

Creation Research Society Quarterly

Haec credimus:

For in six days the Lord made heaven and earth, the sea, and
all that in them is and rested on the seventh. — Exodus 20:11

VOLUME 22

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NUMBER 4

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RENEW NOW FOR 1986/87

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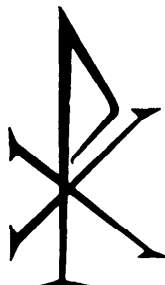
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NUMBER 4

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EDITORIAL COMMENTS

Many of you may have noticed two different styles of type in the December 1985 Quarterly. The printer converted to a new typeset machine for that Quarterly whereas some articles, set with the old unit were included in the issue. So there was a mixed multitude of type!

In this Quarterly a new system of referencing is being introduced. Please note the Sanders and Howe article (pp. 166-70). This paper can be used as an example for the new system. Authors are requested to follow this method of referencing for future manuscripts. Obviously in the upcoming issues there will be a mixture of referencing styles until the conversion is complete with the June 1987 Quarterly. The new system eliminates textual reference superscript along with *Ibid* and *Op. cit.*

It is my pleasure to announce that Dr. E. Norbert Smith, Director of the Grasslands Experiment Station, will act as editor of the Panorama of Science section. He and I have assembled many selections for Panorama in this issue to be used as a guide for the types of notes that are acceptable for publication. Dr. Smith's criteria are given below.

As its name implies, Panorama will consist of a wide view of science from a creationist viewpoint. It will contain short articles or news items. It is designed primarily for our sustaining members—people who, for lack of time or background, are seeking lighter reading than the longer, more technical articles. Hopefully, material from Panorama will lift the spirit and the information can be used for example by pastors, Sunday school or public school teachers. Emphasis will be on readability.

Panorama articles will be short, usually less than one Quarterly page. Material must support the statement of belief of the Creation Research Society. Each piece

will be sent to at least two reviewers knowledgeable in the area. Articles in Panorama will often be spawned from technical articles in the various areas of science and engineering and will usually fall into two categories: (1) Scientific findings that appear contrary to generally accepted principles in evolution recast from creationist's viewpoint, and (2) scientific discoveries that appear to support the creationist viewpoint. Both provide excellent Panorama material. We encourage our members to submit material for consideration. Comments from readers of Panorama are invited.

I organized a written minisymposium on the possibility of creating chemical order and complexity in the natural world. Dr. Marsha Damon, Dr. Larry Helmink and I offer some brief comments from a creationist perspective. Many unique characteristics of insects are considered by Sanders and Howe in an interesting research report from the Grand Canyon Experiment Station. Also preliminary results of the research on pollen grains found in Precambrian strata in the Grand Canyon are included in the Panorama section. Future Quarterlies will contain more information about this project.

Douglas E. Cox conjectures on the possible diagenesis of sandstone after the Flood. Post-Flood geodynamics in relation to a postulated expanding earth are presented by David Unfred. The existing uniformitarian theories are recast into a Flood model.

John Moore discusses the origin of man in the educational column. He carefully compares the evolution and creation models as frameworks for the scientific facts. Robert Herrmann develops a mathematical language to model processes occurring within the universe. I hope that you will find much in this issue to interest you.

Emmett L. Williams, Editor

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MINI-SYMPOSIUM

CREATIONIST INTERPRETATIONS OF CHEMICAL ORGANIZATION
IN TIME AND SPACE

Overview

In recent years there has been considerable work performed by chemists on the development of so-called chemical organization. The approach generally taken is that although nature "drives" systems toward equilibrium according to the second law of thermodynamics, this does not account for all of the chemical order seen in the world. For instance, many non-equilibrium systems, particularly living organisms, exist on the earth. Underlying much of this work are implications that the second law (degeneration processes) is not all pervasive. The second law has been and can be circumvented naturally.

Creationists have recognized that other principles operate in nature besides degeneration processes.¹ There are principles that tend to conserve the natural order—first law of thermodynamics (conservation processes). The creationist understands the interplay of these degeneration and conservation processes and realizes that natural order continues in spite of the second law.

The basic disagreement between the naturalist and the creationist is the origin of natural order. The naturalist seeks to use the present processes of conserving order and organization to explain their origin. The creationist claims that natural order originated by the act of a Creator and could not have evolved.

Thus the present work² should be viewed in this light. The author does not deal with origin of chemical organization, he simply assumes that it exists. The worn-out, unsuitable example³ of how order and complexity can be generated in an open system, such as the earth being flooded with sunlight (p. 142) is used. An already-created universe has been assumed. The author only discusses how order can be produced in an already-ordered (nonequilibrium) world—obviously not a problem when one understands the interrelation of conservation and degeneration processes.

However the definition of organization should be viewed with skepticism. For instance, turbulence is given as an example of elaborate spatial organization (p. 145). Often organization seems to be identified with dynamic confusion. Thus anything that does not exhibit uniform distribution can be called spatially organized. For anyone interested, a good discussion of order and *arrangement* was written by Harold Armstrong in a CRS publication.⁴

Spontaneous generation of a universe and all of its order and complexity by natural processes is still scientifically impossible regardless of fluctuations and kinetic behavior. Genesis 1:1 is the best and most accurate statement of the origin of natural order.

References

1. Williams, E. L. 1976. A creation model for natural processes. *Creation Research Society Quarterly* 13:34-37 also in Williams, E. L., editor *Thermodynamics and the development of order*, Creation Research Society Books, Norcross, GA pp. 114-19.
2. Field, R. J. 1985. Chemical organization in time and space. *American Scientist* 73:142-50.
3. Williams, E. L. 1985. Book review. *Creation Research Society Quarterly* 21:205-6.

4. Armstrong, H. L. 1981. Order: arrangement and uniformity in Williams, E. L. (editor) *Thermodynamics and the development of order*. Creation Research Society Books, Norcross, GA pp. 23-33.

Contributed by Emmett L. Williams

Chemical Order

The first concern from a creationist perspective might be whether chemical systems can actually spontaneously change (evolve) to organized states as claimed in the subtitle of the article: "Chemical systems can spontaneously evolve to organized states, and such processes may have been associated with the beginning of life." It is well known that for many simple processes occurring in open systems, the change in enthalpy (ΔH) is negative and the change in entropy (ΔS) is positive, which results in a decrease in the Gibbs free energy (ΔG). (The second law of thermodynamics states that $\Delta G = \Delta H - T\Delta S$ at constant temperature and pressure.) Thus the process occurs spontaneously, but the degree of organization *decreases*. However it is also known that in some instances a spontaneous *increase* in organization occurs, still in agreement with the second law, because of a large decrease in enthalpy which dominates the process. (For example, the freezing of water vapor to produce a snow flake.) These are the kinds of processes discussed, although they must be "high energy" rather than "low energy" like the snow flake, presumably so that the organization process can continue to occur and order can accumulate at the expense of continually decreasing enthalpy.

As far as I can tell, there is nothing in this article which actually suggests a violation of the second law, although some of the wording at first seems to be a little misleading i.e. the subtitle mentioned earlier. The misleading statement is that "such processes may have been associated with the beginning of life," (p. 142) because it implies a spontaneous, irreversible, successive accumulation of order over long periods of time. This is actually a tremendous extrapolation of data obtained on relatively simple chemical systems to supposedly far more complex processes presumed to be involved in the hypothetical organization of complex organic chemicals into living systems. It seems that such an extrapolation of the data which is presented is unwarranted and misleading.

Secondly, the definition of chemical organization (p. 142) is more restricted than would normally be implied by the terms, probably because of a desire to limit its use to more complex chemical systems such as oscillating reactions. The requirements "to evolve in response to environmental changes and to repair itself" are not inherently necessary and are apparently added to stress the previously *assumed* relationship of this phenomenon to the hypothetical spontaneous generation of life.

Furthermore, I suspect that Field would like to define life or the living cell as "chemical organization" or an "organized chemical system." While I would agree that the living cell contains a highly organized chemical system, I believe that it is more than just an organization of complex chemicals (vitalism).

He seems to have an accurate understanding of the second law of thermodynamics, as any physical chemist should, but apparently fails to recognize that if the universe is an isolated system which is spontaneously increasing in entropy, it must have had an origin as a highly organized (low entropy) system some time in the past. This universal low entropy state could not have arisen spontaneously from a higher entropy state in accord with the second law, if the universe is indeed a closed system, because there could be no corresponding decrease in enthalpy. Furthermore, he apparently fails to recognize the necessity of a preexisting highly ordered energy conversion mechanism in order for the "supply of sunlight" to produce chemical organization on the earth.

In the discussion of the evolution of biological macromolecules (p. 149) the author seems to recognize the problems for the theory of chemical evolution which have been raised by mathematicians, and concedes that "no satisfying, detailed answer to the question of how biologically important molecules were initially selectively synthesized exists at present," but then appeals to hypercycles to somehow overcome these problems. As far as I know, creationists have not yet commented on the use of hypercycles to solve statistical problems associated with chemical evolution.

The limitations of experiments dealing with non-repeatable historical events such as the origin of life is recognized (p. 149). Yet the final statement:

However, it is clear that not only do no apparent physical laws forbid the spontaneous generation of chemical organization, but there are conditions under which currently known theory seems to guarantee it (p. 149)

while being technically accurate as far as "chemical organization" is concerned, is misleading in this context

concerning the origin of life. It seems to say that "not only do no apparent physical laws forbid the spontaneous generation of 'life,' but there are conditions under which currently known theory seems to guarantee it." Obviously, this is not actually the case. No exceptions to the law of biogenesis have ever been documented, and the more we learn about the complexity of living cells, the more obvious it becomes that spontaneous generation is, indeed, impossible.

