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THE BIBLE AND PALEONTOLOGY

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My Perspective. When dealing with a topic subject to as much controversy and interpretation as is this, I think it is appropriate for me to set forth my own presuppositions at the outset. This I will briefly do. While in college, I became convinced of my need of Christ, and committed my life to him, joining the Seventh-day Adventist fellowship because of my desire to follow Truth wherever it led. It seemed very clear to me at that time, and remains so to this day, that the Bible was intentionally teaching us lessons that we could not learn on our own. While I believed rational processes were essential to the establishment of a life philosophy, I recognized they would not be sufficient.

Belief in a literal Divine Creation event in the recent past is a given part of my philosophy. I do not need scientific evidence to support that position, but expect that, rightly understood, all scientific data will ultimately make sense within that framework. Thus, it is not my goal in doing science, to "prove" there was a global flood, or that creation was a literal event a few thousand years in the past. These are givens. Rather I expect that, taking advantage of these unique perspectives on science, I and others so equipped, will be advantaged in the insights we may have when viewing problems in the arena of science.

There are many unanswered questions about what, how and when in the natural world. For scientists, having more questions than answers is not at all unpleasant. After all, science is about answering questions from the natural world, and what could be better than to be surrounded by unanswered and challenging questions. I also understand that not everyone shares this perspective. In the paper that follows, I will attempt to lay out some of what we do know, what we can know, what we do not know, and perhaps what we cannot know from the Bible and Paleontology, about the history of life on the earth.

What is Paleontology? Paleontology is the scientific investigation of the past history of life on earth through the study of fossil remains of animals and plants. This discipline is of considerable interest to the Christian community because it concerns itself with interpreting past history and particularly the past history of life on the earth. Paleontology as a profession has occasioned fear or distrust among Christians because many of the conclusions reached by paleontologists are considered a threat to the integrity of the Bible, and particularly to the biblical account of origins. Thus the title of this paper might be taken to suggest a certain tension between the two subjects, as if paleontology and the Bible were somehow in contradistinction to one another. I am going to propose that this attitude is an unhealthy one that cannot be entertained by those who hold a holistic view of revelation.

The Bible as a Record of Life on Earth.

What the Bible Says. Our purposeful concern is the relationship between the revelation in Scripture and the revelation in the historical record of life on earth. Let us begin with an excursion into the Bible. What can we learn about the history of life on earth from Scripture?

It turns out that we can learn a great deal. While the Bible says virtually nothing about fossils directly, it tells us explicitly where living forms came from, and insofar as chronological connections are sustained, tells us when as well. We shall examine this source because it forms the foundation and framework upon which everything else will be fastened.

The Genesis account describes the world prior to Creation Week as dark and covered with water (Gen. 1:2). This absence of light precludes the existence of life as we know it, since without light, there can be no plants, and plants form the base of the food pyramid. A world covered with water also precludes the existence of life forms not suited for survival in water. Taken together, these two phrases strongly suggest a lifeless world. When God began the creation of life forms on day three with plants, and days five and six with animals of the waters, land and sky, He left no domain of living forms empty. Whatever may have transpired on the planet prior to the beginning of Creation Week, it could not have involved the life and death of myriads of life forms. There were none. God lays claim in the initial chapter of the Bible, and repeatedly throughout Scripture, to all life forms. At the time of Noah, God asserts: "And the Lord said, I will destroy man whom I have created from the face of the earth; both man, and beast, and the creeping thing, and the fowls of the air; for it repenteth me that I have made them" (Gen. 6:7). John implicitly seconds this assertion in John 1:3: "All things were made by him; and without him was not any thing made that was made." This would give Him sovereignty over the life forms represented by fossils as well.

Fossils Originate with Death. When God created life, an entirely different order of interrelationships existed between the organisms of His creation. What was such a world like? Today we have no frame of reference for such a world. We can no more visualize a world without death, than Adam in his unfallen state could have visualized a world with death. Conditions in the Garden of Eden, and presumably on the earth at large prior to the entry of sin, can perhaps be faintly reconstructed by reference to the New Earth. We are told that in Eden restored ,

> "The wolf also shall dwell with the lamb, and the leopard shall lie down with the kid; and the calf and the young lion and the fatling together; and a little child shall lead them. And the cow and the bear shall feed; their young ones shall lie down together: and the lion shall eat straw like the ox." Isaiah 11:6,7.

Again, describing the New Earth, Isaiah records:

> "And they shall build houses, and inhabit *them*; and they shall plant vineyards, and eat the fruit of them. They shall not build, and another inhabit; they shall not plant, and another eat: for as the days of a tree *are* the days of my people, and mine elect shall long enjoy the work of their hands. They shall not labour in vain, nor bring forth for trouble; for they *are* the seed of the blessed of the LORD, and their offspring with them. And it shall come to pass, that before they call, I will answer; and while they are yet speaking, I will hear. The wolf and the lamb shall feed together, and the lion shall eat straw like the bullock: and dust *shall be* the serpent's meat. They shall not hurt nor destroy in all my holy mountain, saith the LORD." Isaiah 65:21-25

And in Revelation, John writes:

> "And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain: for the former things are passed away" Rev. 21:4.

It is difficult for us to know today what level of death has significance in God's plan. Did the change affect only mammals, or vertebrates? What did the anteaters eat? What about plants? What about bacteria? Ignorance feeds on speculation. Our inability to explain, describe or understand how such a system could exist has been considered by some as evidence that it did not exist, and that death is a part of the "natural order." But it is as useless for us today to attempt to understand how such an order might prevail as it is for us to attempt to understand the process by which God brought life into existence in the first place. We have no points of reference for such a world. Our inability to describe or understand such a system ought to be recognized for what it is: a limitation of our knowledge and understanding. It is, of course, more satisfying and self-serving to assert that such a system could not have existed, than it is to admit the failing is ours. The details will have to await new revelation or our return to Eden.

Whatever the order in such an Edenic world, with the entry of sin, it came to an end, and death swiftly followed. God Himself took the lives of precious animals to provide Adam and Eve with clothing that must have served as constant reminders both of the consequences of their choices, and of their need of a Savior. With sin came death (Gen. 2:17, Romans 6:23). Paul well describes the entry of death as the natural consequence of disobedience in Romans 5:12: "Wherefore, as by one man sin entered into the world, and death by sin; and so death passed upon all men, for that all have sinned." In Romans 8:22, he states: "For we know that the whole creation groaneth and travaileth in pain together until now." With death came the possibility of fossilization, the preservation of the remains of previously living organisms. And with fossilization comes paleontology.

