320 kilometer diameter areas allowed. Numbers in parentheses indicate number of fossil sites involved in each Period. Total = 9560 sites (Woodmorappe, 1983. pp. 138-139).

Geologic Period	Index Fossil Types
Precambrian (250)	Miscellaneous Invertebrates
Cambrian (528)	Trilobites, Archaeocyathids
Ordovician (1560)	Trilobites, Graptolites, Brachiopods, Conodonts
Siluro/Ordovician (205)	Echinoderms
Silurian (303)	Brachiopods
Siluro/Devonian (502)	Graptolites, Fish, Trilobites
Devonian (910)	Floras, Ammonoids, Coelenterates, Brachiopods
Carboniferous (421)	Ammonoids, Fusulinaceans
Permo/Carboniferous (767)	Floras, Corals
Permian (884)	Fusulinaceans, Brachiopods, Ammonoids, Ectoprocts
Permo/Triassic (255)	Reptiles
Triassic (304)	Fish, Ammonoids
Jura/Triassic (244)	Floras
Jurassic (440)	Ammonoids/Belemnites
Jura/Cretaceous (188)	Dinosaurs
Cretaceous (499)	Ammonoids/Belemnites
Tertiary (1013)	Mammals, Foraminifers

From this information Woodmorappe then constructed a table covering all the index fossils and sites over the whole of the Phanerozoic. Using 34 index fossils (about three from each geologic period), he found that only small percentages of all localities of any given fossil directly overlie, or are overlain by, others belonging to another period. In other words, the index fossils tend to be not found juxtaposed or superposed; i.e. they 'shun each other' geographically. This is an empirical finding and has quite serious ramifications for evolutionary geology. It can be seen from the list of index fossils used by Woodmorappe in his comparison (Table I), that overwhelmingly they are marine forms, even in the higher (younger) strata of the upper Mesozoic and Cenozoic.

An interesting result was that in the geologic periods comprising the Paleozoic era, juxtapositioning of the fossils was much more evident than it was in the Mesozoic and the Cenozoic. Some examples are given in Table II. The results are not unusual: Of the 478 Tertiary foraminifer fossil locations, less than five percent overlie locations containing Triassic ammonoids. This is remarkable, given that the resolution of fossil localities is several tens of kilometers. In the Mesozoic and the Cenozoic, hardly any localities overlie other older locations.

We see then that when comparing geologic periods, the fossils of those periods tend to 'shun each other geographically,' i.e., they are not usually found juxtaposed or superposed biogeographically, especially so in the upper portion of the column. Although there are more cases of juxtaposed and/or superposed fossils in the lower half, the number of instances is still quite small. This established fact could be considered as evidence that fossils are to a high degree ecological and/or biogeographic equivalents, thus negating concepts of long ages of geologic time. This interesting geographical incompatibility of index fossils makes mechanisms of fossil separation (for those few juxtapositions that do exist), amenable to a diluvial explanation which will be discussed in Part II.

So far we have been concerned only with cases of singular types of index fossils relative to each other. When we turn to multiple types of fossils, there are only 59 regions of possible juxtaposition around the globe, i.e. cases where only seven of 34 index fossils occur in the same regions. These regions have diameters of about 200 miles (320 kilometers). Even so there are only a handful of instances on earth where over 10 of 34 index fossil types are possibly juxtaposed and not one case where half of them are possibly juxtaposed.

Table II. Some examples of superpositioning by index fossils. Percentages in parentheses indicate proportions of total sites where superpositioning is actual. Note that more index fossil sites overlie others in the Paleozoic (over 10X), than in the Cenozoic (less than 5%). Also note that overwhelmingly the sites do not superpose at all (Woodmorappe, 1983. pp. 152-153).

Era	Fossil Types
PALEOZOIC	Silurian brachiopods over Ordovician graptolites (More than 10%)
	Devonian ammonoids over Ordovician conodonts (More than 10%)
	Devonian brachiopods over Ordovician nautiloids (5-10%)
MESOZOIC	Triassic fish over Permian ammonoids (Less than 5%)
CENOZOIC	Tertiary foraminifers over Triassic ammonoids (Less than 5%)

These findings are of great import in viewing the so-called geologic column as having real physical properties, at least as far as preciseness and exactitude are concerned. Nobody doubts that there are such things as lower and higher rocks and fossils which are stratigraphically differentiated, but the fact remains that the so-called column is a broad concept and is lacking in the fine detail claimed by evolutionists. Sometimes this fact is acknowledged. Bell (1983, p. 111) admitted, "For approximate correlation of the larger stratigraphical units, fossils prove satisfactory; the difficulty appears when fine detail is needed." This of course makes the task of the Flood geologist much easier; he has only to find a mechanism which would account for this broad trend.

Woodmorappe was able to demonstrate that the ". . . evolutionary/uniformitarian geologic column does not correspond to reality . . ." (1981, pp. 46-71). He drew attention to the plain fact that ". . . geologic periods tend to be absent, inconsistent in their stratigraphical successional order, from place to place, and all exhibiting some tendency to rest directly on Precambrian basement" (p. 46, emphasis added). Thirteen percent of the earth's land surface has five geologic periods represented, irrespective of their order or identity and less than one percent has all 10 periods in place.

A significant portion of every geologic period's rocks do not overlie rocks of the next older period. About 23.2 percent of Ordovician rocks, and 18.6 percent of Devonian rocks rest directly on Precambrian basement. Even of the most recent rock, the Tertiary, 4.39 percent rests directly on very ancient Precambrian rock. An orthodox geologist would claim that the intervening 'missing' rocks either were eroded away or were never deposited in the first place. This claim really begs the question of whether or not these missing period rocks ever existed.

Of course there are a few places on the earth's land surface where portions of all 10 geologic periods can be found, in Poland for example. But when we remember that 47 percent of the earth's land surface has Cambrian rock alone (the oldest of the Phanerozoic), 31 percent has both Cambrian and Ordovician, and 21 percent has Cambrian, Ordovician and Silurian, one is entitled to be very skeptical of the physical reality of the column. Therefore we are equally justified in looking for more plausible mechanisms and processes which can explain the stratigraphic separation of fossils. If the physical geologic column was indeed a reasonable reality we should expect that the so-called index fossils should not shun each other geographically all over the globe, but rather should be much more compatible. The 'different age' fossils are overwhelmingly incompatible and this must be faced. The geologic column appears to be a misinterpretation of the actual facts.

Two Principles

While showing all the things which tend to reduce the physical reality of the column, and why we are scientifically free to consider the column as a mixture of reality and conceptualism, we must still be prepared to accept the validity of two principles. 1. Most fossils are highly differentiated stratigraphically. 2. The deeper we go in the rock systems, the more different are the fossils generally from those in the higher rocks.