In conclusion, my biggest concern relates to the somewhat misleading implications of the article which arise from its purpose to "shed some light on how life might have evolved," rather than the accuracy of the factual material itself.

Contributed by Larry Helmick

Kinetic Manipulations

The article is full of interesting kinetic manipulations; however the author admits that the universe as a whole is an isolated system. Therefore the argument based on the possibility of life originating in an open system is not valid.

His statement that an isolated system may at some point be far enough from equilibrium to become organized could allow for the kinetic behavior exhibited, but eventually disorganization *will* develop.

The author states that he has no idea of how the biologically-important molecules were initially synthesized and then proceeds to develop his theoretical work by disregarding this problem.

An interesting question for a creationist to ask is: how did the physical laws originate in order for the evolutionary process to follow them?

Contributed by Marsha Damon

SANDSTONE AND THE FLOOD ENVIRONMENT

DOUGLAS E. COX*

Received 20 July 1984, Revised 20 June 1985

Abstract

Terrigenous rocks, those that appear to have been formed on the land, seem incompatible with sediment deposition in the Flood environment. These include sandstones, gravels, and conglomerates. Concepts for reinterpreting these rocks are developed, based upon the evidence of diagenesis, the processes which cause alteration of sediments after deposition.

Interpretation of Sands and Gravels

James Hutton claimed that gravels were formed by the erosional action of rivers over long ages. He interpreted the abundance of rounded pebbles on the land and buried in rock strata as evidence for repeated uplifts and subsidences of the earth's crust and erosion of igneous and sedimentary rocks. The products of erosion eventually became the materials from which new sediments were formed, which were in turn uplifted and eroded, in an endless cycle. To many people, the presence of gravels and sands in the rock record is a compelling reason for assigning a great age to the earth. Hutton wrote:¹

Gravel forms a part of those materials which compose our solid land; but gravel is none other than a collection of the fragments of solid stones worn round, or having their angular form destroyed by agitation in water, and the attrition upon each other, or upon similar bodies. Consequently, in finding masses of gravel in the composition of our land, we must conclude, that there had existed a former land, on which there had been transacted certain operations of wind and water, similar to those which are natural to the globe at present, and by which new gravel is continually prepared, as well as old gravel consumed or diminished by attrition upon our shores.

Sand is the material which enters, perhaps in greatest quantity, the composition of our land.

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But sand, in general, is none other than small fragments of hard and solid bodies, worn or rounded more or less by attrition; consequently, the same natural history of the earth, which is investigated from the masses of gravel, is also applicable to those masses of sand which we find forming so large a portion of our present land throughout all the earth.

Following Hutton, most geologists assume that conglomerates, or cemented gravels, and fluvial and aeolian sandstones, overlaid by shales and limestones can only be explained by continental and marine deposition respectively. They envision a cyclical pattern of uplift and subsidence, as if the earth were a creature slowly breathing in and out, lying half submerged in a vast sea for hundreds of millions of years.

These conglomerates and sandstones, if they really do prove intermittent periods of continental deposition during accumulation of the Phanerozoic sedimentary column, are fatal to the hypothesis that the bulk of these sediments can be attributed to the Noachian Flood. Some creationists have attributed sandstone formations to violent currents of the Flood waters. Bernard E. Northrup, reviewing an account of the Franciscan rocks of California, claimed that these were:

... the product of extremely catastrophic, violent processes occurring abruptly in time and involving the degrading of basement and continental self materials into rock paste and sands that were redeposited almost as rapidly.²

These ideas may be valid for certain types of sandstones, but it is doubtful that the currents of the Floodwaters would disintegrate basement rocks into sand-size particles. In the creationist concept of the deposition of much of the world's sedimentary rock in the period of about a year, (the duration of the Noachian Flood), the abundance of sand contained in sandstones presents a problem. Indeed there may be far too much sand in sedimentary rocks for it to have been formed by mechanical processes of rock disintegration on the continents.

Pettijohn, Siever and Potter listed the following processes as the major ones contributing to sand formation: weathering, explosive vulcanism, crushing, pelletization, precipitation from solution, and rock disintegration.³ Garrels and Mackenzie estimated that sandstones constitute about 30 percent of the geologic column.⁴ About a third of all sandstones are quartz arenites, sandstones consisting almost entirely of quartz.⁵ The proportion of quartz in sandstones averages about 65 percent. These facts imply some very effective mechanism of sand production must have existed to supply the sand in the world's sandstones.

Sources of Sand

Experiments on rock crushing and abrasion have been conducted to determine which processes are more effective in producing sand. Abrasion of pebbles apparently produces silt and not sand.⁶ Weathering and disintegration of granite may produce quartz grains in some regions, but this seems ineffective at the present time over much of the

Canadian Shield, since the exposed rock surfaces show fresh looking striations that have been little affected by weathering, abrasion, or freeze-thaw processes of disintegration, in several thousand years.

Rounded sand grains are supposed to have been formed in continental environments, particularly by being blown about in deserts by the wind. This of course is incompatible with a creationist model of sedimentation in a Flood environment. But not all desert sands are rounded, as Folk has shown in his study of the sands of the Simpson desert in Australia.⁷ These sands consist of angular grains, and no significant rounding seems to be occurring at the present time.

Conglomerates with well rounded pebbles are invariably interpreted as continental deposits, and the pebbles are thought to have been rounded by abrasion such as the action of waves on a beach. These may occur above thousands of feet of shale, and in a creationist interpretation, this order of deposition seems wrong. As well, the time for rounding of the pebbles by abrasion is lacking, and it seems unlikely that violent currents could have transported masses of pebbles and deposited them in the positions in which they are now found. In the Catskill Mountains of Southeastern New York there are coarse sandstones and conglomerates with pebbles of granite and metamorphic rocks, quartz, and feldspar. To supply the enormous quantity of sand which is contained in this region, geologists have proposed a slowly rising mountainous island called "Appalachia" located east of the area, and that these mountains were continuously eroded for millions of years, while the sand and pebbles piled up in shallow seas. Meanwhile, the earth's crust was steadily sinking under the weight of the sediments. A total of 600,000 km³ of sand is thought to have been produced in this way, from Ordovician to Upper Devonian times.⁸ But this is only one-tenth of the volume of the Silurian sands in the Appalachian mountains. Describing the Silurian strata in this region, Dott and Batten wrote:⁹

The Silurian strata of northeastern United States provide a classic example of transgressive facies recording the reduction of an old mountainous region by erosion. Had James Hutton lived in New York instead of Scotland, he still could have developed his theory of uplift, erosion, and burial of successive mountain systems.

Early Silurian clastic sediments clearly were derived from the core of the mobile belt east of New York. This is shown by the coarsening of sandstones eastward, and by orientation of current-formed features. Silurian quartz sandstones are widespread in the Appalachian mountains, comprising roughly 6 million cubic kilometers (1.4 million cubic miles). This staggering volume of sand with scattered quartz pebbles represents weathering, winnowing, and concentration from a tremendous volume of source rocks in the Taconian Mountains.

The volume of these sands and their localization in the Appalachian region poses problems for the uniformitarian interpretation, as visualizing a mountain range of sufficient volume to produce the required quantity of sand will illustrate. Such a mountain range would have to exceed the height of any existing

mountains. As well, there is the question of what became of all the sand that was presumably deposited on the eastern side of the mountains of Appalachia. Berry and Boucot considered this hypothetical island a possible source for only a small fraction of the quartz sands of the Appalachians. They wrote:¹⁰

Unfortunately, volumetric considerations strongly suggest that this island (or islands) was totally incapable of providing more than a small fraction of the quartz-rich terrigenous material present in the Silurian of the Appalachians.

The problem of the source of the sands of the Appalachians remains unresolved. Similar problems exist in accounting for the source of Silurian sands in the northern and western parts of the continent.¹¹

Some sandstones which have been thought to be aeolian deposits, have been reinterpreted as marine in origin. The Navajo sandstone of Utah and Arizona has been presented in geology text books as a prime example of an aeolian sandstone. It was described by Dott and Batten as "a vast blanketing mass (approximately 40,000 km³) of very well-sorted, prominently cross stratified sand," containing 90 percent quartz.¹² Spectacular large scale patterns of cross stratification were thought to represent ancient wind dunes formed on a vast Sahara-like desert, but Freeman and Visser have argued against the aeolian interpretation and in favor of a marine environment of deposition.¹³ The upper Navajo sandstones are locally interstratified with thin carbonate rocks containing marine fossils.

This reinterpretation of aeolian sandstones as marine illustrates that criteria for explaining sandstones are only vaguely defined, and in fact little is understood about their formation. In a creationist model, it is obvious a marine interpretation of these sandstones would be preferred, but the idea of sand particles being deposited in pure quartz formations by violent currents, which ought to have eroded shales and silts and mixed them up with the sands, is hard to conceive.

Identifying the means of transportation of the sand from supposed source areas to regions where it was deposited is also a problem in the uniformitarian explanations. These are often far from the exposed source rocks in the granite craton (i.e., basement rocks). Certain parts of the craton are supposed to have been subject to subaerial erosion, the weathering of granite providing a source of quartz grains for sandstones being deposited elsewhere. Yet these regions from which quartz could have been derived are quite limited, since early Paleozoic sediments (especially Silurian) cover much of the area of the North American continent. These areas covered by sediments were protected from erosion for much of the time in which the Phanerozoic sedimentary record is supposed to have been formed, so could not supply sand for the deposition of sandstones. As well, examination of the relief of the granite basement below these protected areas shows little evidence of differential wearing down of the exposed parts as would be expected according to the uniformitarian assumptions.