The Record of Death. Since paleontology is about death, we will look at that aspect of the history of life on earth. The earth's crust contains in excess of 20 trillion tons of organic matter stored as coal and oil and dispersed carbon. There are additional trillions of tons of debris from inorganic constituents of fossils, such as shells, bones and other forms. There is a strong probability that at least a significant part of this material was produced in connection with Creation Week. For example, did God create coral reefs, or just coral polyps without a home? Was there organic matter in the soil or was it composed entirely of inorganic constituents? It should be noted that without a source of calcium carbonate, the oceans would likely not have been suitable for the growth of many marine invertebrates. Marine aquariums require a substrate of ground coral or seashells for a healthy environment. In any case, a large part of the fossil material represents the remains of organisms once alive on the earth, and we have in the paleontological record evidence of massive destruction of living forms. Later we shall look in detail at the organization of these fossil remains. But first, what can we understand about this massive record of death from the Biblical history? We have already seen that death followed sin. Sin was in all probability an early affliction of the earth. Adam and Eve had not yet procreated, something they were explicitly commanded to

do in Gen. 1:28. This gives us a period of history of a couple of thousand years, between the inception of death and the catastrophic global flood considered below. During this time, the **antediluvial period**, death of animal forms was apparently an increasingly frequent and violent occurrence among all the categories of organisms, including man. In looking over the results of sin just prior to the Flood of Noah, God "...saw that the wickedness of man *was* great in the earth, and *that* every imagination of the thoughts of his heart was only evil continually." (Gen. 6:5).

Even more graphic and inclusive is the language in subsequent verses:

> "The earth also was corrupt before God, and the earth was filled with violence. And God looked upon the earth, and, behold, it was corrupt; for all flesh had corrupted his way upon the earth. "And God said unto Noah,' The end of all flesh is come before me; for the earth is filled with violence through them'" (Gen. 6:11-13)

There must have been massive death and destruction not only of men, but of every form of animal life as a result of the spread of sin over the earth. Death and destruction are the fodder of paleontology, and we have evidence that the remains of life forms must have accumulated on the earth prior to the destruction of the earth's surface by the flood. Whether these forms were actually buried prior to the flood is a subject we can speculate on at length. By the time the flood was ended, those that remained were buried and at least in part, preserved. But the death and destruction wrought on the preflood world cannot be compared with what happened as a result of the flood itself (the **diluvial period**). We read (Gen. 6):

> "And the LORD said, 'I will destroy man whom I have created from the face of the earth; both man, and beast, and the creeping thing, and the fowls of the air; for it repenteth me that I have made them' (v.7).
> "And God said unto Noah, 'The end of all flesh is come before me; for the earth is filled with violence through them; and, behold, I will destroy them with the earth' " (v. 13).
> "'And, behold, I, even I, do bring a flood of waters upon the earth, to destroy all flesh, wherein *is* the breath of life, from under heaven; *and* every thing that *is* in the earth shall die '"(v.17).
> "And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man: All in whose nostrils *was* the breath of life, of all that *was* in the dry *land*, died. And every living substance was destroyed which was upon the face of the ground, both man, and cattle, and the creeping things, and the fowl of the heaven; and they were destroyed from the earth: and Noah only remained *alive*, and they that *were* with him in the ark" (v. 21-23)

The language is unmistakable. The flood was an enormous cataclysm that affected the whole earth. No local flood could do justice to this account, and such a suggestion is ludicrous, though often made by those who wish to preserve a flavor of historicity for the account in Genesis without sacrificing scientific orthodoxy. It is unclear why Noah and his sons would have spent 120 years building a boat for a local flood, or why the preservation of the animals in the ark was necessary for such a flood.

> "In the selfsame day entered Noah, and Shem, and Ham, and Japheth, the sons of Noah, and Noah's wife, and the three wives of his sons with them, into the ark; They, and every beast after his kind, and all the cattle after their kind, and every creeping thing that creepeth upon the earth after his kind, and every fowl after his kind, every bird of every sort. And they went in unto Noah into the ark, two and two of all flesh, wherein *is* the breath of life. And they that went in, went in male and female of all flesh, as God had commanded him: and the LORD shut him in." (Gen. 7:13-16)

In the account of the flood, we have a record of the death and burial of life forms on a global scale. This account will have a profound effect on what we do with the recorded history of animal life on the earth.

The third period during which animals and plants have died and been preserved as fossils is the period subsequent to the emergence of the Ark residents in the "Mountains of Ararat." This period will be referred to here as the **post-diluvial period**. Although the flood itself was over, the earth was by no means finished with the consequences of the flood, and for a period of hundreds to thousands of years following the landing of the Ark, life on the recovering earth must have been undergoing rapid proliferation and modification to accommodate to the new environments resulting from the catastrophe. These conditions, ideal for creating fossils, are also the conditions necessary for rapid speciation: low population densities, rapid migration, high reproductive rates and high rates of geologic change. Even today, we occasionally witness geologic catastrophes that produce fossilization of organisms on large and small scales. A widely cited example was the catastrophic eruption of Mt. St. Helens in Washington State in 1980. In this one catastrophe, millions of animals and plants were destroyed in a manner that will facilitate the preservation of some of them as post-diluvial fossils.

If our goal as scientists includes attempting to understand the past history of life on the earth, recognizing these three periods (antediluvial, diluvial and post-diluvial) and attempting to recover their bounds must be a high priority.

One of the approaches those who follow the Biblical model of origins could explore would be the construction of a model of the preflood world based upon what is known from Scripture and from the best understanding of the natural world in harmony with Scripture. The effort required for such a project to be viable would be staggering. Some of us have recently begun such a project, starting to probe the Cambrian, with the view of understanding what was probably the beginning of the Flood of Genesis. We are using patterns of sedimentary deposits to discriminate potential source areas for sediment and fossils, the pattern of fossil distributions to attempt to reconstruct the kind or number of habitats, and paleocurrent data to attempt to reconstruct flow patterns and to help trace backwards to source areas. It is apparent that such a monumental undertaking can only succeed as a well-funded joint effort among as many well-trained, dedicated individuals as possible. Of course the goal would be to better understand the circumstances that gave rise to the fossil record, within the context of Scripture, and to be able to explain some of the details hard to understand. We will return to this point later. For now, let us turn our attention to paleontology.