Unlike the evolutionist who is tied to one concept of organic transformation over hundreds of millions of years, the creationist is at liberty to accept fossils at face value and to offer alternatives as to how they got where they are. The uniformitarian geologist cannot do this. If he finds fossils which are (to his mind) out of place, he must insist that they are reworked from another place whether or not there is any physical evidence to support him, as was openly admitted by Redfern (1983, p. 86). If geologists often have to resort to removing extraneous fossils from those pertinent to the strata being investigated, then creationists are conversely free to accept all the fossils at a site, at face value, and as being pertinent to the strata, unless there is good evidence that the "extraneous" fossils are the result of reworking. Woodmorappe has given over 200 cases where fossils are misplaced and his list is by no means exhaustive (1982, pp. 210-214).

We are also entitled to accept so-called paraconformities at face value while the uniformitarian must insist that these conformities are deceptive. That is, even though the conformable state of the interface is fully consistent with a short time-frame of deposition, many millions of years must have elapsed before the deposition of the uppermost strata on the lower. The same goes for interbedding, intertonguing, and interfingering. The orthodox geologist must deny the physical evidence while the creationist can easily accept that there is no problem if the bulk of the sedimentary strata was laid down more or less concurrently.

There is a further problem: Historical geologists assure us that in most parts of the world they know the biostratigraphic history very well and this knowledge is based overwhelmingly on the placement of ancient fossil biota. If this precision is so high, why do the rocks yield *only a disputed handful* of all the untold transitional forms and lineages that surely must have existed at some time in that long past? How can the past life history be both so precise and yet lacking so much? Why do mostly the same fossil forms keep appearing all the time?

Turek et al. wrote in 1984 (p. 13), "One of the basic tasks of paleontology is to present a comprehensive picture of the evolution of the organic world." I would maintain that such a task requires much speculation and imagination because a page earlier, the same author wrote—

> . . . the exact determination of fossils is often fraught with difficulties. None of the biological systems is as yet completely unified and universally accepted, so that the classification of fossils is still exceedingly unstable. Not infrequently, *the same species* has been placed by contemporary authors in different genera, or *the same genus* in different families. (emphasis added).

This indicates just how conceptual the art really is.

A Diluvial Perspective

So far we have dealt with flaws and deficiencies in the standard uniformitarian paradigm and endeavored to illustrate the scattered and fragmentary nature of the so-called geologic column. All these factors must be kept in mind at every stage as we turn to the positive side of Woodmorappe's Flood model, especially the fact that the index fossils, the chief (but not the only) basis of the uniformitarian geochronological concept, very rarely actually overlie one another but really are geographically incompatible (Figure 4).

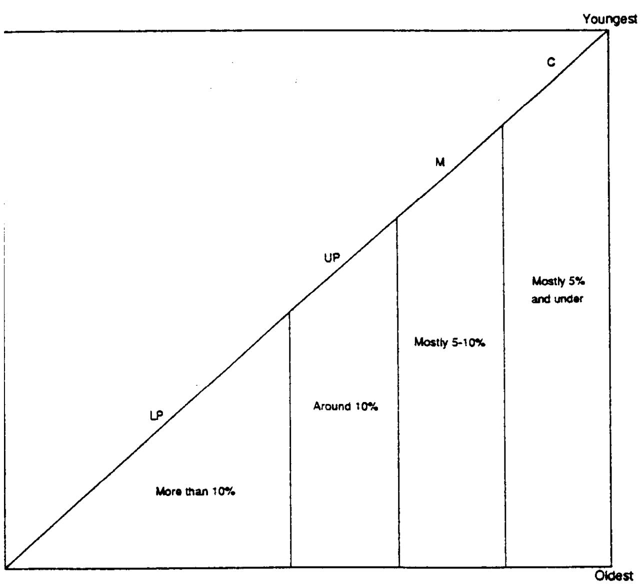

Figure 4. Actual compatibilities and incompatibilities of index fossils—juxtapositional tendencies. In the Cenozoic (C), only 5 percent or less of index fossils directly overlie fossils of 'earlier' ages; 5-10 percent of Mesozoic (M) index fossils directly overlie those of previous periods. In the geologic periods of the Lower Paleozoic (LP), the tendency for superpositioning of index fossils is mostly over 10 percent. It is therefore clear that the important index fossils shun each other geographically, particularly when it is recalled that Woodmorappe allowed considerable lateral scope—up to tens or hundreds of kilometers (Woodmorappe, 1983, Table III, p. 152).

Apart from the standard evolutionary hypothesis, there are a number of other mechanisms, working alone or together which can cause fossils to become stratigraphically differentiated:

Pure chance
Preservation bias
Ecological / biogeographical
Tectonic factors
Hydrodynamic sorting
Differential escape factors

Evolutionary 'turnover' is thus only one of a number of possibilities affecting the positioning of fossils in the rock record. We shall briefly examine these before advancing to Woodmorappe's main theme.

(i) Indeterministic factors—chance

Although many would consider this rather mundane, Woodmorappe points out that it would indeed be odd if organisms buried by a great Flood were equally present at every stratigraphic horizon. Mirroring the fact of index fossils' geographic / geologic incompatibility, note that there is only one instance where all three fossils occur in the same stratigraphic section (the third column of Figure 5, Case l—Fossils' N, P, and S). That is, one out of 20 instances. In the other 19 cases only one or two coexist in the same section. Taking two at a time, the only combinations possible are N / P or P / N, S / N or N / S or P / S or S / P.

Now if there were many mutual juxtapositions of these fossils, then all six combinations would occur and therefore there would be no global biostratigraphic differentiation. However as actual juxtapositions are very rare it may happen that one or more of the six possibilities may never occur solely by chance. We can apply the statistical principle that artifactual or apparently significant trends can occur if the sample is small enough. And because the sample is small (few juxtapositions), chance can play a considerable role. In Figure 5, Case 1, rare mutual stratigraphic occurrences generate apparent stratigraphic incompatibilities, and the combination of N / S never occurs, purely by chance. In Figure 5, Case 2, we allow the Flood to occur again hypothetically, and now the combination P / S is the one that never occurs. Keeping in mind that in global reality the index fossils do shun each other, we see in both cases there are few opportunities for any two index fossils of different 'ages' to mix with each other—because in Case 1, N / S never occurs due to the rarity of cases where fossils N and S occur in the same location, and in Case 2 the same goes for P / S.

The key is that if many organisms are ecologically separated from each other then only occasionally will they have the chance to mix during the Flood and chance has a stronger role to play than otherwise would be the case. As paleontologists and stratigraphers note (in Case 1) S always appears higher than N, they conclude that this is the 'natural' order of fossil succession relative to each other. The conclusion then follows that the two are 'chosen' or index fossils relative to each other and thus they delineate different short spans of geological time. We shall see later just how this works. Since P can occur in any combination (P / N, S / P, S / P / N, P / S, etc.) it is considered an overlapping or stratigraphically extended fossil of longer time frame and has no time significance and thus becomes rejected as an index fossil.