Where was all the material from which later sediments were formed while the earliest Phanerozoic sediments were laid? Even if a seemingly inexhaustible supply of granite were available to supply quartz grains for sandstones, how could it be transported

thousands of miles, and what could have caused the disintegration of granite to form sand in such vast quantities?

Uniformitarianism falters again when it comes to finding modern counterparts of ancient quartz sandstones, since nowhere are these seen being formed at the present time. Desert sands are generally derived from existing sandstones. Pettijohn and others wrote:¹⁴

Because quartz arenites are by definition essentially quartz sands with less than five percent other constituents, they are exceptional sands. They are exceptional, that is, in the sense that sands of this character seem not to be forming today.

Diagenesis

New interpretations for these rocks are suggested by the findings of petrologists in recent years. Detailed mineralogic study of sandstones has produced some remarkable shifts in concepts. A pure quartz sandstone may not have been initially deposited as such, but has evidently undergone many changes since the deposition of the sediment, due to the movement of pore fluids through the sediment pile during compaction. This compaction results from a sediment that is initially in a hydrostatic stress state being unloaded by uplift or erosion of overlying sediments.

A sandstone consisting almost entirely of quartz is thought to have been subject to the action of pore fluids which removed all other minerals. Such a sandstone is called "mature." Some sandstones have been made progressively more mature by fluid movements, and have undergone repeated alteration, such as deposition and dissolution of various cements, compaction, and alteration of grain shape and size. These, and similar processes, which occurred at relatively low temperatures, constitute the class of processes called "diagenesis."

Sandstones of various types can be classified according to their stage of maturity. At the top end of the maturity scale are pure quartzites, consisting of quartz grains cemented by quartz. Below these are sandstones containing other kinds of grains such as feldspar, which is less stable than quartz, or rock particles, and quartz sandstones cemented by minerals such as calcite and clay minerals. At the bottom of the scale are greywackes, which are rocks consisting of rock fragments or pebbles cemented by argillaceous material (clay minerals), the grains and pebbles not in contact with one another.

Sediments may initially contain 50 to 80 percent fluids, and unloading of a sediment pile tends to cause a flow of these fluids upwards to the surface. The effect of unloading would be to create a pressure gradient, causing pore fluids to flow upwards towards the low pressure zone. The expulsion of fluids would result in further compaction of the rock. If the fluid flow was restricted by a layer of impermeable rock such as shale, a zone of over-pressured rock in which trapped fluids sustain pressures greater than hydrostatic could be formed. Many areas of over-pressured rock have been encountered during drilling for oil. The presence of these zones could be evidence for uplift of these areas from some depth of burial below the sea, or erosion of over-burden, or both.

As well, it is possible that over-pressured rocks may

sometimes result from the migration of fluids from very great depths towards the surface, the fluids becoming trapped by the formation of an impermeable layer. Since rocks are usually well compacted, and considerable volumes of fluid have been forced out, it is likely that unloading associated with uplift has caused the compaction of rocks and expulsion of fluids they must have initially contained.

Evidence for grain and matrix alteration in sandstones has led geologists to conclude that existing sandstones may be much altered from the original sediment. E.C. Dapples, in a paper on sandstone diagenesis, noted the considerable diversity of opinion about the extent of the effects of diagenesis. He wrote:¹⁵

The extent to which diagenesis has modified the original detritus still remains a subject of considerable diversity of opinion. Are the modifications so profound that the present-day mineralogy of the sedimentary rocks is only remotely akin to that of the detritus which was deposited? Is it possible that pure-quartz sandstones were never sediments of such composition, but are the products of substratal solution episodes during which episodes all minerals were removed except the most resistant ones?

Dapples wrote that there is considerable evidence that calcite has replaced quartz in many sandstones. There are various kinds of evidence for this, such as relics of former quartz grains in calcite crystals, and irregular surfaces of remaining quartz grains due to corrosion and partial replacement by calcite. He stated: "Silica alters readily into other forms, dissolves, and reprecipitates repeatedly throughout the history of certain sandstones."¹⁶ Fluids moving through a sediment pile during compaction precipitate or dissolve certain minerals depending upon the concentration of ionic species, temperature, pressure, pH and Eh and other parameters, which may change rapidly during uplift because of faulting. At low pH, (i.e., acid conditions) quartz is relatively insoluble, but calcite dissolves, and moves upwards in the sediment pile to be re-deposited where pH is higher. By this process, a calcite cement may be almost entirely removed from one horizon in the pile, to be replaced by quartz, which could possibly precipitate if the pH changed from a high to a lower value.

If pH is very high, (nine or higher), quartz solubility is increased significantly. Existing quartz grains in a sandstone can be corroded, the dissolved silica moving upwards in the sediment pile, to be re-deposited at another level, perhaps at lower temperature and pressure, where it may form overgrowths on existing quartz grains. Geologists believe processes such as these have produced mature quartzites with quartz grains cemented entirely by quartz. A mature sandstone of this kind is illustrated in Figure 1.

Quartz Solubility: A Dilemma

There is a problem, though, with the uniformitarian explanations of sandstone diagenesis, because highly alkaline fluids, which can dissolve significant amounts of quartz, are only rarely encountered in sandstones. Quartz is only slightly soluble in solutions with pH values below nine. Quartz solubility is increased

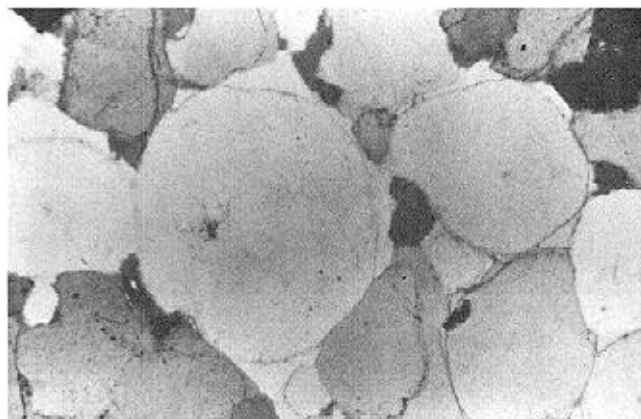


Figure 1. Quartz grains of a mature sandstone (Potsdam formation) seen in thin section. All grains seen are quartz. Rounded grains have been enlarged by quartz overgrowth in optical continuity. Dark outlines of the rounded grains are due to a thin coating of hematite. (38x)

dramatically in solutions with higher pH, and at elevated temperatures and at high pressures.

If quartz solubility was only slightly more than its value in meteoric waters or sea water, each unit volume of quartz deposited as overgrowths on grains in a sandstone would require some 10^5 unit volumes of pore fluids to have passed through each unit volume of the rock. Calculations show this is unlikely, even for sandstones thought to be hundreds of millions of years old.^{17,18}

The solution to this problem may be that sandstones were formed in conditions unlike those existing at the present time, and that their diagenesis involved pore fluids with compositions that could not have been stable over long periods of time. The presence of 'evaporite' minerals in the sediment pile suggests that high concentrations of sodium and potassium cations with hydroxyl and carbonate anions may have generated the high alkalinity.

So-called evaporite minerals and volatiles such as CO_2 may have been dissolved in the Flood waters expelled from the earth's interior. High partial pressures of CO_2 , together with cations such as Na^+ , Ca^{++} , and Mg^{++} in solution, would tend to raise the concentration of bicarbonate and carbonate ions, increasing alkalinity.

Another source of CO_2 , which may have been more potent in the environment of the Flood than in uniformitarian environments, is the production of CO_2 by bacterial decay of plants and animals buried in the sediments. During compaction of the sediments in the Flood environment, the sediments contained all their fossils freshly buried. CO_2 production in the months following burial would have a significant effect on processes of chemical precipitation sensitive to changes in pH.

Bissell and Chilingar suggested that alkalinity may increase because of CO_2 production in sediments on the ocean floor, contributing to the formation of dolomite. They wrote:¹⁹

Another possible reason for the influx of magnesium from bottom waters into the sediment would be the decomposition of organic matter by bacteria with generation of CO_2 . As a result of this process first the alkalinity $\Sigma(\text{HCO}_3^- + \text{CO}_3^{--})$ would rapidly increase and then would decrease with loss of CO_2

from interstitial waters of the sediment. With increasing alkalinity dolomite could reach a saturation value and precipitate.

Strongly alkaline fluids may have transported dissolved silica upwards through the sediment pile during compaction. Changes in alkalinity at various levels could result in quartz precipitation.

Compaction in the Flood Environment

Clearly the potential for diagenesis of sediments is greater in the creationist model, in which the entire sediment pile was compacted at once, than in the uniformitarian one. One major period of sedimentation, in which a whole world of creatures was buried, was followed by uplift of the sediment pile as the continents emerged from the Flood waters.

Uplift of continents, and removal of the weight of overlying waters, which ran off towards the oceans, would initiate both the movement of pore fluids upwards through the rocks and the associated compaction of mud into rock. There was a much greater supply of pore fluids to cause diagenesis than in the uniformitarian model, which invokes multiple minor uplifts and presumably, successive periods of compaction for each additional thin sediment layer.

This kind of scenario provides only limited amounts of pore fluids for diagenesis. Once a rock was compacted, it is difficult to see how it could have once again become a significant source of fluids for further alteration of overlying sediments.

Interestingly, some geologists investigating diagenesis convey an impression that they consider the sediment pile to have been compacted in a single event, as the creationist model would predict, rather than invoking a long series of minor episodes of compaction. The extensive evidence for diagenesis seems to require more fluid movement through the sediment pile than their model would permit.