The Fossil Record

What are fossils? Fossils are any remains in rocks or sediment of previously existing organisms. These can range from carbon films in Precambrian rocks attributed to bacteria, to the giant skeletons of whole whales buried in deposits of diatomite, a rock itself composed of tiny fossil single-celled organisms. A fossil can be a cast of the external forms of a shell, for example or an internal mold of a cast, with the original organism completely gone. Fossils can result from replacement, a process that substitutes the original matrix of the organism atom by atom with minerals. Organisms can be impregnated with minerals, hardening the original animal or plant into rock. Fossils may also represent the hard parts of organisms essentially unaltered from their original chemistry, but encased in rock. In the case of bone, for example, fossilization involves the removal of the bone proteins, and recrystallization of the bone mineral into a slightly different form. Whatever the process, a record of the animal is left that can be retrieved by the paleontologist for study and interpretation.

Conditions for fossilization. Several conditions must be met in order to form a fossil from a dead organism. The first of these is burial. Most fossils must be buried within a short time after death in order for their body parts to be found together. When a paleontologist finds an assemblage of fossils, some fossils may exhibit decomposition and disarticulation, but often in the same depositional assemblage intact organisms, or even organisms that were buried alive are found. Taphonomic studies have determined the length of time required for organisms of various types to disarticulate. These times are strongly dependent on the conditions under which the remains are maintained. In a wet or humid environment, the flesh rots quickly and the bones or body parts are rapidly dispersed. If the organism is in an arid climate, the flesh may desiccate, cementing the bones together, and impeding dispersal for long periods of time. For fossil forms post-mortem conditions are rarely known with certainty and any conclusions we may reach with respect to the speed of burial must be drawn with caution. Generally, organisms that live in water will quickly disintegrate, unless burial in an environment conducive to preservation intervenes. Deposits that contain organisms that are intact or alive at burial demand rapid entombment and preservation and define a minimum for the rate of burial.

A second condition for many types of fossilization is the presence of a mineral-charged fluid in the pore spaces of the sediment. The type of mineral in the fluid and the composition of the fossil itself will determine what class of fossilization occurs.

A third condition for many types of fossilization is the application of a significant confining pressure, and in some cases, of elevated temperatures as well. There is much more to be learned about the process of fossilization, and it is an area of study with a promising future.

The Geologic Column. On the surface of the earth, sedimentary rocks are exposed in many places. Exploration for oil has revealed additional information regarding rocks below the earth's surface, and our knowledge about these rocks is considerable. Over the years, these sedimentary rocks have been systematized based upon the fossils they contain and the

relationship between layers. This systematic record is commonly referred to as the **geologic column**. When reference is being made to the distribution of fossils in the geologic column, the term **fossil record** is often used instead. Knowledge of the geologic column is invaluable in seeking to understand the past history of life on earth. An outline of its major features will help us as we proceed.

The suite of rocks present in the crust of the earth is conveniently divided into two major units on the basis of the fossil content of the beds. Those rocks containing animal fossils were assigned to the divisions of the Phanerozoic. The generally unfossiliferous rocks below this level were designated as Precambrian. The Phanerozoic is divided into three epochs. From lowest to highest, these are the Paleozoic, Mesozoic and Cenozoic. The Paleozoic is subdivided into six periods, from bottom to top, the Cambrian, Ordovician, Silurian, Devonian, Carboniferous (Mississippian and Pennsylvanian in the United States), and Permian. In Paleozoic rocks, the fossil record includes members of every significant animal phylum, from sponges to vertebrates. It also includes vascular and non-vascular plants with affinities to living groups. The Mesozoic is subdivided into three periods, from bottom to top, the Triassic, Jurassic and Cretaceous. The Mesozoic record is best known for its spectacular dinosaur fossils, but it also includes the first records of mammals, and the appearance of the last major group of plant fossils, the flowering plants. The Cenozoic is divided into the Tertiary and the Quaternary. These strata record the death and burial of huge numbers of mammals, and transition to the recent environment.

The Precambrian. The Precambrian contains all of the types of rocks present in the Phanerozoic, but without multicellular fossils. The term Precambrian was originally applied to all unfossiliferous rocks underlying strata defined as Cambrian on the basis of the metazoan (multicellular animal) fossils they contained. Precambrian rocks are also separated from Phanerozoic rocks by a major angular unconformity in many places around the world.

Continuing study has revealed that while Precambrian rocks are indeed free of metazoan fossils (possible exceptions will be noted below), they do contain inorganic films and complex structures that at least superficially resemble modern bacterial and algal cells. Stromatolites, lithified mound-like banded structures resembling modern algal structures by the same name, are also found in some Precambrian rocks. In the uppermost part of the Precambrian (Vendian), a variety of forms described as cysts and acritarchs are recognized (2), as well as a group of associated complex impression fossils in sandstones, referred to as the Ediacaran Fauna (named for the locality in Australia where they were first found). Because they are impressions in sandstone, there are no organic remains, and little detail can be seen in most specimens. They have been referred to primitive invertebrate animals of various affinities, inflated single cells, lichens, animal groups that died out, to name a few. These structures do have symmetry and appear superficially to have been alive. The have the appearance of feathery fronds, pouches or disks. The frond-like remains usually show delicate branches, and none of these organisms had heads or obvious circulatory, nervous or digestive systems. Because they are not clearly attributable to any extant group, they cannot at present serve as the basis for any strong arguments.

Quite recently claims of a different sort have surfaced in studies of upper Precambrian localities in China. These localities contain beds rich in phosphate. Phosphate deposits have the unique ability to petrify very fine structures in minute detail. Microscopic analysis of materials from these beds revealed the preservation of what have been described as plant and animal embryos. The indirect dating of the deposits could be challenged and they may well be Cambrian rather than Precambrian. In either case, they are very close to the Cambrian boundary. These claims, if substantiated by additional work, are of great interest because of the detail of preservation. The fossils, some of which superficially resemble early stage animal embryonic forms, are not yet ascribable to any group with certainty and may turn out to be algal.