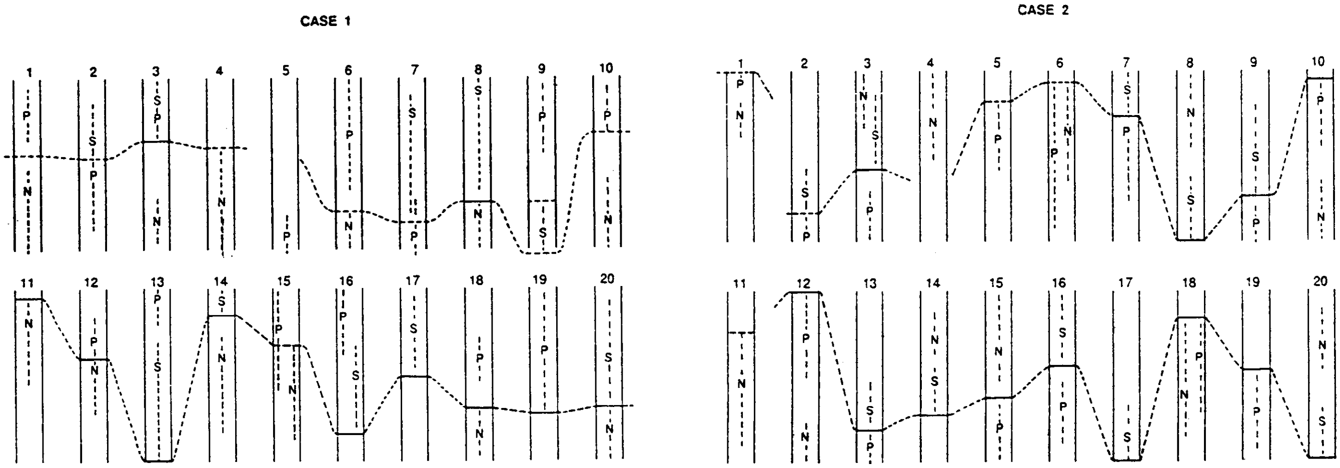

Figure 5. The effects of chance on stratigraphic ranges and positioning of fossils. The 20 columns in Cases 1 and 2 represent various possible combinations of fossils P, N, and S at different locations. The incompatibilities of fossils P, N, and S are only 'apparent' because of chance—i.e., N/S never occurs in Case 1 and P/S never happens in Case 2. The chance positioning is misinterpreted by uniformitarians. N and S in Case 1 and S and P in Case 2 become regarded as short-range index fossils. The dotted horizontal lines indicate how a uniformitarian would establish time-equivalents between locations. Dotted vertical lines represent stratigraphic range of the fossils. Further explanation is in text (Woodmorappe, 1983, Figure 2, p. 159).

In Case 2, S and P become the index fossils and N has no time significance as it can appear in any combination. Taking this a step further, a 'time horizon' is then drawn and the geologic sections are time-correlated. In Case 1, where N and S occur, a solid line can be drawn between them but in the case of only one being present, the time horizon can only be drawn either under S or above N but not with exactitude. In Case 2, the line can be drawn between S and P—always below S and always above P while N has no time value.

We have so far restricted the examples to just three index fossils for simplicity, but the principle can be extended to much larger numbers. It can be seen how index fossils could occur or rather be interpreted, in such a system with each index fossil being restricted to a small stratagraphic range within its geologic period. All over the globe, a given index fossil will always be interpreted as being in an Upper Silurian deposit, while another will be considered as belonging to a formation of the Lower Silurian, thus allowing a world-wide correlation. Of course this is a very simplified example and the final determination would be influenced by a number of other factors including ecological zonation, sorting, preservation bias, etc., and we shall shortly see how it would all fit together.

In cases of faunal/floral assemblages, as in Riversleigh, Australia, the total biota including plants and animals are all or part of a Tectonically Associated Biological Province or TAB as Woodmorappe describes it. A typical TAB province could include for instance, bovids, grasses, carnivores, trees, insects, and some reptiles. Most stratigraphic occurrences of 'index' fossils are solitary, but once any particular fossil is considered to be a chosen or index fossil, its stratigraphic confinement is largely due to circular reasoning. Woodmorappe (1983, p. 152) quotes Potapenko and Stukalina: "The crinoids found . . . rule out a Precambrian or Cambrian age for the host limestone because no reliably identified primitive crinoids have ever been found in Paleozoic rocks older than Early Ordovician." Thus the above periods are ruled out by the fact that such crinoids have never been found there! The circularity of reasoning is obvious, and it is quite frequent. In this particular case, those crinoids should have been allocated stratigraphically to the Precambrian or the Cambrian.

Sometimes index fossils are found in common with others in an assemblage and these are usually 'unique' as a whole in much the same fashion as a single index fossil. A Devonian bed may include several fish remains and other amphibians or plants believed to have lived at a particular time, and will not contain say mammalian or avian fragments; this will be explained further when we come to the TAB principle.

(ii) Stratigraphic differentiation and separation of fossils

So far we have dealt with chance combinations and non-combinations within a geologic 'period,' but what about the larger stratigraphic rock-time units such as eras and suberas? Woodmorappe's research showed that adjacent periods (e.g., Cambrian-Ordovician), have around 50 percent of fossil families in common with each other stratigraphically. When examining the apparently natural eras of the Phanerozoic, (Paleozoic, Mesozoic, and the Cenozoic), it becomes obvious that more deterministic mechanisms are necessary to account for their stratigraphic fossil differentiation. Woodmorappe now turns his attention to how the ecological, physical, and biogeographic properties of organisms have led to their biostratigraphic differentiation with emphasis on possible connections between the biogeography of pre-Flood animals and plants, and the associated tectono-sedimentary environments.

I digress slightly here to make two points before proceeding. One third of all fossil families span three or more of the geologic periods and only one third of all fossil families are restricted to just one period, while a small percentage of families cross all or most of the periods—e.g., 14 percent of Ordovician fossil families are also found in Tertiary deposits. This contrast between geologic period overlap and the restriction to just one period separation must be explained. Uniformitarian geology does not account for it.

While the creationist has to account for stratigraphic differentiation, the uniformitarian must make use of special pleading when using some fossils as time markers (index fossils), but not the majority which span large portions of the column. We recall that so-called long-ranging fossils are useless as time markers for the uniformitarian. If he finds a fossil type which is commonly located both well above and below that particular level also, he must obviously dismiss it as having no time value. The diluvialist faces no such dichotomy in this regard because time has no significance nor has the fossil separation. He only has to find a suitable mechanism to account for the separation.

In examining the Woodmorappe TAB concept, we must remember the two principles, stratigraphic overlap and nonsuperposition of the index fossils. Woodmorappe gives an example of how deterministic factors such as differential escape could have an effect on the indeterministic factor of chance, previously explained. Let us suppose that when in the same geographical area, fossil S has a 70 percent chance of being buried later than fossil N due to sorting or escape capabilities. Because S and N so rarely coexist, this enables the 30 percent tendency of N/S never to occur by chance (Figure 5, Case 1). In Case 2 the 30 percent situation does occur where N/S but in this case they are not regarded as index fossils relative to each other because they are perceived as long-ranging and overlapping forms and there is no time significance. Now the sorting and escape factors in Case 2 cause a burial bias where fossil P is buried before S, say 80 percent of the time, the same bias having been thwarted by the 20 percent chance in Case 1. Thus we see that factors like sorting and escape need not be excessively efficient to generate fossil differentiation.