Fluids originating from within the earth which were released during the Flood and forced upwards through the sediment pile during compaction would have heated the sediments through which they flowed. Heat would also have been generated because of the work expended in forcing fluids through less permeable layers. The heat may have contributed to the solubility of quartz and various reactions during diagenesis. In the uniformitarian model, because of the very slow rates of uplift that are postulated, heat generated in this way would not be significant.

In the uniformitarian interpretations of sediment compaction, there is no significant pressure gradient to cause the flow of pore fluids, although in their discussions of diagenesis, geologists invoke extensive movements of fluids within rocks. These movements were necessary for the deposition of cements, replacement of minerals, the formation of secondary porosity, etc. A pressure gradient is required for any pore fluid movement to occur, by Darcy's law. Pore fluids cannot flow through rocks without a pressure gradient, any more than rivers can flow uphill.

Forced expulsion of pore fluids from sediments during compaction due to a pressure gradient can result in the concentration of dissolved species in zones below a thin layer of rock that acts as a semi-permeable membrane. The process is known as reverse osmosis.²⁰ Because of the pressure gradient,

the flow of pore fluids through the rock will result in a more concentrated solution at the high pressure side of the rock layer. This could possibly lead to precipitation and the formation of strata.

Growth of Sand Grains

There is abundant evidence, in the form of quartz overgrowths on quartz grains in many sandstones, for quartz precipitation both on existing grains and as a cement. Quartz grains may be well rounded, and rounded grains have been enlarged by the growth of quartz in optical continuity with the grains. Blatt discussed the source of silica for the overgrowths observed in sandstones, and he stated the major source of silica was 'vertically circulating groundwaters' from shales underlying and interbedded with sandstones, pressure-solution contributing less than one-third of the quartz present.²¹ However, groundwaters are unlikely to have been very effective in dissolving and transporting the amount of silica required for the formation of overgrowths. In the environment of the Flood, waters expelled from the earth's interior may have contained much dissolved silica because of their high alkalinity. These fluids may have been released from beneath piles of unconsolidated sediments and would precipitate silica as they ascended to regions of lower pressure.

As the continents were uplifted, faulting in basement rocks, the introduction of intrusives, and associated metamorphic processes beneath the sediments may have released hot fluids which contributed silica. The initial sediments deposited by Flood waters may have contained volcanic glass, from undersea eruptions during the Flood, which was subsequently dissolved and redeposited during compaction. It is suggested that existing shales may be very different from those that were initially deposited, and that they represent the remanent minerals from which silica and other more soluble minerals were removed.

Transfer of quartz to solution in one part of a sediment requires its deposition elsewhere, and this could be controlled by pH. As the fluids moved upwards, a change to more acid conditions would cause quartz to precipitate. This could result in the formation of quartz grains where none were present before. Considerable volumes of quartz must have been precipitated on quartz grains as overgrowths in quartz arenites. It would be expected, then, that quartz grains might have been formed by precipitation of quartz from solution at various levels within the sediment pile. (It is assumed that the flow of fluids expelled from the sediment during compaction was upwards through the pile, and that these fluids were responsible for the transportation of quartz which formed overgrowths.) Grains of quartz formed in this way would no doubt have been previously interpreted as detrital grains. It is suggested that such a process, associated with the compaction of sediments deposited during the Flood, could be one of the most significant primary sources of sand grains in sandstones. There is the possibility, also, that sand grains formed in this manner were subsequently eroded and redeposited in later stages of the Flood, forming sandstones of various types.

Rounding of quartz grains may have been due to certain conditions existing at the time of precipitation

of the quartz. Alternatively, grains may have become rounded after their precipitation, because of the dissolving action of hot alkaline fluids flowing around them. The rate of flow of these fluids may have been a factor in causing rounding. Possibly the crystal facets of overgrowths developed on well rounded grains were formed by fluids flowing more slowly than those from which the initial grains were precipitated.

The Origin of Pebbles

The traditional interpretation of conglomerates is that these are simply lithified deposits of stones worn round by attrition. In other words, according to uniformitarian geologists, every rounded stone or pebble has been rolled around at the earth's surface in a stream or a beach at some time in the past.

That waters of streams and beaches do cause wearing of the surfaces of stones and pebbles was observed long ago, as we read "The waters wear the stones" in Job 14:19. The rounded cobbles and pebbles of conglomerates fall into streams that cross them, or are released by erosion of the shoreline by waves, and become further worn and smoothed by the action of the waters. The water itself does not smooth the stones, but vibrates and jostles the pebbles around, so they abrade each other. Only pebbles at the earth's surface can become worn in this manner, so for ancient pebbles buried in conglomerates to have been worn round would require enormous spans of time. But the pebbles of conglomerates may have been generated in a totally different environment.

Pebbles in sandstones and conglomerates may be abundant or sparsely distributed. Many conglomerates contain pebbles of a particular kind, such as quartz, or granite. In the Shawangunk Grit of the Catskill area of New York, some of the quartzite pebbles interpenetrate, indicating that the formation of this rock was not merely a matter of lithification of a detrital accumulation.

It is proposed that the formation of pebbles was subsequent to the formation of sandstones in which they occur. Pebble formation in the Shawangunk sandstone involved the initial deposition of cement from compaction fluids introduced into the sandstone. Cement was precipitated in discrete centers or nodules, rather than throughout the whole rock. Precipitation may have been initiated suddenly because of a change in stress conditions. Grains or crystals of quartz were cemented together, forming pebbles. The cement was precipitated in nodules having a shape which tended to minimize the surface area. This is analogous to recognized phenomena of concretion growth, which involves segregation of minerals into centers of precipitation. Finally, the pebbles were cemented by deposition of quartz or carbonate in the sand matrix, resulting in a quartz conglomerate.

The conglomerates of Catskill area increase in coarseness towards the folded and metamorphosed zone towards the east, suggesting that a more rapid uplift in that area, or the introduction of hot silica-rich fluids, or temperature effects may have been involved in the formation of pebbles. The mechanism of formation of rounded pebbles was evidently quite different from that which caused rounding of sand grains in other sandstones, since rounded quartzite pebbles are

embedded in a matrix of angular quartz grains in the Catskill rocks.

Formation of Stratification

In previous articles the writer has suggested that the pattern of cross stratification, which characterizes many sandstones, may be of non-sedimentary origin.^{22,23} Let us consider how this pattern may have originated in sandstones, in this environment of compaction of the sediment pile at the end of the Flood.

Alkaline fluids containing SiO_2 moving upwards through the sediment pile would precipitate silica as pressure decreased and as the pH was lowered because of CO_2 production. At some level in the pile, then, we would expect to find horizontal layers of quartz precipitated. Silica dissolved in fluids at elevated temperatures would precipitate at zones of lower pressure, where the fluids could vaporize. The silica may have been deposited either as quartz or as amorphous silica which soon became converted to quartz. The quartz deposited may have enlarged very tiny existing quartz particles which formed nuclei for grain growth and the formation of a granular framework in which the grains were in contact with one another may have altered the porosity of the rock, allowing fluids to flow more readily, thus causing more quartz to precipitate from fluids moving up to the zone of precipitation. The lower boundary of a sand layer formed in this way could thus become a surface at which more grains would form and so a pattern of stratification could develop, which would be a non-sedimentary one, characteristic of these sands and sandstones. A pattern such as this has been previously interpreted as a sedimentary one.

Non-sedimentary patterns of stratification have been recognized as possible results of diagenesis. Concretions in limestones and shales may occur in horizons of favorable pH and Eh values, which may not correspond with bedding planes. Botvinkina discussed examples of diagenetic stratification produced by processes of replacement and precipitation. He thought that the diagenetic form of stratification would correspond with the original stratification of a sediment. He wrote:²⁴

The phenomenon of diagenetic stratification may be called stratification, for although the strata form as a result of diagenesis, they are not accidentally distributed but appear in those places where the conditions for their formation were prepared during the process of sedimentation, the primary stratification serving as the starting point for the subsequent diagenetic change of the sediment and making it possible for the diagenetic stratum to replace a primary bed. For example, along either the upper or lower boundary of a bed conditions may exist which favor change; either the primary bed is enriched in some substance (organic matter, for example) which aids the chemical processes occurring in the bed, or the primary bed is more porous than the adjacent ones and thus the possibility is created for concentration in the pores of some substance, or the boundary between two beds serves as an impermeable surface and precipitation from solution is initiated in one of them, etc.

Chilingar and others stated that these diagenetic

processes produce laminations that may be "very similar to those formed by ordinary detrital accumulations."²⁵

Origin of Rippled Surfaces

Many sandstones contain rippled surfaces, the ripples being very well preserved. These are similar to ripples formed by currents on sand bars in rivers, or by waves on a beach. An explanation of the ripples in harmony with the proposed authigenic interpretation of sandstones is that they were formed by movements of fluids within sandstones during diagenesis. Upon the formation of a sandstone by quartz grain growth in successive layers, the greater permeability of the sandstone permitted flow of fluids entering the sand from adjacent strata. The flow direction may have been along horizontal planes as well as vertically.

Vortices of pore fluids could develop where there were variations in the flow velocity at different levels in the sandstones. If the rock was slightly more permeable along the plane of one of the laminations, pore fluid flow in that zone would be faster, possibly causing vortices in adjacent laminations which in turn would cause ripple development. The effects of vortices were preserved because the fluids were capable of precipitating and dissolving quartz or other cementing agents. This concept of a diagenetic origin for the rippled surfaces in sandstones is in harmony with Folk's analysis of ripple formation in various environments.²⁶

Rippled surfaces generally are variable in both size of ripples and orientation, and these facts and their excellent preservation favor an explanation in terms of a diagenetic process rather than a sedimentary one.