The conventional explanation for the Precambrian record is that the organic and inorganic cell-like forms are the remains of the earliest cells to evolve on the planet. This theory also maintains that these forms originated from nonliving material by completely naturalistic means (i.e. no Creator) during the Precambrian. Subsequently, biological evolution took place, leading to the immense complexity revealed in the Cambrian metazoan forms. This absurd assertion has been the cause of considerable consternation among thoughtful biologists. Werner Arber, Molecular Biologist at University of Basel and Nobel Laureate has summarized the extent of the problem:

> "Although a biologist, I must confess I do not understand how life came about. . . . I consider that life only starts at the level of a functional cell. The most primitive cell may require at least several hundred different specific biological macro-molecules. How such already quite complex structures may have come together, remains a mystery to me. The possibility of the existence of a Creator, of God, represents to me a satisfactory solution to this problem." (1)

At least two alternative views can explain the observed data without being encumbered by the impossibility of explaining the origin of life and of complex life forms. One alternative view attributes the impressions in Precambrian rocks to inorganic processes and attributes all living organisms to the Biblical account of Creation. There is at least indirect evidence that all of the forms described as cyanobacteria and other prokaryotes can be duplicated in the laboratory with inorganic compounds. The stromatolites may also be inorganic in origin. A third hypothesis would have the possibility of cyanobacteria placed on the earth prior to Creation Week. Both of these hypotheses have the advantage of satisfactorily handling the data without glossing the problem of getting life here in the first place. And both are at least within the spirit of the Genesis account of origins. The Ediacaran fossil forms and other examples of presumed Precambrian metazoa are within the uppermost sediments of the Precambrian. If these turn out to be the remains of living organisms, they could easily be accommodated in either of these models as Paleozoic outliers, perhaps buried during the prediluvial period.

The Phanerozoic. The rest of the fossil record is made up of the Phanerozoic, the rocks in which life in all of its forms appears on the earth. We will cover the contents of the various divisions of the Phanerozoic in a bit of detail as we proceed.

The Paleozoic. The Paleozoic is dominated by marine invertebrates. As one progresses up the column, plants and amphibians are added, followed in short order by reptiles. The Paleozoic ends with the last fossil record of most of these plants and marine invertebrates.

The Cambrian. At the base of the Paleozoic in many parts of the world are rocks of the Cambrian. The Cambrian was historically defined by the occurrence of the first metazoan fossil forms, often trilobites. This definition has been undergoing revisions as the efforts to find ancestors for the Cambrian metazoan fossils has become more intense, and a number of faunas have been found that stratigraphically precede the first trilobite. The Lower Cambrian boundary is presently defined by the appearance of the trace fossil (burrows) *Trichophycus pedum.* Some distance stratigraphically above this the first remains of the animals themselves appear. These faunas have been collectively referred to as the "Small, Shelly Fauna," an apt descriptor for them. The fossils are very small, a millimeter or less in diameter is typical, and consist at first of cones, tubes, spines and plates of uncertain affinities. These are shortly enriched with sponge spicules, the shells of molluscs, brachiopods, and some unknown organisms whose taxonomies are still being worked out. These are followed in rapid succession by trilobites and many other arthropod forms. Representatives of virtually all phyla appear as fossils within Lower Cambrian strata. The only significant organisms without known fossil representatives in the Cambrian are the bryozoa. In time, I suspect they too will be found in these rocks. The sudden appearance of life forms - representatives of virtually all life forms - is widely referred to as the **"Cambrian Explosion."** Theories to explain the catastrophic appearance of the whole spectrum of animal life in such rapid order are both numerous and unsatisfactory. Most of them amount to little more than arm waving and wishful thinking. Generally the explanations include statements about the development of hard parts (more or less simultaneously by members of 35 or so phyla), enabling previously existing soft-bodied organisms to suddenly be preserved as fossils. Unfortunately for this scenario, the rock record shows beautiful preservation of soft-bodied forms in the Cambrian (over 80% of the genera recorded from the Burgess Shale, for example are soft bodied forms), but virtually identical Precambrian strata contain no evidence of such forms. Furthermore, there is a general absence in the Precambrian rocks of burrows and other trackways that even soft-bodied forms are capable of producing today. It is the first appearance of such a trace fossil, *Trichophycus pedum* that marks the beginning of Cambrian rocks.

The issues surrounding the Cambrian Explosion are manifold. The appearance of members of every phylum in what is a very short interval has left evolution in the unenviable position of the Emperor in his new clothes. The sentiments expressed in a recent article by Carroll are revealing:

> "The extreme speed of anatomical change and adaptive radiation during this brief time period requires explanations that go beyond those proposed for the evolution of species within the modern biota." "This explosive evolution of phyla with diverse body plans is certainly not explicable by extrapolation from the processes and rates of evolution observed in modern species, but requires a succession of unique events." (2)

From a paleontological standpoint there are several possible explanations for the data. The generally accepted Naturalistic Hypothesis is that the Cambrian forms were evolutionary descendants of soft-bodied precursors in the Precambrian that had become "preadapted" for roles in a new ecosystem that arrived at the beginning of the Cambrian Period. So the "suddenness" is illusory, and the animals were merely coming out of their previous roles in the Precambrian. Whatever satisfaction such a theory may produce in the minds of its adherents must be eroded by the absence of any data to support the theory. There are no known Precambrian metazoan precursors, but even more telling, the molecular biological complexity of the earliest Cambrian forms equals that in any form alive today (3). One must respond to the challenge of having all the evolution of complex information in metazoa occurring deep in the Precambrian when there is no evidence for metazoa. Such a position requires a faith commitment to a model that equals or exceeds that required for any imaginable religious view. Of course the advocates of this theory expect that someday the illusory Precambrian ancestors will be found. But in spite of increasing efforts in this endeavor, the vacancy remains.

A second, Deistic Hypothesis, quite popular among some Christians, would have divine creation of all these life forms in the remote past. In a variant theory (Theistic), God is involved not just in the start of life, but in guiding evolutionary processes as well. Both views are based on naturalistic assumptions, interpreting the events in Genesis 1 as figurative in order to preserve a commitment to the radiometric time scale and to the Naturalistic (evolutionary) paradigm. A third Creation/Flood Hypothesis explains the sudden appearance of diverse, complex fossils in Cambrian sediments as a record of the sudden Creation of the whole spectrum of life forms coupled with the catastrophic flood described in the first chapters of Genesis. The presence of the full spectrum of complex biota in the absence of evidence for progenitors certainly offers strong support to this model. The rocks below the Cambrian were accumulated on the earth possibly prior to Creation week of Genesis 1, and thus were without evidence of metazoa. The rocks of the Cambrian represent either the sediments accumulated on the earth subsequent to Creation, and prior to the Flood, or they are the first rocks resulting from the Flood.