(iii) Ecological zonation

Woodmorappe believes that another factor is of more importance in fossil separation than sorting; ecologic zonation. For instance in Figure 5, Case 1, fossil N occupied a lower habitat than S. The combination of S/N would then occur if say N was benthic (bottom dwelling) while S was say a pelagic (open ocean) form; or, if N was either benthic or pelagic while S was planktonic or free floating; or again, if N lived on low ground while S dwelt on high ground. Because S and N rarely coexist geographically, ecological zonation only needs to work consistently several times for a S/N stratigraphic relationship to be established.

It would be unusual but not impossible to have benthic forms buried directly beneath a pelagic, low ground or high ground form; all would depend on the tectonics of the area and the flows of the sedimentary material, thus the incompatibility factor. Woodmorappe considers that this zonation played a major role in total biostratigraphic differentiation but it would also cause this type of biotal incompatibility within any geologic period. We know that facies fossils are not generally used as index fossils because they are restricted to a particular lithology and therefore would be misleading, yet in some cases these units do have great stratigraphic significance.

The true graptolites, for example, especially those of the Lower Paleozoic, are apparently very rarely found as fossils in limestone (Woodmorappe, 1983, p. 154). They occur in large quantities in other types of sedimentary rocks such as black shales and chert, and appear to have been restricted to what are called graptolite zones, with each 'zone' characterized by the presence of a particular species which were adapted to life at specific marine levels—so it is believed. One would expect that being open sea organisms, they would be very common in limestone. Therefore they obviously were ecologically controlled and may have little significance as index fossils. In view of this ecological dependence of such important and widely used index fossils, there is no reason why the role of zonation cannot be extended beyond faunal differences within alleged time-horizons, to differences between geologic periods.

(iv) Divisions between eras, a new way for geology?—The stratigraphic column

Assuming for argument's sake that the broad geologic column really exists, we can see that as far as fossil-bearing rocks are concerned, the Phanerozoic breaks rather naturally into four segments: the Lower Paleozoic, the Upper Paleozoic, the Mesozoic, and the Cenozoic eras. Woodmorappe's concept for biostratigraphic differentiation is based on the fact that sedimentation from the Cambrian to the Tertiary has been strongly influenced by tectonic activity and also on the fact that fossils are not only ecologically zoned but biogeographically zoned also. If all these factors can be linked together then biogeographic provinces could be superposed consistently, thus resulting in the stratigraphic separation we undoubtedly see in the rocks.

Woodmorappe found a major trend of changes in tectonic activity as one moves stratigraphically upward in the Phanerozoic layers, and this trend could well be independent evidence supporting his TAB concept. Before examining this trend, Woodmorappe considers the role of biogeography in the fossil record. It is pointed out that many factors cause biogeographic zonation and such zones are not necessarily large in area. The Tuvaella brachiopod fauna is a distinctive Silurian biogeographic zone and is restricted to only Mongolia and closely adjacent parts. Fossil organisms of all geologic periods are divided into paleobiogeographic provinces. The uniformitarian will note for example that Ordovician trilobites differ markedly in different global deposits and he will ascribe these differences to paleobiogeographic provinces such as the bathyurid province and the remopleuridid province. At the same time, the differences between trilobites from so-called Ordovician and Silurian deposits are ascribed to evolution and geologic time. Why should this be so?

Creationists, on the other hand, can reject this dualism and ascribe these differences between and within periods to biostratigraphic processes. As there is considerable differentiation within geologic periods, there is nothing to prevent us from postulating the same basic processes to account for faunal differences between periods. There is a difference between ecological zones and biogeographic zones or faunal provinces. The latter however, may be ecologically controlled and the definitions strictly speaking may overlap.

First, the term ecological zonation refers to organisms that are mutually proximate but do not live together because they occupy different habitats or have different environmental tolerances; second, biogeographic zonation refers to organisms that are geographically separated, irrespective of whether or not they occupy the same ecological niche. The term biome could apply to organisms that are both ecologically different, such as those possessing different climatic tolerances, and biogeographically zoned. When organisms are members of the same ecological niche but geographically zoned, then they could live together were it not for their geographical separation and any geographic barriers which enforce that separation.

In summary it can be seen that the preciseness of the standard geologic column must be considered as quite doubtful. When other processes such as ecological zonation and the TAB concept are taken into consideration, a new way of looking at geology arises, in which Diluviology can provide many answers to the present problems.

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PANORAMA NOTES

Catastrophism — Dam Breaching in the Rocky Mountains

Introduction

I had the pleasure of visiting Rocky Mountain National Park in September, 1992. When traveling eastward on the Trail Ridge Road, I stopped at Rainbow Curve Overlook (elevation, 10,829 ft.). While viewing the spectacular scenery, I was surprised to see an alluvial fan in the valley below (Figure 1). As Osterwald (1989, p. 118) explained:

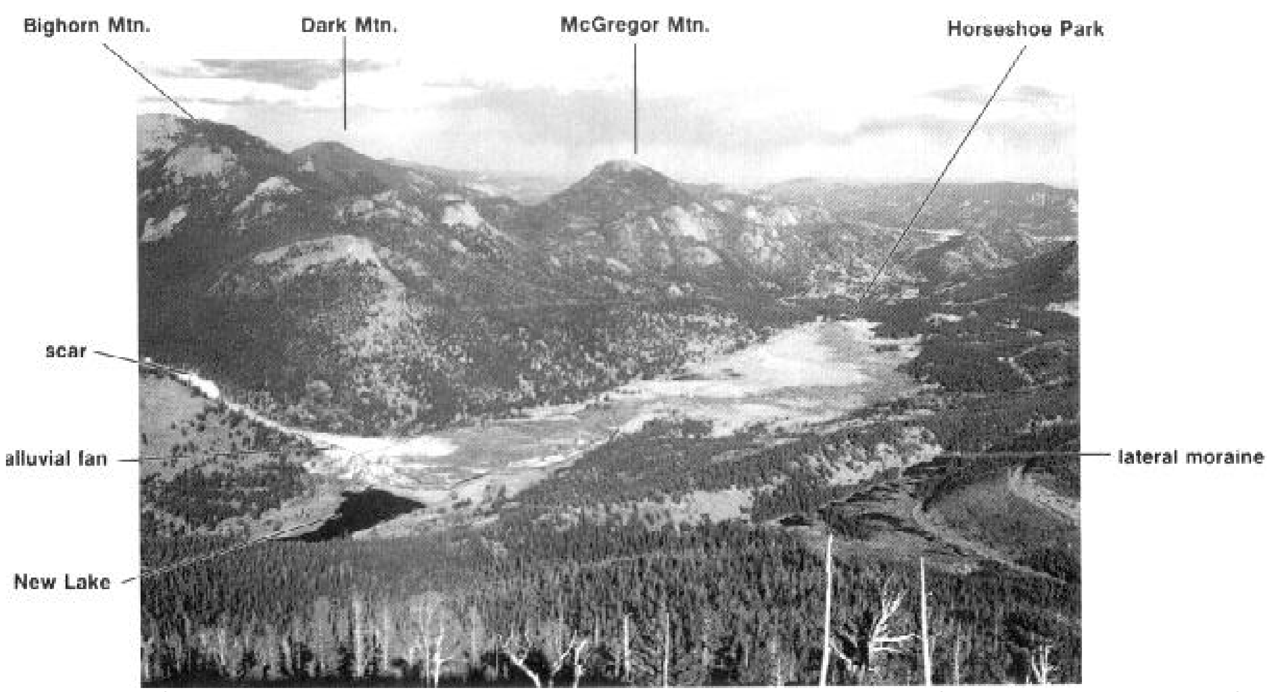

Figure 1. Looking east from Rainbow Curve Overlook, Rocky Mountain National Park, scar and alluvial fan can be seen on the lower left of the photograph.

> The scar and alluvial fan, deposited *almost instantly* on July 15, 1982 when Lawn Lake dam failed, are on the northern side of Horseshoe Park valley . . . (Emphasis added).

Later she stated (p. 151) that:

> Lawn Lake Dam failed because water seeping through the earth fill around the outlet pipe . . . began washing away fine-grained material from the body of the dam, creating a channel through which water, mud and rocks eventually poured.

This dam failure was caused by a mechanism similar to piping as the lake water made a path through the dam, not overtopping it. Austin (1991) postulated the failure of natural dams on the Colorado Plateau after the Flood as a means of providing surging waters which formed several canyons including the Grand Canyon. His proposed mechanism of dam failure is piping (pp. 69-91). Also see Williams, et al., 1991; 1992a; 1992b; Oard, 1993.

History

Osterwald (1989, p. 150) briefly discussed the history of the catastrophe.

> Lawn Lake, a natural lake, was enlarged in 1903 to hold irrigation water for farmland on the Plains. When the dam failed, a wall of water 25 ft. to 30 ft. high rushed down Roaring River. . . . Large trees and huge glacially-rounded boulders in the path of the flood were washed away. The debris was dumped along the steep slope and against the lower side of Horseshoe Park when the flood water slowed as it reached the flat valley floor. Rubble and debris in the alluvial fan is as much as 44 ft. deep. Huge boulders, weighing up to 452 tons, were carried several miles down Roaring River before they were deposited in the fan. Finer-grained sand, silt and soil were carried outward from the fan and deposited on the floor of Horseshoe Park.

In a sign placed by the National Park Service at the alluvial fan, the power of moving water in relation to this event is graphically portrayed. Some of the description is quoted:

> Some 300,000,000 gallons of water smashed down the five mile length of Roaring River. The water snapped trees like matches, tossed boulders like playthings, and filled the air with its awful roar.
>
> For several fearful hours the water tore at deposits of glacial debris, then disgorged its chaotic load onto the floor of Horseshoe Park.

The town of Estes Park, CO suffered greater than $26 million property damage and the National Park about $5 million because of the flood resulting from

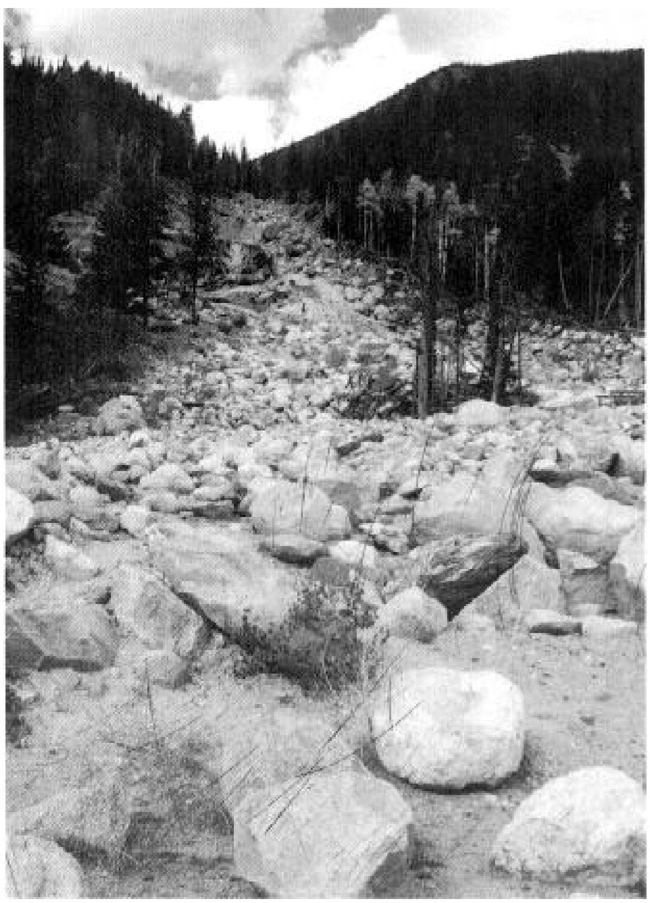

Figure 2 a. Looking up along scar from the alluvial fan, the size of the boulders can be determined if you note the size of the hikers in the center of the photograph.

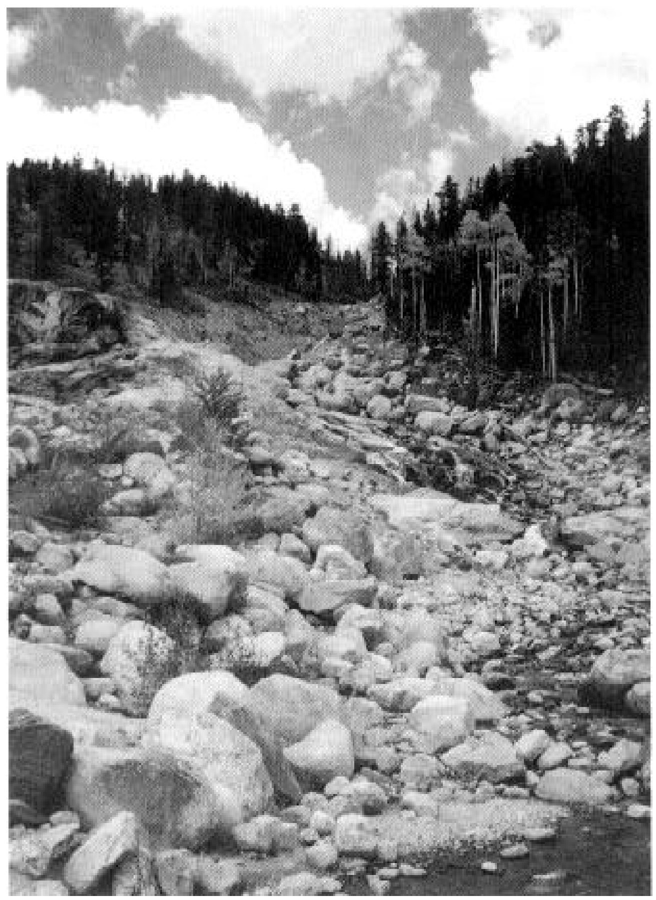

Figure 2 b. Another view of the scar and the present size of Roaring River (September, 1992). It can be seen that the wall of water in 1982 cut into glacial debris forming the scar.