Clastic Dolomites

The concept of authigenic sandstone formation outlined above requires that one of the common forms of stratification exhibited in sandstones be reinterpreted as a diagenetic form of lamination rather than a sedimentary one. This is supported by the fact that dolomitized limestones often exhibit a pattern of cross stratification like that of many quartz sandstones. The formation of dolomite in a limestone is generally interpreted as a diagenetic process. These cross stratified rocks, in which the "sand" is composed of rhombs of dolomite, are called "clastic dolomites."²⁷

Describing these rocks, Williams and others wrote:²⁸

The clastic texture of calcarenites is not to be expected in dolomites, yet many dolomites contain rounded quartz grains presumably inherited from original calcarenites whose calcareous textures have been obliterated by dolomitization; in some of these rocks the quartz grains are disposed in cross-laminae, indicating that the original limestones were indeed deposited by currents.

The proposed alternative interpretation is that the patterns of cross strata were formed at the time of diagenesis, when the dolomite was formed. In certain cases, dolomitization causes an increase in porosity. High temperatures, high alkalinity and other parameters could be involved in the process of dolomitization.

The Underside of Sandstones

A quartz sandstone may thus have grown downwards as layers of quartz were deposited from fluids moving upwards from below. Patterns of cross stratification

in sandstones record the successive surfaces of deposition at the sandstone-shale boundary as it moved downwards. As quartz was deposited, other minerals were dissolved or altered, existing grains were enlarged by overgrowths of quartz, and new grains were initiated. Lateral enlargement of the sand body and differential movements of the sand with respect to the underlying shales may have produced the grooves and chatter marks, called sole markings, which have been observed at many boundaries between sandstone and shale.

Major sandstones commonly appear to be non-conformable to the sediments they overlie. This would be expected from the nature of the process of sandstone formation outlined above. The underlying formations of mud, shale, or limestone, from which the fluids which supplied the silica for the growth of the sandstone were derived, would appear depleted in silica. Since the process of quartz precipitation proceeded at various rates, depending on the fluid supply rate, the shape of the surface of active precipitation would tend to develop irregular forms, such as channels and hollows. These have been interpreted as river channels, and as evidence of an erosional surface, or disconformity. Dott and Batten described such a surface below the St. Peter sandstone.²⁹

After extensive dolomite deposition for several million years, a widespread disconformity was produced over virtually the entire craton. The sea retreated completely from the craton at least to the marginal mobile belt areas and the interior was subjected to extensive erosion. Above the disconformity lies a very widespread pure quartz sandstone called the St. Peter. Stream channels were cut into the underlying dolomites and sandstones prior to the deposition of the sand.

A similar disconformity exists below the Oriskany sandstone in the eastern U.S., and disconformities typically occur below the sandstones of cyclothems. The new interpretation accounts for the apparent disconformities without recourse to several up and down movements of the earth's crust and episodes of erosion.

Multistory Sandstones

Sandstone formations display a tendency to reflect the geometry of other sandstones which they overlie. A sequence of sandstone layers, separated by layers of shale or limestone, may be thicker above areas where underlying sandstones are thicker, so that two or more lenses of sandstone may occur in vertical alignment. Such a sequence is called a multistory sandstone and is illustrated in Figure 2.

The uniformitarian interpretation requires that erosion was active immediately above a buried sand, and more sand was deposited in the depression. The hypothetical river, which eroded the upper channel, must have "remembered" the course of a preceding river, whose channel lay buried deep below. An example of a multistory sequence in the Permian rocks of north-central Texas extends through 1200 feet.³⁰

These thick lenses of sandstone stacked vertically can be explained as follows. Once a sandstone body formed in the shale, the sand provided a conduit for fluids expelled during compaction. The process of

sand formation by quartz grain growth was initiated below or above the first sand body, because of convergence of the flow to that region. The flow of pore fluids towards thicker sandstone layers (with higher permeability), where the pore fluid pressure gradient was greater, caused the development of thicker sandstone layers vertically aligned with previously formed lenses.

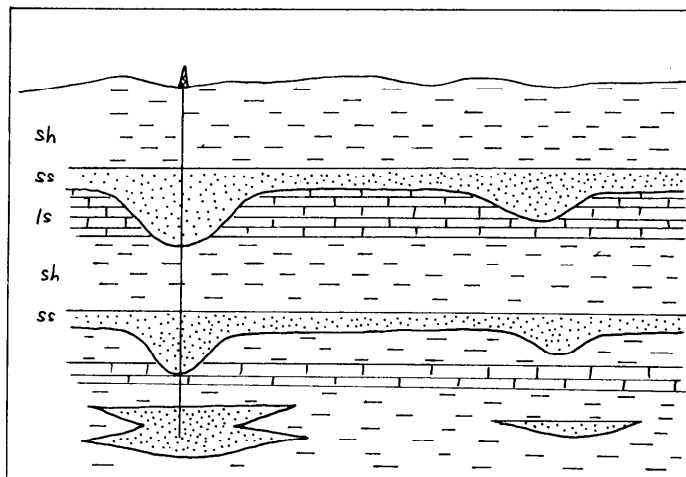


Figure 2. Diagram showing how multi-story sandstones occur in a sequence of shale, sandstones, and limestones. The vertical sequence of thick sandstone lenses provided a conduit for fluids escaping from the sediments when they were compacted. The symbols are: sh: shale, ss: sandstone, ls: limestone.

Sandstone Dikes

Faulting in sediments during uplift and compaction could provide conduits for the escape of pore fluids, the low pressure initiating deposition of quartz grains in the vicinity of the fault zone, thus forming vertical sandstone dikes, commonly called elastic dikes or neptunian dikes. These characteristically pinch and swell, so are not easily explained by infilling of cracks by sand, as has been proposed by uniformitarian geologists. The sand would have to be forced into cracks with such great pressures that the walls of the host rocks became dilated. The sand grains would probably be crushed long before the walls of the dikes became dilated. The facts about the sandstone dikes support the new interpretation of the origin of sandstone. Even the patterns of cross stratification, here interpreted as a diagenetic phenomenon, are present within some sandstone dikes. Patterns of vertical laminations resembling cross laminations within a sandstone dike were reported by Peterson?

At Clear Lake, near Espanola, Ontario, a group of sandstone dikes up to 30 feet thick occur in a carbonate siltstone. The dikes cut across the banded carbonate rock at a high angle. Some of the dikes contain a central band of coarse pebbles, as illustrated in Figure 3. The pebbles associated with sandstone in the dikes are easily accounted for in an authigenic interpretation, but how could they be explained in terms of the uniformitarian explanation, that the dikes were formed by injection of elastic material into fissures? Why would they arrange themselves in a central band within the dike? The features of sandstone dikes are anomalous in the traditional

interpretation of the origin of sand, but these mysteries dissolve in the new explanation.



Figure 3. Portion of a sandstone dike containing a central band of quartz pebbles. The dark section of the dike is due to recent rain. The distribution of the pebbles seems anomalous in the interpretation of sandstone dikes as the product of injection of elastic material into fissures. The dike is on the shore of Clear Lake, about one mile south of Espanola, Ontario.

Preservation of Cross Strata

Analyses of pure quartz sandstones suggest that these are typically altered extensively by diagenesis, but these "mature" sandstones may have the patterns of cross stratification well preserved. In terms of the conventional interpretation of the pattern, this is enigmatic since the pattern is supposed to be formed during sedimentary deposition of the grains, and the diagenetic processes of grain growth and replacement, dissolution and emplacement of cement, and porosity reduction and compaction would all tend to obliterate rather than enhance original sedimentary patterns.

Metamorphism of rocks would also tend to destroy original sedimentary patterns, but cross strata have been reported in rocks that have undergone high grade metamorphism.³² If the cross strata formed authigenically during metamorphism of the rocks, the presence of the pattern in high grade metamorphic rocks is not paradoxical.

Conclusion

In the context of sediment deposition in a world wide Flood and subsequent compaction of the sediment pile, the formation of sandstone authigenically by the formation of quartz grains and pebbles from expelled compaction fluids provides a plausible theory. These concepts are useful in accounting for many characteristic features of sandstones, their geometry, occurrence as dikes in other kinds of rock, and the presence of cross stratification in various contexts. These new concepts depend upon the uniqueness of the Flood and the consequently greater scale of associated processes of uplift of the sediments, compaction, and diagenesis.

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INSECTS INDICATE CREATION

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Abstract

A Creation Research Society (CRS) insect collection has been started. Qualified workers are invited to participate in the identification of these specimens and other phases of entomological research. There are outstanding evidences for design in dragonflies, click beetles, springtails, and other insects. Insects simply appear in the fossil strata without indication of an evolutionary ancestry. The paleontology, physiology, and anatomy of insects are fields ready for creationist study.

A CRS Insect Collection

Baseline studies are needed of botanical, zoological, geological, and other scientific features at the CRS Grand Canyon Experiment Station (GCES), Paulden, Arizona. Collections of insects, plants, rocks, and other scientific specimens can be started for our laboratory facility when funds are available for its construction. Individual members can play important roles in these and other tasks. For an introduction to research possibilities at the GCES, consult Howe (1984). Insect research can also be performed at

Grassland Experiment Station, Weatherford, Oklahoma from which a list of plants and animals has already been published—consult Hagberg and Smith (1983).

On July 10-13, 1985, insects at the GCES and nearby regions were collected and mounted. Several covered bait cups containing fruit or other foods were sunk to ground level along the southern edge of the GCES land and were periodically examined for insects (Figure 1). Insects were also netted out of milkweeds, thistles, and other plants flowering on the CRS land and at nearby Sullivan Lake, Paulden, Arizona.