In the Naturalistic Hypothesis, there is no Creator. The Deistic/Theistic and Creation/Flood hypotheses involve a Creator, and the Creator is the God of the Bible. It is difficult to believe that intelligent, educated individuals cannot see the handwriting of the Creator in nature. As Werner von Braun has so incisively stated:

> "One cannot be exposed to the law and order of the universe without concluding that there must be design and purpose behind it all... The better we understand the intricacies of the universe and all it harbors, the more reason we have found to marvel at the inherent design upon which it is based... To be forced to believe only one conclusion -- that everything in the universe happened by chance -- would violate the very objectivity of science itself... What random process could produce the brains of a man or the system of a human eye? ... They (evolutionists) challenge science to prove the existence of God. But must we really light a candle to see the sun? ... They say they cannot visualize a Designer. Well, can a physicist visualize an electron? ... What strange rationale makes some physicists accept the inconceivable electron as real

> while refusing to accept the reality of a Designer on the ground that they cannot conceive Him? ... It is in sceintific honesty that I endorse the presentation of alternative theories for the origin of the universe, life, and man in the classroom. It would be an error to overlook the possibility that the universe was planned rather than happened by chance."(4)

The decision between the Theistic/Deistic and the Creation/Flood views must be made taking into account what the Creator has Himself told us. We are dealing with earth history, and in history, a written account of a reliable eyewitness is the most valuable information available. In trying to discriminate hypotheses on origins, extrascientific data must be used, and it makes a great deal of sense for one who claims allegiance to the God of the Bible to look in the Bible for answers without apology. A straightforward reading of the Biblical account is quite apparently framed in a few thousand years, favoring the Creation/Flood Hypothesis. This view of origins is not without problems in the natural world, as we shall see. But the ultimate conclusions one reaches with respect to origins rests with who or what an individual chooses to accept as authority. In the first two hypotheses, authority is naturalistic and rationalistic. The individual asserts that human mind, acting alone, is capable of discerning and discriminating all truth. In the third, the ultimate source of authority is the God of the Bible. It is imperative that individuals working in this area recognize and acknowledge what the source of their authority is. Until this can be established, there is little fruitful ground for constructive communication. On the balance, the Creation/Flood Hypothesis, unlike the Deistic/Theistic Hypothesis, is consistent with the clearest reading of Scripture. It also satisfactorily confronts two of the most pressing issues in paleontology: the origin of life, and the Cambrian explosion. The Naturalistic Hypothesis, for all of its popularity, satisfies neither. While there are other hypotheses or variants that could be proposed and discussed, we will limit ourselves to these three. We will continue our evaluation of the paleontological record with these three hypotheses in mind.

The fossil record of the Cambrian is one of richness and incredible diversity. Gould (5) has likened it to an upside down bush (as opposed to the normal phylogenetic tree image), because from the first diversity is so high, and there are many forms that are not found at higher levels in the rock record. During the Cambrian, the diversity of trilobites reaches an all-time high. When Cambrian deposition is superceded by Ordovician rocks, the transition is more a matter of a change in the rock types than it is in any major change in the fauna.

The Ordovician. Ordovician rocks exhibit a continuing increase in diversity, with many species of brachiopods, trilobites, corals, crinoids, cephalopods and jawless fish. The Ordovician starts with about 150 families of organisms, and ends with over 400. The only additional phylum not yet recorded from the Cambrian, is bryozoa. Although fossils of land plants are not seen until higher layers, spores of land plants are occasionally reported from the Ordovician. The trilobite diversity is still high in these sediments. The "Ordovician extinction" occurred near the top of the Period. At this point in the fossil record, one third of all brachiopod and bryozoan families were lost, as well as numerous groups of conodonts, trilobites, and graptolites. Much of the reef-building fauna was also decimated. In total, more than one hundred families of marine invertebrates made their last appearances. These families disappear from the record in an orderly and regionally consistent manner. Any

model purporting to explain the history of the earth with integrity must accommodate these data.

The Silurian and Devonian. Following the loss of diversity (burial of habitats) at the end of the Ordovician, new groups appear as fossils throughout the Silurian and Devonian. Newcomers include the first macroscopic land plant fossils in the Silurian. In addition, the Devonian record includes the first known fossils of sharks, bony fish, and cephalopods along with a variety of stromatoporoids and corals. Fossils of terrestrial forms appearing in Devonian strata include amphibians, insects, and many forms of land plants.

The Carboniferous (Mississippian and Pennsylvanian in the United States). By the time the last Devonian strata were deposited, the fossil record had come to include a large component of fossils associated with shallow water or land. The marine record continues to contain abundant remains of bryozoa, echinoderms, particularly crinoids, brachiopods, molluscs and arthropods. The extensive representation of Carboniferous insects attract much interest. Many of these forms, including cockroaches and dragonflies, are familiar to us in much smaller forms today. The Carboniferous contains the first massive coals, and it is from this feature that the system derives its name. The coals of the Carboniferous are made up of plants that are generally not familiar to us today, although there are living representatives of most groups. The dominant plants are giant lycopods, tree ferns, horsetails and others, many times larger than any of their modern counterparts.

One objection that is sometimes raised to the Creation/Flood Hypothesis (the fossil record is largely the result of a single event) is the huge volume of organically derived material in the earth's crust. The massive amounts of coal, oil, gas and dispersed carbon seems to be far beyond the scope of what a single event could produce. And so it seems, at least until we examine the data.

The world estimated reserves of natural gas are 5,000 trillion cubic feet. This would convert to about 94 billion short tons of carbon (coal). World reserves of oil are about a trillion barrels. This would be equivalent to 180 billion tons of carbon (coal). Adding these to the estimated coal reserves of 1 trillion tons, gives a world total of 1,274 billion tons of fossil carbon from organic sources (gas, oil, and coal).

Compared with this, the present biosphere contains approximately 829 billion tons of carbon, about 83% of the fossil carbon mass preserved as coal, oil and gas. About 243 billion metric tons of dry plant biomass are produced per year. If the earth were operating under conditions that were optimal, we could perhaps increase this value by a factor of 10 (larger land mass, higher CO_2 concentration, no deserts, vegetation overgrowing the oceans, optimum biomass in the ocean and seas...see below).

Allowing this optimization, we could conceivably accumulate 2 trillion tons dry weight of vegetation per year. If an average accumulation of organic material represented ten years of growth, 20 trillion tons of organic material, living and dead and decaying, would have been present on the surface of the earth at the time of the flood, just from plants. In addition, about 2000 years of carbon accumulation with perhaps 10 - 20% of the carbon being permanently

preserved as dispersed carbon in the sediments and the water column may have been present. There would also have been an unknown amount of organic carbon added to the earth at creation to prepare the surface for habitation.