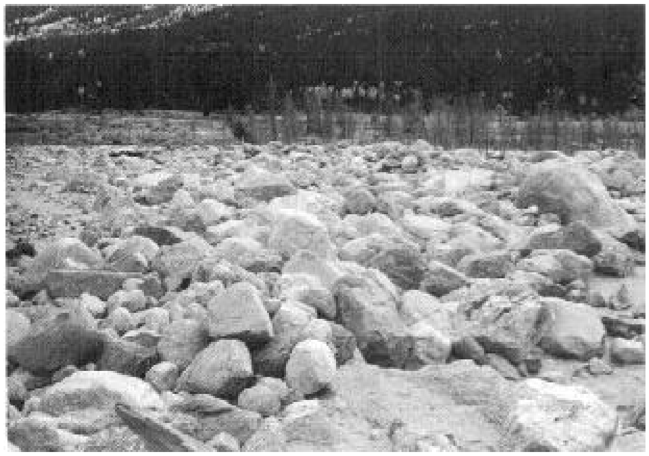

Figure 3 a. Boulders in the alluvial fan; size of boulders can be estimated by the automobile in the upper left of the photograph.

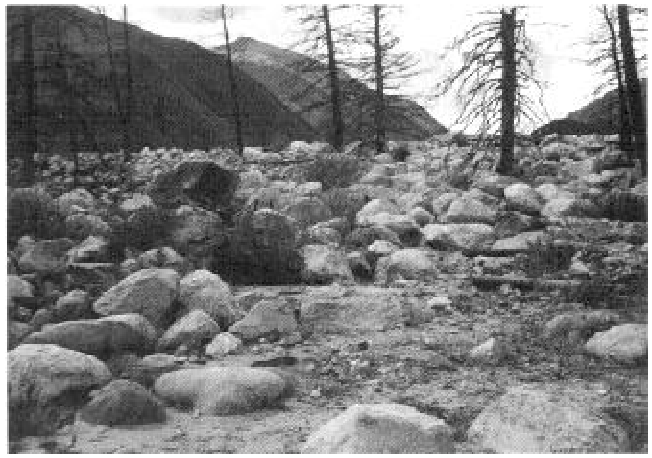

Figure 3 b. Another view of boulder field in the alluvial fan; note the dead trees still standing in the alluvial fan.

the breached dam. Lawn Lake was at an elevation of 10,987 ft. The town of Estes Park is at an elevation of about 7,589 ft. Unimpeded water could have struck the town at speeds of up to 468 ft/s if all of its potential energy were converted into kinetic energy. Likely the speed of the water was less than this maximum possible flow rate but it gives an idea as to how much force could be involved in such rapidly moving water. The damage potential is enormous.

Resulting Alluvial Fan

The elevation of the alluvial fan where the wall of water dumped much of its debris is 8560 ft. Maximum water speeds from the failed dam may have been in the range of possibly 100 ft/s.* The force of high-speed water containing massive boulders and abrasive particles is capable of considerable scour and gross erosion as well as rapid deposition where the water drops its debris load. The National Park Service did not remove the deposited boulders, sand, and other debris. Figures 2-4 taken in 1992 show some of the existing deposits in the alluvial fan at Horseshoe Park.

Figure 4 a. As large boulders were dumped first when the wall of water struck Horseshoe Park in 1982, when you move further away from the scar, the size of the boulders decreases in the alluvial fan.

*Unimpeded water could have rammed into this area at speeds up to 395 ft/s if all of its potential energy were converted into kinetic energy.

Formation of a Lake

Some of the flood deposit in the alluvial fan dammed Fall River forming a small lake (Figures 1 and 5). Trout and beaver populations quickly established themselves in the new pond. Eventually this dam likely will be breached and the lake emptied.

Catastrophist Implications

Dam breaching appears to be a common occurrence in earth history (Costa and Schuster, 1988) often resulting in catastrophic consequences. Steve Austin's postulation of dam breaching on the Colorado Plateau is quite reasonable. The Lawn Lake dam breaching episode can be used as a small-scale model of the postulated events proposed by Austin. Rapid erosion and deposition is possible. Flowing water, particularly when moving from higher to lower elevations, is capable of vast erosion damage. Moving boulders and abrasive matter can scour large areas of land quickly.

Deposits such as the alluvial fan in Horseshoe Park, but of greater magnitude, could block existing river flow creating another dam which could fail later. Also

Figure 4 b. Note transported section of tree had bark and roots removed by water and abrasive matter. If all of the trees had been buried in a silica-rich debris, many standing and transported dead trees could have been silicified and subsequent study would have revealed both autochthonous and allochthonous origins for the resulting silicified stumps. See Williams (1993).

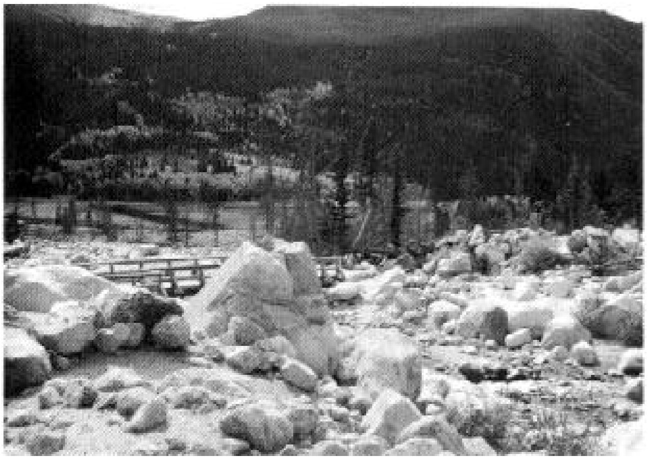

Figure 5. A view of the new lake created by the debris from the Lawn Lake dam breaching episode that blocked the flow of Fall River.

many post-Flood dams, created by landslides in unconsolidated strata during times of tectonic activity. could have been breached after their formation releasing water and abrasive sediments that would scour the landscape, forming many canyons. Then the matter eroded from these canyons could have formed other dams upon deposition across lower elevation rivers with the same results to follow.

These speculations offer a possible model for rapid post-Flood canyon formation and dam formation with breaching events occurring in a chain reaction sequence as time passes. The damage potential would decrease toward the end of the postulated sequence as the amount of water available becomes less and less because of decreasing precipitation and the consolidation of Flood sediments which would increase the resistance to erosion. This is offered only as one means of rapid post-Flood canyon formation.

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The author is a geologist and her husband (Ph.D. in geology) wrote the geology section (pp. 223-250) in this book. This is one of the finest books I have ever seen on the geology, biology and history of a National Park. This beautifully-illustrated book can be obtained from the Rocky Mountain Nature Association, Rocky Mountain National Park.