Collections were made at night by using ultra-violet and fluorescent attractant lamps. Insects were mounted, labeled, and placed into families for future categor-

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ization and as a nucleus for the CRS insect collection. A list of the orders and families collected are given in the Appendix following an outline used by Borror *et al.* (1976).

CRS members specializing in various insect families are encouraged to write George Howe who will ship part or all of this collection for classification to genus and species. The help of qualified experts is needed in this effort.

Design in Insects

Shortly after sunset we collected an owlfly (Figure 2) and noted in Borror *et al.* (p. 334) that larvae of owlflies lie in wait to ambush their prey. Ant lion larvae dig a pit into which other insects slide and are captured. Unlike the ant lion larvae, the owlfly larvae lie concealed in surface debris and from such hiding places attack small insects. Diverse predatory activity such as this by ant lion and owlfly larvae involve exquisite genetic control which could be profitably studied by creation researchers as an indicator of design in nature.



Figure 1. Robert Sanders inspects bait in sunken cups along the edge of the GCES.

While discussing interesting insect hunting strategies, at the GCES there are spider wasps—large hymenopterans that capture and paralyze tarantulas. Concerning spider wasps as a group, Borror and DeLong (1964) had this to say:

The spider wasps generally capture and paralyze a spider and then prepare a cell for it—in the ground, in rotten wood, or in a suitable crevice in rocks; some spider wasps construct a cell first, then hunt for a spider to store in the cell. A few species attack the spider in its own cell or burrow and do not move it after stinging and ovipositing on it; a few species deposit on spiders that have been stung by another wasp. p. 553

As E. N. Smith has pointed out (personal communication) the origin of such a delicate interaction would be hard to understand in terms of evolution. If the spider-wasp injected too little venom into the tarantula, the spider would walk away and the wasp's larva would die. But if it injected too much, the spider as well as the wasp larva would die!

Near Sullivan Lake we observed the darting flight of dragonflies and were reminded that these large insects have on their legs basketlike apparati by which they catch other insects which they eat while flying or later while resting—Borror *et al.* (p. 122). The origin

of this food-catching basket is difficult to understand in evolutionary terms. It may be reasonably assumed that before they possessed this device, the dragonfly ancestors must have already had other efficient means of securing food—or else they would not have survived. But if evolutionists argue that some pressing “need” for such basket structures suddenly arose, the evolving Odonata would have likely starved before the slow processes of mutation, natural selection, and such could have equipped them with the new leg apparati needed to arrest prey in flight.

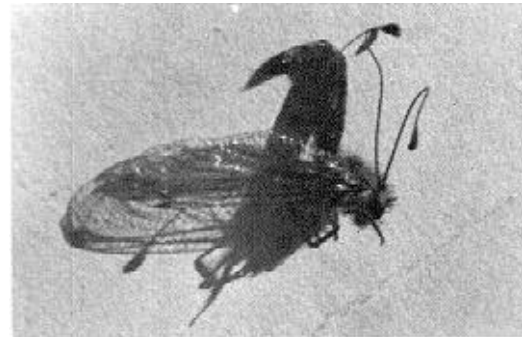


Figure 2. An owlfly — *Ulodes* sp.—caught by using attractant lights at the GCES. Note prominent antennae.

Fossils and Insect Origins

Someone seeking to demonstrate the history of dragonflies from fossils will encounter facts that do not fit easily with the macroevolution model. For example, fossil dragonfly-like creatures, found in what are called Paleozoic strata, were already very complex, having large wingspreads, and giving no evidence of having descended from simpler predecessors. Borror *et al.* relate that although the largest dragonflies in the United States today are only 3.25 inches long, Carboniferous fossil dragonflies had wingspreads of 2.5 feet (p. 170). Barker (1966, p. 148) reports that what is now the state of Kansas was the habitat for dragonflies that measured more than two feet.

If we come to the fossils in quest of an evolutionary ancestral tree for insects in general, we are again disappointed as the first (deepest) insects were already insects, according to the authority Wigglesworth (1964, p. 1) who writes that these fossil types “. . . were recognizable then as now by having the body divided into three more or less well defined regions . . .” Peter Farb (1962, p. 5) asserts that the origin of insects is uncertain, stating that: “There are no fossils known that show what the primitive ancestral insects looked like . . .”

Like many other workers, Wigglesworth writes at great length about how the hypothetical ancestor of insects might have looked; but concerning his own evolutionary speculations he frankly concludes that: “These notions are not ‘proved’ in the popular sense of our knowing as a fact that the changes during evolution did happen in that way” (p. 3). Wigglesworth further asserts that evolutionism is “. . . merely a provisional description of what we believe has happened and is happening” (p. 3). Even so, he adopts the evolution model anyway because: “There is at present no other theory which fits the facts so well . . .” (p. 3). But upon turning to a fossil diagram on page 5 of Wigglesworth's book, one would think that the facts did not fit

evolutionism very well because most insect groups are found to show up rapidly at various geological layers from the Devonian and the Cretaceous to the Permian without any hint of an ancestral tree.

For example, Wigglesworth (1964) and Cowen (1976, p. 27) indicate that the springtails made their debut in the Devonian Rhynie Chert strata of Scotland and are thus thought by uniformitarians to be the deepest and oldest of the insects. Looking at springtails with an eye for evolutionary evidence, one might expect to find that they are "primitive" or at least "transitional" in body structure. Instead, they are complex little creatures each having a folded, forked organ called the "furcula" at the back of the abdomen. As Hutchins (1966) reports, the furcula is normally held by a biological catch in the locked position. When it is released, however, the furcula strikes against the surface on which the springtail is standing and propels the insect for distances up to eight inches—Hutchins (p. 291) and Farb (p. 12).

Members of this supposedly ancient and primitive springtail group also have a ventral tube which serves as a sucker to hold them onto a leaf or some other object. Hutchins even describes the water springtail as using its ventral tube to penetrate the surface film on water, thus anchoring the insect near the surface.

Concerning springtails, it should be noted in passing that some workers, like Carpenter, would file a minority report, arguing that these Devonian fossils either were not true springtail insects or that springtails themselves (Collembola) should not be classified as insects (1947, pp. 66-67). Carpenter thus concludes that the oldest unquestionable insect fossils come from the Upper Cretaceous, not the Devonian.

Although Hutchins makes it clear that he holds an evolutionary view for the origin of insects, he makes this commendable exclamation at the onset of his book: "God must have loved the insects he made so many of them. . ." (p. vii). He also recognizes a natural human aversion to insects by adding, "Not all human beings share God's preference."

Concerning insect fossils, Hutchins writes:

... there are vast gaps in the fossil record covering millions of years, and when we go beyond the Carboniferous period which began about 300 million years ago, the trail fades completely (p. 3).

Note Hutchins' words carefully as he hints at evidence against evolution but then checks himself:

Insect origins beyond that point [the Carboniferous] are shrouded in mystery. It might almost seem that the insects had suddenly appeared on the scene, *but this is not in agreement with accepted ideas of animal origins* [Emphasis added] (p. 4).

Did Insects Come from Arthropods?

Wigglesworth believes that hypothetical insect ancestors must have evolved as a branch of the arthropods but he then notes that "The origin of the Arthropoda is quite unknown. . ." (p. 4). Klots and Klots also suggest that:

The Trilobites, Paleozoic Arthropods known only from fossils could have been ancestors [of insects], a belief based on their combination of general structures; *but there is no actual proof or even good evidence that they were*. [Emphasis added] (1961, p. 7).

Klots and Klots (p. 7) suggest that the members of the phylum Onychophora are "living fossils" having some features intermediate between arthropod and annelid groups. Perhaps some creationist zoologist will pursue this claim and see if the onychophorans actually look like valid candidates to bridge the broad gap between arthropods and annelids. To their own question "What are the direct ancestors of insects?" They give the frank reply: "We do not know."

The Origin of Insect Wings

In addition to the somewhat questionable springtails from Devonian strata, two other groups of insects appear in the fossil record quite deep or "early" (from a uniformitarian point of view)—the dragonfly-like Protodonatas and the cockroaches—both from mid-Carboniferous rocks, as Cowen (p. 27) has indicated: "Some forms of these early insects closely resemble species that are living today but they are noted for their large size." Matthews (1962, p. 113) writes about these large dragonflies and giant cockroaches. The dragonflies are representative of that group of insects having wings that cannot be flexed or folded over the abdomen. Roaches, on the other hand, are in that great group of insects where wings can be flexed. Both of these strikingly different types of wing patterns make their debut together among the oldest of insect fossil specimens. This means that there is no indication from the fossils regarding which type of wing was most "primitive" nor can one tell how these different wing types arose.

Before leaving the topic of insect wings, we should note, as Borror *et al.* (p. 139) pointed out: "The insects are unique among flying animals in that their wings are in addition to their legs, and not modified legs (as in the case of flying vertebrates)." It is obvious as well that flying would require supporting changes in behavior and physiology, the origin of which is not readily apparent.

A Puzzling Parallelism for Evolutionists

Carpenter relates that Paleozoic protohemiptera insects had suctorial mouth parts which permitted them to consume liquid foods. Yet it would appear that evolutionists are forced to defend the unlikely proposition that suctorial mouth parts must have arisen twice independently:

... as far back as the Upper Carboniferous, at least two hundred twenty-five million years ago, the suctorial mechanism had been developed in insects; and also that this device originated in relatives of the may-flies and dragonflies, *quite independent* of its subsequent development in the Hemiptera and Diptera. [Emphasis added] (p. 75)

The odds against suctorial mouth parts arising just *once* (let alone *twice*!) by naturalistic evolution are very high.