Extant peat bogs also afford an example of how the preflood environment could have held a much higher carbon reservoir than just what is in the present biomass. Other reservoirs may have included floating masses of vegetation such as are found in modern quaking bogs. Much of the Paleozoic plant vegetation must have grown under these conditions, not just because the modern representatives of these groups do, but because even a cursory analysis of the rooting structures associated with these plants indicates they could not have grown in soil. The plants grew up to 30 meters tall, probably in a single growth season, and most of the forms were annuals with little or no wood. The roots were unique anchoring structures called ***Stigmaria*** that branched out from the base of the trunk on opposite sides, dividing immediately to give four principal roots that typically bifurcated again in close proximity to the trunk. These roots grew from a terminal bud, and sent spirally arrayed pencil-sized rootlets outward half a meter from the main axis. The rootlets were composed of large, thin-walled cells, with very little structural tissue. From all appearances the roots were designed to penetrate plant debris, and certainly could not have grown in soil. Because of their size and bulk, and the evident rapid growth, large amounts of this vegetation could have accumulated quickly under the ideal growth conditions of the preflood world. It is not surprising that there were large amounts of this material available for burial and conversion to coal during the flood. The roots of many of the dominant tree ferns (e.g. Psaronius) show aerenchymatous tissue, composed of thin-walled air filled cells. These features are also characteristic of aquatic or semiaquatic plants. Thus these forms could easily have grown atop ponderous masses of floating vegetation, allowing the possibility of an additional very large carbon reservoir. In any case, there was, at least in theory, more than enough carbon on the preflood earth to account for all of the coal, oil, gas and dispersed carbon of organic origin in the sediments.

The Carboniferous also contains the remains of many amphibia, frequently associated with the coal producing plants mentioned above. It is conceivable, and entirely consistent with the lifestyle of amphibia, that these forms lived among the plants in the floating bogs in which they were buried.

As the Carboniferous deposition ended, so did the Paleozoic coals and many of the large Carboniferous plant species. There does not appear to be a good explanation for this loss in the Naturalistic or Deistic/Theistic hypotheses. Why would plants that dominated the landscape, and were obviously very successful, suddenly cease to exist? According to the Creation/Flood Hypothesis, this loss can be accounted for by the destruction of the habitat of the preflood world in which these forms lived, and subsequent burial of their remains by the continued influx of sediments.

The Permian. The Permian fossil record contains many invertebrate forms present in the rocks below, but the flora reflects dramatic changes. The major extinctions marking the ends of two major divisions of the Phanerozoic, the Permian (ending the Paleozoic) and the Cretaceous (ending the Mesozoic), feature dramatic change of the plant record in

layers far below major changes in the animal record. Why this should be so is not apparent in the various proposals being advanced. The plants of the Permian, which appear to be much more xeric (dry climate) than the Carboniferous coal plants, are referred to as the Glossopteris Flora. This flora consists of coniferous trees and gymnospermous plants of various affinities, most of which are now extinct.

The faunal record is one of gradually decreasing diversity, until near the end of the Permian, nearly all of the Paleozoic invertebrates are lost. Although figures differ, a figure of 96% is often used for the number of species found in the Permian that do not extend into the Triassic. This includes invertebrates and vertebrates. Among vertebrates, 75% of the amphibian and 80% of the reptile families are lost to the record. This loss of so many taxa is referred to as the "Permian Extinction", and a great many popularizers of science have tried to explain this loss in terms of a catastrophic event, such as a meteor impact. The difficulty all such attempts face is that the loss of species was going on throughout the Permian, or as in the case of the major plant taxa of the Carboniferous, had already occurred prior to the base of the Permian. If the correct explanation is a global flood, then the loss of taxa is understandable, and fanciful explanations are unnecessary.

The Mesozoic. The Mesozoic rocks are characterized by a dramatic change in the biota. The plants tend to be similar to those of the Permian at first. The animals are mostly different. There are more terrestrial (land-dwelling) forms, and marine rocks carry fossil fish, cephalopods, bivalves, and different corals from the Paleozoic forms.

The Triassic. Rocks of the Triassic are characterized by redbeds, deposits so-named because of the abundant iron oxide they contain, and widespread volcanic ash. In these rocks are the remains of fossil reptiles and the first fossil mammals. The plants are ferns, tree ferns, cycadeoids, Ginkgos and gymnosperms of a wide variety of types. *Glossopteris* of the Permian is replaced with the ubiquitous Triassic genus *Dicrodium*. All of the dominant tetrapods, including the dinosaurs and various other reptile forms and mammals, appeared first in Triassic rocks. A variety of insects are known from the Triassic, including many species of dragonflies. Marine forms include fish, marine reptiles and most modern groups of invertebrates, including an increasing variety of cephalopods.

The Jurassic. Thanks to Hollywood, Jurassic is probably the best known of the geologic periods. The Jurassic rocks contain the remains of the largest dinosaurs that ever lived, including the giant sauropods. The marine rocks contain an abundance of fish remains, including sharks and rays and an increasing array of cephalopods, mostly ammonites. The patterns of appearance and disappearance of the ammonites provide the premier stratigraphic indicator for the Mesozoic. This is a feature that needs to be studied carefully, since this pattern contains a great deal of useful information to help in reconstructing the sedimentary processes of the Mesozoic. Although the patterns are generally assumed to be evolutionary in origin by those working under the Naturalistic or Deistic/Theistic hypotheses, the appearances and disappearances do not seem to represent evolutionary lineages. Thus the patterns may contain other kinds of information compatible with the Creation/Flood Hypothesis that would allow us to discern features of the preflood world not accessible otherwise. Land plant fossils included ferns, conifers, *Ginkgo* and cycadeoids. Small

mammals are a minor element. Occasionally, the fossil remains of birds, including the famous *Archaeopteryx*, are encountered.

The Cretaceous. The Cretaceous begins inauspiciously and generally the Lower Cretaceous rocks display the kinds of fossils that are found in Jurassic strata. In contrast with the red rocks of the Triassic, Cretaceous strata include hundreds of meters of black shales, indicative of source areas very different from those of the Triassic.

Midway through the Cretaceous, a dramatic change takes place. The fossil record of the flowering plants (angiosperms) begins, and by the end of the Cretaceous, most of the major families of flowering plants are represented either by pollen, leaves, fruit and/or wood. This dramatic introduction of a totally new flora, referred to as an "abominable mystery" by Darwin, is of great significance. On the face of it, the sudden appearance of the angiosperms is as great an "explosion" in the plant realm as was the previously referenced "Cambrian Explosion" in the animal domain.