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Emmett L. Williams*

*5093 Williamsport Drive, Norcross, GA 30092.

Antarctic Glacial Chronology and Biostratigraphy in a Muddle

Although the West Antarctic ice sheet is claimed by some to be unstable, the East Antarctic ice sheet is said to have existed in its general configuration for about the last 14 million years of geological time. However, this view of the East Antarctic ice sheet has been under challenge for the past 10 years. The controversy started when many types of microfossils from the Cretaceous to the Pliocene Periods of geological time were found mixed together in the Sirius Formation on the Transantarctic Mountains (Harwood, 1983, 1985; Webb et al., 1983, 1984). *Nothofagus* (southern beech) leaves and pollen, suggesting a cool temperate climate like in southern South America, are also found in the formation (Sugden, 1992). The Sirius Formation appears to be a glacial till high on the mountains. The fossils were found as high as 2500 meters throughout a 1300 kilometer stretch of the Transantarctic Mountains.

The Pliocene marine diatoms are the most disconcerting because they imply either: 1) the Transantarctic Mountains rose as much as 3000 meters in the last three million years, or 2) the East Antarctic ice sheet was small in Pliocene time. The authors favor the second suggestion, in which case a marine seaway crossed Antarctica along the east flank of the Transantarctic Mountains. Then sometime in late Pliocene time, the East Antarctic ice sheet grew larger than its present dimensions, scooped the marine fossils out of the seaway, and then lifted them up and over the Transantarctic Mountains. Late Pliocene diatoms are also found below Ice Stream B that flows from the West Antarctic ice sheet, suggesting there was no West Antarctic ice sheet at that time either (Monastersky, 1993).

A greatly diminished East Antarctic ice sheet with a marine seaway through the continent poses a great difficulty for evolutionary scientists. It throws the evolutionary glacial chronology of Antarctica in disarray. The results also indicate that geochronology and biostratigraphy are arbitrary. The reason for this latter assertion is because many pieces of evidence have shown that the East Antarctic ice sheet has changed little in 14 million years of evolutionary time. For instance, geomorphological arguments indicate prolonged polar conditions that are incompatible with temperate forests during Pliocene time (Sugden, 1992). Some of these arguments are based on dating of volcanic ash up to 14 million years old (Sugden, 1992). A second line of argument comes from deep-sea cores off Antarctica that are dated by biostratigraphy, oxygen isotopes, and other methods. A third line of reasoning, suggesting long-term stability, is glaciological modelling that indicates a temperature rise of 20 to 25°C would be necessary to remove the ice from the interior of East Antarctica (Sugden, 1992). Furthermore, a warming of 5°C would likely cause more precipitation and a larger ice sheet. So, a slightly warmer Pliocene Period should have caused a thicker ice sheet, not a greatly diminished ice sheet.

The best way out of the dilemma is to simply redate the Miocene and Pliocene microfossils in the Sirius Formation. These ages were determined by biostratigraphic methods, but were questioned by some investigators. However, the Pliocene diatoms have recently been found associated with a volcanic ash in a deep-sea core in Ferrar Fjord, East Antarctica (Barrett et al., 1992). The ash was dated by the K-Ar and $^{40}Ar/^{39}Ar$ methods at about three million years old. The Pliocene age of some of the diatoms in the Sirius Formation is considered solid. Thus, there is a serious geochronological and biostratigraphic contradiction.

Furthermore, Barrett et al. (1992) indicate the new date of three million years for the volcanic ash associated with the diatoms was obtained by a roundabout and questionable method. First, the K-Ar ages of the bulk volcanic ash were found to vary from 12 to 23 million years old. This suggested "contamination" by old feldspar from basement detritus (i.e. the assumed age was not obtained on the first try). Sure enough, by separating various grains in the ash, plus other manipulations, the authors determined that a volcanic endmember with an age of three million years old had mixed with a basement endmember of 445 million years old.

This example of manipulation of supposedly solid biostratigraphic and radiometric ages is similar to the dating of the east African KBS Tuff reported by Lubenow (1992, pp. 247-266). In the latter case "firm" dates from several different dating methods agreed with each other, only to be radically changed because the results contradicted ideas about early man. I do not believe the dating problems reported here and by Lubenow (1992) are unique.

As far as the creationist interpretation of the fossils in the Sirius Formation is concerned, these could easily be Flood deposits raised high at the end of the Flood during mountain building. Glaciation of the Transantarctic Mountains at the beginning of the post-Flood period would then simply erode and redeposit the material as glacial till. As ice accumulated rapidly on Antarctica, the focus of glaciation shifted from the mountains to the lowlands. Eventually the ice melted on the Transantarctic Mountains.

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Michael J. Oard*

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

Functional External Ear Muscles

In William Paley's remarkable work *Natural Theology* (Paley, 1986), he quotes from the *Philosophical Transactions* of the year 1800 concerning the acquisition of function of the external ear muscles in an individual who had lost the use of his membrana tympani. He states that

> . . . the use here assigned to that membrane, of modifying the impressions of sound by change of tension, was attempted to be supplied by straining the muscles of the outward ear. The external ear had acquired a distinct motion upward and backward, which was observable whenever the patient listened to any thing which he did not distinctly hear: when he was addressed in a whisper, the ear was seen immediately to move; when the tone of voice was louder, it then remained altogether motionless (p. 48).

We may have here an example of latent potential utility manifested in response to need, rather than an example of a vestigial organ.*

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John Kaplan**

*Also see *"Vestigial Organs" Are Fully Functional,* a title published by Creation Research Society Books.

**327 Prospect St., Pawtucket, RI 02860.

Reprinted *CRSQ* Volume 13

Introduction

The *Creation Research Society Quarterly* has been published since 1964 (29 complete volumes). In an effort to make these volumes available, all of the missing issues have been reprinted. Brief synopses have been written on volumes 1-12 and have appeared in the previous 12 quarterlies. In each synopsis, major articles are reviewed to give a person interested in scientific creationism a general idea of the contents of that volume. Many of the articles are of continuing interest and value.

Dendrochronology

Sorensen's brief article (1976, pp. 5-6) offered several problems with using the rings of bristlecone pines as a dating method. He stated that "the ring width patterns in bristlecone pines are not sufficiently distinctive" and at that time the chronology was "The work of one laboratory, the director of which has refused to allow the critical study of the raw data" (p. 5). Wiant (1977, pp. 206-207) noted that in dendrochronology:

> Double, multiple or false rings may occur when suitable growth periods are interrupted by droughts, defoliation by insects or late frosts or other unusual conditions.

Radioactive Decay

DeYoung (1976, pp. 38-41) discussed the precision of nuclear decay rates and what influences can cause a change in the rates. He questioned if decay rates are always exponential. In a mathematical study of radiocarbon dating, Hanson (1976, pp. 50-55) named several problems inherent in the method. They are as follows:

1. Numerical sensitivity of the computed age on the decay measurement
2. Improper constitutive equations
3. Prejudical calibration of the relation of historical and radiocarbon ages
4. Failure to set the initial conditions in the light of the present specific productivity and specific activity.