Insect Problems for Creationists Too?

A problem for creationists emerges as well—see Klots and Klots (p. 7). Of the six insect orders present in Carboniferous rocks, only one still exists—the Blattidae or cockroach order—all others having become extinct. But many of the insect orders found in the Permian rocks are still extant. If both Permian and

Cretaceous rocks were formed in the same catastrophe (as some creationists hold) how can one explain the fact that most insects in Carboniferous rocks are extinct while those orders in Permian rocks still exist?

But creationists face an even greater problem in the study of insects. We obviously abhor the assertion that "vestigial organs" exist, and yet many adult insects that do not eat have mouth parts. Did this contradictory situation arise as a change in insect behavior after the Flood catastrophe? Is it a degenerative aspect of the curse?

Insect Development Is Unique

Farb (p. 59) reported an interesting feature of insect embryology—both the larval cell mass and the adult cell cluster coexist in isolation from each other at a very early age in the insect. This means that the plans for both the larva and the pupa-adult are already determined when the embryo is no more than a ball of cells. When the larva finally enters the pupal stage, the larval cells promptly die while the adult cell cluster undergoes accelerated growth. Thus the larval cells die at the right time to serve as food for adult cells which grow rapidly and undergo differentiation at the specific time.

All these changes are under strict hormonal controls, as insect physiologists have noted. A pair of glands in the head—corpora allata—control the change from larval to adult stage. They secrete a "juvenile hormone" which keeps the insect in the larval stage and when its production is halted, other hormones formed in the thorax signal the larval cells to die. Farb (p. 59) reports that at the same time a head hormone induces another hormone secreted in the thorax—a hormone that ultimately stimulates the dominant pupal-adult cells to grow!

Farb hints that this wondrous embryologic dichotomy is merely a device to permit independent variation and evolution of both larval and adult stages—thereby allowing each to adapt to widely different environments. Creationists could more credibly assert that such independent simultaneous growth of the larva and the pupa is a scheme by which the Creator provided remarkably different specializations for larvae and adults so that insects can be supplied with the best possible larval and adult adaptations to meet the requirements of widely differing habitats.

Thus there can be such very different lifestyles as those found in the larvae and adult stages of the dragonfly. Locomotion of the larvae (which live in water) is by jet propulsion—water being expelled from the anus. Adults however, move through the air with wings. Larvae feed by a "mask" whereby the lower lip is greatly enlarged and also armed with a pair of hooks—forming a device that can be shot out to seize prey—Burton and Burton (1975, pp. 74-75). The adult dragonfly, on the contrary, hunts while flying (as already noted) with a basket-like trap on its legs. Thus the Creator provides for amazing diversity of lifestyles in two stages of the same insect's life.

While still pursuing the subject of insect development, CRSQ readers will remember that W. J. Ouweneel of the Royal Netherlands Academy of Sciences clearly showed that the so-called "homoeotic mutants" of the fruit fly (*Drosophila melanogaster*) by which a wing may be changed into a haltere or an

antenna into a leg are very striking in their morphological aspects but are "... only negative with regard to evolution"—Ouweneel (1975, p. 141). He summarized such homoeotic mutations as follows:

On the basis of present knowledge of homoeotic phenomena, I come to the conclusion that they are not evidence for any evolution whatsoever. On the contrary, these phenomena are an example of how one simple gene mutation can disturb, not just one small morphological feature only, but the expression and regulation of dozens of other genes. (p. 153).

The Beetles

Many families in the beetle order (Coleoptera) were found at GCES—see Appendix. This is not surprising as Borror *et al.* give 23 families of beetles in a coleopteran key which itself requires about 25 pages of text! One beetle we collected was in the family Elateridae and possessed a fascinating device which apparently equips it to escape predators or stand upright when it falls on its back. Borror *et al.* (p. 391) indicated that the prothorax and mesothorax of other insects are united in such a way that no movement between the two sections is possible. But in the case of this "click beetle" they reported that:

The clicking is made possible by the flexible union of the prothorax and mesothorax, and a prosternal spine that fits into a groove on the mesosternum ... If one of these beetles is placed on its back on a smooth surface, it is usually unable to right itself by means of its legs. It bends its head and prothorax backward, so that only the extremities of the body are touching the surface on which it rests; then, with a sudden jerk and clicking sound, the body is straightened out; this movement snaps the prosternal spine over end. If the insect does not land right side up, it continues snapping until it does.

The origin of such exciting morphological and behavioral adaptation would be difficult to explain in terms of mutation and natural selection.

Insects and Speciation

Much research into the origin of species has been conducted on the fruit fly. Yet the developmental geneticist, W. J. Ouweneel feels that this whole field should not be called "evolutionary genetics" as it presently is but simply "population genetics." He asserts that what is called "micro-evolution" in the genus *Drosophila* "... does not require the chance occurrence of new variation by mutation" but simply involves "... an already existing repertoire of genetic variation latent in the population"—Ouweneel (1977, p. 33). Thus according to Ouweneel, the little fruit fly with its hundreds of species in the Hawaiian Islands alone would not be a tribute to evolution but is an example of "... adaptation based on the innate genetic variation in populations, a prediction fully confirmed by the molecular genetic results of the last ten years" (p. 33).

CRSQ Entomology

Over a period of 22 years many articles covering creationist implications of insect study have appeared in the CRS Quarterly, of which the following five are

examples: Ouweneel (1975), Ouweneel (1977), Smith (1981), Rea (1981), and Lammerts (1983). It is hoped that even more creationists will perform research on insects and that some will assist in preparing a substantial collection of insects from northern Arizona to be stored and used at the GCES research facility.

Acknowledgments

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Appendix:

Each order of insects is in capital letters followed by various families collected in that group. Unless otherwise noted, each collection was made at or near the GCES.

ODONATA

Aeschnidae, *Aeshna arida* Kennedy, dragonfly, Sullivan Lake.
Coenagrionidae, damselfly, Sullivan lake

ORTHOPTERA

Locustidae, locust
Tettigoniidae, long horned grasshopper

HEMIPTERA

Corizidae, box elder bug
Pentatomidae, stink bug, and three other Hemipterans

NEUROPTERA

Ascalapidae, *Ululodes* sp., owlfly, Sanders has this and is working on species.

COLEOPTERA

Cincindellidae, tiger beetles
Carabidae, ground beetles
Staphylinidae, rove beetle
Elateridae, click beetle
Pyrochoridae, fire-colored beetle
Tenebrionidae, darkling beetles
Scarabaeidae, June beetles etc.
Chrysomelidae, cucumber beetle

LEPIDOPTERA

Pieridae, cabbage moth
Sphingidae, Sphinx moth

Noctuidae, owl moth
Geometridae, geometrid
Pyrilidae, pyralid moth
Micropterygidae, mandibulate moth

DIPTERA

Pipunculidae, big-headed fly
Syrphidae, fruit fly
Ephyridae, shore fly
Muscidae, muscid fly
Tachnidae, tachnid or warble fly

HYMENOPTERA

Pompilidae, spider wasps or tarantula wasp
Apidae, *Bombus* sp. and *Anthopora* sp. (bumble bee and mason bee) as well as several other Hymenopterans

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QUOTE

Consider the following concrete existential phenomena: Where is the first-class scientist or philosopher or scholar today, one who has won or who may be considered for a Nobel Prize, who can recite the Nicene Creed in good faith and accept what it asserts without mental reservations? Excellence in science and scholarship appear, then, to corrode faith demonstrably. How much of whatever faith a scientist or artist finally comes out with as a result of his science or art will be acceptable to David, Paul, Augustine, Athanasius, Chrysostom, Aquinas, and Luther? Who "judges" whom in the matter of faith, the scientist or the saint?

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FLOOD AND POST-FLOOD GEODYNAMICS: AN EXPANDED EARTH MODEL

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Abstract

Several creationist and non-creationist global tectonic models have been put forward to explain the distribution of continents, topographical features, floral and faunal dispersions. An Earth expansion geodynamic model appears to best account for the empirical data and the catastrophism of the Flood-Judgment required by Scripture.

Introduction

This writer's interest in Earth models arises from studies into the archaeological record left by paleo-historic peoples.¹ If an archaeologist accepts the Bible as authoritative in science and history, then development of non-evolutionary Earth models is essential. From Creation there has been no time in the Earth's geologic history that mankind has not been present. If archaeologists are to develop a true understanding about the lifeways² of paleohistoric peoples, then knowledge of environment and of peoples, interaction with the environment is required. Post-Flood human, plant and animal populations were affected by Earth's geodynamic processes. These processes determined weather patterns and climate. They affected regional and global geography. The post-Flood dispersion of animal populations and the later post-Babel dispersion of the human population were influenced, perhaps directed, by the changing paleogeography. New lands were opened to habitation and other regions were isolated from further migrations and colonization.³

The plan of the article is to critically summarize the major evolution-biased geodynamic models: These are

- (1) Models where the oceans and continents are fixed in position and permanent;
- (2) Plate tectonic models where continents drift and new ocean floor is formed while old ocean floor is destroyed; and
- (3) Earth expansion models where growth of new ocean floor is not compensated by destruction of old ocean floor.

This critique is followed by a Bible oriented *expanded Earth model*. As creationists our attention has been directed to Earth expansion most recently by Glenn Morton.⁴ This paper suggests that a feature of Flood-Judgment geodynamics was the rapid expansion of the Earth. This expansion contributed to changes in both the hydrosphere and atmosphere and the distribution of post-Flood land masses. The expanded Earth model presented here is empirical and simplistic, intended to nurture hypotheses explaining the relationship of humankind to the post-Flood environment.