Attempts to explain the issue within the evolutionary model have been numerous. One of these, put forth by Daniel Axelrod, proposed that the plants were evolving in "upland floras" away from the regions where fossils were being preserved, and thus we have no fossil record of their evolution. Not accidentally, this explanation shares many features with explanations proposed for the Cambrian fauna (i.e. they had no hard parts to preserve). A second defense of the evolutionary hypotheses attributes the development to "gradual" evolutionary changes, by asserting that the angiosperms are introduced slowly to the fossil record over a protracted period, suggesting that they had sufficient time to "evolve" from the first form(s). This is similar to another defense put forward for the Cambrian explosion, suggesting those animal forms appeared slowly throughout the Lower Cambrian.

There are fatal difficulties with both of these approaches. The Angiosperms are a rich and diverse group, outnumbering all other land plants today by twenty to one. This diversity enters the record rapidly, and requires an explanation. It is inconceivable, given the vast differences among angiosperms, that the entire spectrum of information they represent could have accumulated from nothing in infinite time, let alone in as short an interval as that claimed. Furthermore, the data suggest the plants were fully functional and fully modern in aspect at their first appearance, just as we saw for the invertebrates in the Cambrian. For example, Tidwell reported a fossil branch of maple (*Acer*) from the Dakota Sandstone in Utah that contained pollen, flowers and seeds attached to wood. The branch was found in rocks considered to be Jurassic, then revised upward to Lower Cretaceous. The problem of having fossils that are fully modern in aspect from Cretaceous strata persists. Where did the evolution take place? A peculiar revisionist science has sought to alleviate the problem by recasting the Cretaceous, and even the Tertiary remains of flowering plants into archaic groups. By changing the name to some different genus, or even family, leaf and other form genera have been endlessly and needlessly multiplied. It is presumed that if a maple leaf is found in the Cretaceous, it must be a coincidence that it looks like a maple leaf, because how could we have *Acer* represented 100 million years ago. Some imagine that calling maple *Protoacer* or *Pseudoacer* solves the problem of the sudden origin of the angiosperms. But of course it doesn't.

Only the Creation/Flood Hypothesis can explain the sudden appearance of the Angiosperms without resorting to fanciful and contrived reconstructions. And even this hypothesis does not easily explain why angiosperms are not found below Cretaceous strata. But this apparent sudden appearance of the angiosperms is data laden, and can help us in formulating a scientific model for the distribution of life forms on the preflood earth, and the processes of the flood itself. The model must take this into account and use these data in developing a view of the preflood biota and geography that could explain the absence of angiosperm fossils below Cretaceous.

The animal fossils of the Cretaceous sediments undergo permutations with new forms appearing, such as the much-discussed *Tyrannosaurus rex* and the duckbilled dinosaurs that dominated the Upper Cretaceous. The few Cretaceous mammals are diminutive and exceptional elements in the record. The Cretaceous marine environment continues to be dominated by fish and molluscs, especially ammonites. . Throughout the Mesozoic, the key marker fossils in marine sediments are ammonites, coiled cephalopods related to the modern chambered nautilus. These forms reach their zenith in the sediments of the Upper Cretaceous. In the these rocks alone in the central United States, over 50 stratigraphic intervals are defined by what appear to be distinct species of ammonites. While some of these will turn out not to be distinct species, many of the morphotypes are present only for brief intervals, then disappear from the record.

When the Cretaceous rocks end, another incomprehensible transformation accompanies it. All of the dinosaurs are gone. Along with them many other non-dinosaurian reptiles of the Mesozoic are no longer found as fossils. None of the ammonites reach beyond Cretaceous. The angiosperms, begun earlier, go through the transition from Mesozoic to Cenozoic with very few changes. This great extinction has been tied to many rich and fanciful theories, such as meteoric collision, indigestion, the rise of the mammals, etc. But none of the theories does justice to the evidence. If a meteoric impact was the terminal Cretaceous event, why are most of the Dinosaurs already dead? In fact there is no kill that can be directly attributed to an event that is purported to be responsible for laying down a few centimeters of iridium-enriched dirt. And if an impact were the cause, why did it not affect the angiosperms, and why did it destroy all of the ammonites, but not other marine forms? If the cause of the end of the Cretaceous was mammals, or "constipation", etc., then why did the ammonites die out? Certainly there is room for a comprehensive global catastrophe that finally affected the environment in which these various forms lived, and as an on-going event, the end of the Cretaceous marked a set of conditions in which ammonites and dinosaurs could no longer live.

The Cenozoic. The rocks of the Cenozoic include all deposits from the Cretaceous to the present. The Cenozoic is divided into three portions, from bottom to top, the Paleogene, the Neogene, and the Quaternary. These rocks contain the remains of a fauna dominated by mammals, and record a flora that appears to transition from the plants represented in the Cretaceous to the plants specific to the various regions on the earth today. The marine record also includes forms that would be familiar to us today. Cenozoic deposits are more local and basinal than are the deposits of the Mesozoic or Paleozoic. Mammal remains, especially

teeth, are used as stratigraphic markers. An understanding of the Cenozoic record involves being able to explain the striking change from widespread rock layers and index fossils of the Paleozoic and Mesozoic to the much more localized rock units and fossil assemblages of the Cenozoic. Again, considering the Creation/Flood Hypothesis enables us to account for some of the details that cannot easily be explained by Naturalism or Deism/Theism.

A global flood has to have an ending somewhere in the rock record. We would expect that ending to be marked by drainage patterns that remain to the present, and increasingly familiar patterns of flora and fauna. As dramatic an event as a worldwide flood would have repercussions that lasted long after the animals left the ark. In this view, the flood left many basins filled with water in which sediment and the decayed remains of dead animals and plant continued to accumulate for sometime after the end of the flood. The repopulation of the earth with animals would occur rapidly, and the creatures and plants expanded into seemingly endless expanses of vacant territory. Varieties of plants and animals never before seen on the earth could now develop, expressing genetic information heretofore held captive in the quiescent genomes of animals of a different world. The environment immediately after a worldwide Flood would be expected to have optimal conditions for natural selection, including open niches, bottlenecking of populations, founder effects and geographic isolation to bring about the rapid proliferation of species for the many unfilled niches of the earth. A clear example of the magnitude of these effects is witnessed in the Hawaiian Islands, where the organisms were able to expand without the normal competitive pressures of predation and disease. Here what was possibly a single species of *Drosophila* has apparently sired as many as 600 distinct species of the fruitfly. On balance, it is important to note that they are all still *Drosophila*, and that we can only speculate about the process by which they were differentiated. Although the Cenozoic has not ended, the recent past has been characterized by continental glaciations in the Pleistocene. These deposits contain flora and fauna that are generally recognizable as indigenous. Reports of huge numbers of elephantine forms frozen in ice have caused interest, and are still causing interest today. Darwin himself calculated that a single pair of elephants could produce a million progeny in less than a thousand years, so this does not appear to present a problem for any model.