Astronomy and Weather

Velikovsky's catastrophic theory of the solar system was critiqued and modified by Keister (1976, pp. 6-12). His frank appraisal considered gravitational forces as well as electromagnetic effects. Thompson (1976, pp. 82-86) developed a catastrophic model for the origin of the asteroids and the rings of Saturn. He considered that his model was superior to that of nebular condensation. Many of the assumptions of the model for the pre-Flood earth vapor canopy were questioned by Kofahl (1977, pp. 202-206). He suggested some guidelines to follow when developing any canopy model.

Education

In his usual thorough manner, John Moore wrote concerning a university course on origins (1976, pp. 46-49). He presented a tentative outline for a creationist position. Rodabaugh (1977, pp. 183-184) discussed audience response on whether the creation model should be taught along with the evolution model in schools.

Fleeming Jenkin's critique of *Origin of Species* was reprinted to show that his points still have not been countered by evolutionists (Siegler, 1976, pp. 111-114). Davidheiser (1976, pp. 115-116) briefly explored some of Darwin's mistakes, particularly in the area of variation.

Chemistry

Larry Helmick (1976, pp. 14-22) considered amino acid racemization in marine sediments. He developed a teleological model for the data based on a recent creation, degeneration, world-wide Flood and a young earth. This interesting article deserves serious study. Brine mixing was the subject of a research report by Wilcox and Davidson (1976, pp. 87-89). This area is of interest because of the possible rapid formation of so-called fossil reefs.

Geology

Another research report (Williams and Herdklotz, 1977, pp. 192-199) presented conditions under which cave-like calcium carbonate formations could form rapidly. A tentative model was offered for:

1. The rapid deposition of limestone
2. The rapid formation of caves in limestone
3. The rapid deposition of stalactites and stalagmites.

Several areas were investigated to form a core of evidence to support the model. Cox (1976, pp. 155-161) offered a mechanism he labeled rock disintegration for the formation of caves.

Cox (1976, pp. 25-34) challenged the present theory of glaciation. In discussing the zonation theory, Burdick (1976, pp. 37-38) claimed that the so-called geological column does not exist. Honeyman (1976, pp. 58-62) postulated that Mt. Ararat erupted and was formed under water. Also he reasoned that the continents are sinking. His model is based on what might have occurred during and after the Flood. The elliptical formation in the Tendurek Mountains in Turkey, shaped like the hull of a ship, was studied by Shea (1976, pp. 90-95) and Burdick (1976, pp. 96-98). The so-called Heart Mountain thrust fault was examined by Burdick. He (1976, pp. 207-211) carefully offered evidence for a normal or vertical fault rather than a thrust fault.

Fossil Record and Transitional Forms

Morrell (1976, pp. 56-58) showed that the evidence for the evolutionary hypothesis, particularly for supposed transitional forms, is lacking. The "fact of evolution," as referred to by the popular press, is actually propaganda. In the same vein Moore (1976, pp. 110-111) documented the absence of transitional forms in the fossil record. Rodabaugh (1976, pp. 116-119) performed a probability study on transitional forms and concluded ". . . if transitional forms ever occurred they were exceedingly rare" (p. 119). Lubenow (1977, pp. 185-190, 230) discussed reversals in the fossil record. This problem makes attempts to resolve the order of strata by supposed evolutionary changes in fossils very questionable.

Biology

Zoology

The symmetry of eggs laid by the Mourning Cloak butterfly was viewed from a design perspective by Keithley (1976, pp. 13-14). Human population growth studies were presented by Holroyd (1976, pp. 63-65) and Rodabaugh (1976, p. 65). Both men developed their data employing a young-earth model. The prey-predator relationship was realistically examined by Smith (1976, pp. 79-81). He questioned the evolutionary assumption that predation eliminates inferior prey. Much evidence to the contrary was offered by the author. Hamby (1976, pp. 106-107) briefly noted some recent research on the effects of varying magnetic fields on living organisms. He suggested that a higher earth magnetic field strength in the past could be correlated with greater lifespans. Kaufmann (1977, pp. 214-216) wrote on the phylogenetic development of adipose tissue in animals. His observations were opposed to a macroevolutionary model of improving quantity and quality of tissue with "evolutionary advancement."

Abortion

Quarterly writers, [Liley (1976, pp. 98-103); Nicholas and Howe (1976, pp. 103-105)] objected scientifically to the propaganda concerning the "foetus." The unborn child is human from the *moment* of conception. The horror thrust on our society by a pseudoscientific media and spiritually blind judges staggers the imagination.

Natural Processes

A creation model for natural processes based on a physical science foundation was offered by Williams (1976, pp. 34-37). Observable processes are either conservation or degeneration. Improvement (macroevolutionary) processes are neither observable nor possible. Natural selection and survival were discussed within the framework of the model. Tinkle (1976, pp. 131-133) outlined artificial and natural selection and noted Darwin's faulty logic on the subject.

Archaeology

von Fange (1976, pp. 133-149) exhaustively examined the use of metals by ancient man. He suggested that such divisions as stone, bronze and iron ages are an oversimplification and possibly erroneous. Seaman (1976, pp. 150-154) provocatively asked "Who came before Columbus?" He postulated world-wide travel very soon after the dispersion at Babel.

General

Howard Holroyd (1976, pp. 42-43) argued against rigid deterministic factors in nature, whereas Tinkle (1976, pp. 44-46) explained the value of scientific laws. Both men offered comments within a creationist framework. Armstrong (1976, pp. 108-110) discussed theistic evolution and offered objections to the concept. Considering the fields of the origin of life, mutations, natural selection, absence of transitional forms, stratigraphic position of fossils and supposed ancestors of mankind, Haines (1976, pp. 162-171) questioned the macroevolutionary hypothesis. Worrad (1977, pp. 199-201) offered evidence that the premise of uniformitarianism does not work. Ingram (1977, pp. 211-214) discussed the importance of creation in the Christian message. This mammoth volume of the Quarterly also contained 40 notes as well as many book reviews and letters to the editor.

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Quote

The dominion over nature that God has assigned to man (Gen. 1:26; Ps. 8:6) entails human sensitivity to the Creator's moral and spiritual purposes for our planet. It is this biblical emphasis on human dominion that secular theories have unjustifiably blamed at times for the plunder and exploitation of natural resources. Christians may indeed not always have fully implemented ecological responsibilities but they have at least identified the moral framework that objectively motivates conscience and action. Naturalistic morality on the other hand can neither summon nor vindicate fixed ethical principles of any kind. If *homo sapiens* is essentially but an animal he can hardly be expected to subordinate self-interest to the good of the community. For that reason, even as Christians have brought to the *ad hoc* concern of secular nature-lovers a depth and permanence of protest against cosmic pollution that mere humanism cannot sustain, so now they must also speak up against the littering of outer space by satellite and missile debris.

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