Analysis of the Record. The Fossil Record contains a mixture of information. Some of these data, for example, appear at our present level of understanding, to favor naturalistic ideas of origins. Some appear to support the concept of a Divine Creative origin for life on the earth, and a global catastrophic flood. The method and timing cannot be reliably derived from the naturalistic methods of science, and should therefore be sought through revelations of the Creator Himself.

The Fossil record exhibits an orderly progression of forms, very different from what one might propose for evolution without foreknowledge of the record. It is also not intuitive for popular misconceptions of what a global flood would entail. Many parts of the record appear to exhibit a patterning of fossils that suggests that the preflood earth and the flood itself were very different events than these caricatures. If the fossil record originated largely with the flood, then some form of ecologically or physiographically constrained explanations are necessary.

In lower Paleozoic strata, fossils are almost exclusively marine organisms. Although from the first there is great diversity, that diversity changes patterns as we go up the column. The changes are orderly and meaningful. In middle and upper Paleozoic strata, plants of types that are best understood as living on water are abundant. Tetrapods associated with these plants may also have lived on the floating plant terrain. Then the first true land plants or animals are found in Permian (uppermost Paleozoic) or Mesozoic deposits, after the Paleozoic coal plants are gone from the record. These are important data to go into a model of the preflood world. Much of the world that was buried during the Flood was already underwater.

Mesozoic marine forms are very different from the Paleozoic forms. Terrestrial deposits with terrestrial life forms are center stage. The appearance of the angiosperms in mid Cretaceous is an event that hardly squares with evolutionary expectations, and places important restrictions on model building for every hypothesis. The termination of the terrestrial dinosaurs and the marine ammonites almost simultaneously constrains naturalistic models to look for catastrophic explanations. These Creationists would gladly supply, were it not for the need themselves to explain where the mammals and angiosperms were hiding when the dinosaurs were being buried. The zonation of ammonites in the Mesozoic is another opportunity for Creationists to collect information to use in model building. For now it has to be considered another formidable challenge for the Creation/Flood model. In the Tertiary, dinosaurs are no longer represented in the fossil record, but the flowering plants continue right on, becoming increasingly more specific to present localities throughout the Tertiary. Likewise, mammals of modern types do not appear until near the end of the Tertiary, for many groups. All of the major problems posed for the Creation/Flood model must be considered data for model building. This suggests that if we want to build models, we ought to be taking advantage of the challenges and pushing them to reveal more data.

These are some of the data from paleontology that model-builders must have in hand for reconstructing the world that was before the flood. Is such an endeavor worthwhile? Is it needed?

Final Considerations. How can we accommodate the paleontological record with Scripture? What can we do with the serious challenges to our faith presented by some aspects of the fossil record? What can we do to make known the serious problems of the Naturalistic Hypothesis and for the Deistic/Theistic Hypothesis? Is it enough to maintain "The Bible says it, and I believe it, and that's good enough for me"? Should we be exploring science, knowing that we may be led to conclusions that are not compatible with our beliefs? These are serious questions and worthy of study and careful consideration.

If our approach to science is as it should be, we can acknowledge that there are still many unanswered questions for all sides, and we should have no fear of deeper investigation In science the data are not all in. But we must recognize that the view of origins presented in Scripture is clear about Creation. The plants were made on day three, the animals in the sea and air were created on day five and the land animals, including mankind were created on day six, three evenings and mornings after the plants. The Bible is also reasonably clear about the events significant for fossilization of these life forms that have occurred since then.

There is a great deal we have not been told about the preflood world. If we knew more I think we could answer many of the questions that are now open, or perplexing to us. Should we be trying to do that? Can we continue to bury our heads when issues of paleontology arise?

We have traditionally taught and thought that the physical realm was an indispensable component of the totality of God's revelation to us. Verses such as Romans 1:20 and Psalm 19:1-4 and many others make this clear. If we maintain this holistic approach to Revelation, it would be inconsistent to ignore a huge component of that witness in the fossil record. Rather, we ought to be more aggressive in our efforts to seek harmony with the Revelation in Scripture, using the principles laid down in Scripture as a filter to test ideas. I think this is not an option, but a mandate of the highest order. If we choose to ignore the efforts to find that harmony between the Bible and Paleontology, we may miss that great opportunity to receive the revelation of God through the earth. The Psalmist writes:

> **"I will hear what God the LORD will speak**: for he will speak peace unto his people, and to his saints: but let them not turn again to folly. Surely his salvation is nigh them that fear him; that glory may dwell in our land. Mercy and truth are met together; righteousness and peace have kissed each other. **Truth shall spring out of the earth**; and righteousness shall look down from heaven. **Yea, the LORD shall give that which is good; and our land shall yield her increase.** Righteousness shall go before him; and shall set us in the way of his steps." Ps. 85:8-13

We must be prepared and open to receive that Truth. The issue is not whether we can believe what God has told us in Scripture. That question must be settled in the basis of our faith, before we begin. For we are told specifically that:

> "Through faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear. [...] But without faith it is impossible to please him: for he that cometh to God must believe that he is, and that he is a rewarder of them that diligently seek him." Heb. 11:3, 6.

But will we successfully apply that faith to real problems in the physical realm? It is here that we can make a difference, if we choose to do so.

I think our view of revelation in the physical realm as a component of God's total revelation to us demands that we seek to achieve a satisfactory level of understanding of the physical realm. We should not give lip service to this principle without implementing serious efforts to seek the understanding we believe is there. I am sure God does not want this revelation to come in a way that will exalt man. But a prepared mind and a committed life, these God can trust. Most certainly the object of this work has to be that which God has Himself set, that:

> "The heavens declare the glory of God; and the firmament sheweth his handywork. Day unto day uttereth speech, and night unto night sheweth knowledge. There is no speech nor language, where their voice is not heard." Psalm 19:1-3.

And:

> "[...] the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead; so that they are without excuse." Rom 1:20.

I look forward with great anticipation to the times when these new revelations will be more fully received.

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