Evolution-Biased Earth Models

Evolution-biased Earth models are creations of the evolution paradigm. As such they require unlimited time for Earth history. These models are at variance with Earth models framed around the historical global Flood-Judgment. Evolution-biased models attribute all geologic history to uniform processes or to chance

catastrophes which supposedly operate over billions of years. The Creator is irrelevant and the Bible is myth.⁵

No evolution-biased Earth model can be demonstrated on the global scale for which it is postulated to occur. And herein lies a conflict. These geodynamic models lack a coherent mechanism which explain how their processes could operate for billions of years of geologic history. However, without billions of years the uniformitarian geological processes could not have occurred.

Contracting Earth Models

The idea that the Earth is contracting, cooling from an originally incandescent ball, was doctrine to Earth scientists until the 1960's. Folded mountains were believed to be uplifted surface crust (lithosphere) resulting from contraction of the Earth's interior. Ocean basins were regions of crustal collapse. Vertical movements and compression of the lithosphere were possible, but horizontal plate movements were excluded.⁶ But contracting Earth models have some serious problems. According to the model, mountain building processes should be spread evenly over the globe as uniform contraction has occurred. The analogy often raised was to the random wrinkles produced on the surface of a dried apple. But this random occurrence is not the case. Mountain ranges primarily occur in narrow, curvilinear belts, often at the edge of continents.⁷ Another anomaly was discovered with the analysis of data on the Earth's topography. Calculations from data taken over the surface confirmed that two distinct levels could be distinguished: the continental crust and the abyssal ocean floor. This bimodal distribution was not predicted by a contracting Earth model. If elevations resulted from random uplifts and subsidence, a normal or bell-shaped distribution of elevations around the median level would be expected.⁸

The relationship of a cooling interior to a contracting surface also produced contradictions. Internal heat, whether primal or radiogenic would be expected to decline exponentially through time. Evolution-biased geology recognized that the sequence of orogenesis did not correlate to a pattern of exponential cooling.⁹

As already noted, a fundamental concept of contracting Earth models is that position of the continents and oceans has been permanent throughout geologic history.¹⁰ One of the most debated problems between biologists and geologists has been the distribution of fossils and geological features common to two continental land masses which are separated by a vast ocean. To allow for such associations land bridges were assumed to have existed in a remote past (particularly, transatlantic land bridges). Land bridges allowed migration of animal and plant populations

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between continents. Where are these bridges today? It was assumed that they collapsed and became part of the ocean basins. When exploration of the ocean floor became possible, fossil and sedimentary evidence for collapsed land bridges was not found. Instead it was found that ocean floor sediments were much thinner than those on the continents. This was not expected. If the oceans and continents were of equal age and in permanent positions, the sedimentation rates and distributions should reflect this.¹¹ A further problem was that ocean floor sediments were "young;" that is, comparable fossil indicators were the same in the ocean sediments as the topmost sediments deposited on land. Ocean sediments have not been found comparable to the "older" continental sediment profiles. If continents were uplifted ocean floor, then the sediment profile of the oceans should be comparable to those "older" sediments on land.¹²

Drifting Continents

The contracting Earth model rapidly gave way during the 1960's. The associations of trans-oceanic fossil and sedimentary distributions of the continents were eventually accepted and deemed explainable only if the continents were at one time joined. If joined in the past, then the logical extension of this idea is that at some time the continents must have also separated.

Almost 50 years before acceptance, the concept of drifting continents and moving ocean floors had gained the attention of the scientific community. In 1912, a German meteorologist, Alfred Wegener, proposed that the continents on either side of the Atlantic were at one time joined, had rifted and then drifted apart. His theory was inspired, in part, by the apparent jigsaw fit between South America and Africa. Figure 1 is a modern version of the fit between the continents either side of the Atlantic. To Wegener the idea that the continents were once joined explained fossil and stratigraphic links between continents without the problems associated with land bridges. But Wegener's theory of continental drift was rejected by most scientists of the day. The reason for rejection most often given was that the theory failed to provide an acceptable explanation of forces required to start and maintain the continents in motion.¹³ However, another reason for rejecting Wegener's theory was that those in control of the scientific media could not accept challenges to popular and cherished theories on which many academic reputations rested. Professor Carey, one of the leading revivalists of the continental drift model in the 1950's, observed:¹⁴

During the thirties and forties and early fifties, Wegener's ideas were generally rejected as a fantasy—fascinating but false. 'Ein Marchen, a pipe dream, a beautiful fairy story' chanted the American bandwagon. During the decades of repudiation, arguments which denied continental dispersion passed without scrutiny or test. They were correct, *a priori*, because everybody knew that continental drift was wrong . . . (p. 6)

But here's the rub. Although any loose statement denigrating or mocking continental dispersion got easy passage and approval for publication, any who was unwise enough to argue for displacement of continents was cold-shouldered by referees and



Figure 1. Alfred Wegener was impressed by the apparent fit of the continental shorelines between the continents on either side of the Atlantic. Computer assisted projections have further refined this apparent fit. Geological studies of fossil and sedimentation profiles on adjacent regions of South America and Africa also suggest joining in the past. (After Carey, S., 1976, p. 41).

editors and became the butt for snide comments. (p. 9)

Such is the history of "scientific objectivity."

During the decades of scientific community prejudice and ridicule, a minority of geophysicists continued to support the continental drift model. Geologists of the Southern Hemisphere, for example, A. DuToit of South Africa and S. Carey of Australia, saw evidences that indicated a common ice cap had covered portions of South America, Africa, India and Australia.¹⁵ These areas today are separated by thousands of kilometers of ocean. Distribution of fossils, particularly the fossil flora, *Glossopteris*, also suggested these lands had once been joined.¹⁶ Such evidence continued to keep the idea of continental drift alive. (See Figure 2).

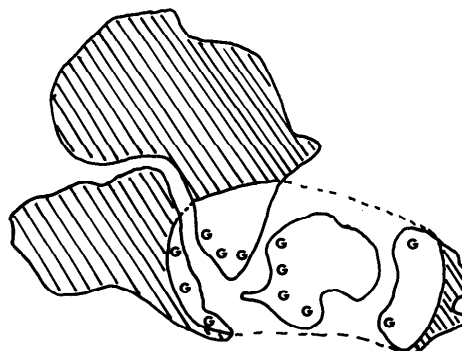


Figure 2. The unshaded, encircled area represents regions of South America, Africa, Antarctica, and Australia thought to have been once covered by a common ice sheet. G represents the fossil plant *Glossopteris* in sediments also common to these Southern Hemispheric regions.

Spreading Oceans and Plate Tectonics

In the 1920's A. Holmes suggested thermal convection in the mantle was the mechanism driving the continents apart. Holmes assumed this convection acted as a conveyor belt on which the continents rode.¹⁷ In the 1960's several geophysicists put forward the idea that the ocean floor was spreading from mid-oceanic ridges. New ocean floor composed primarily of basalt, was being extruded from the mantle. The assumption was that new oceanic crust was being produced through a global network of oceanic ridge-rift systems. New ocean floor spreads out from both sides of these oceanic ridges. The cooled crust is

displaced by still newer upwellings. The older crust is pushed further from the ridge-rift system. The ocean floor continues to move laterally away from the source until it descends again into the mantle. Descending ocean floor results in the oceanic trenches where the "oldest" ocean floor dives beneath the continental margins or under island arc systems. This process was termed subduction. In this way old floor is removed while new floor is produced. The descending wet oceanic crust supposedly undergoes partial melting as it descends into hotter and higher pressure regions of the mantle (asthenosphere). A portion of the melting, descending crust moves back toward the surface as lava which results in tectonic and volcanic activity. Furthermore, "lighter" oceanic sediments cannot descend into the mantle. These sediments slough-off becoming part of the continental margin. But most of the descending ocean floor is circulated within the mantle convection currents and may later resurface at the oceanic ridge-rift system as new ocean floor. In this way ocean floor is theoretically constantly being renewed throughout geologic history.¹⁸ Figure 3 summarizes some hypothetical features of ocean floor spreading and mantle convection.

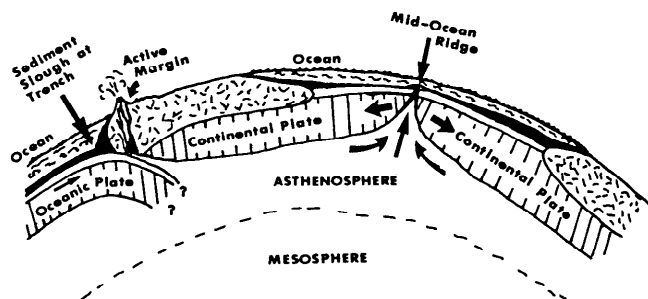


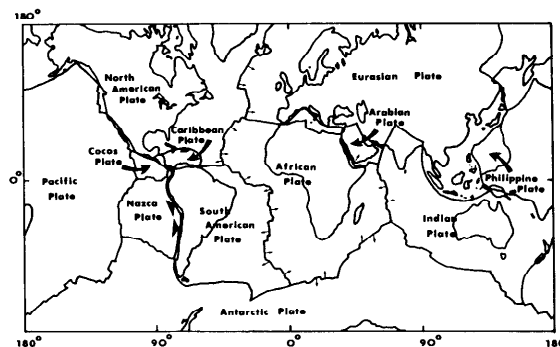
Figure 3. Representation of the major features of the plate tectonic model (After Talwani, M., and Langseth, M., 1981, *Science* 213:23).

Plate tectonics is a synthesis of the hypotheses of continental drift, mantle convection and ocean floor spreading. The plate tectonic model views the Earth's crust as being composed of seven large, fairly rigid plates and several minor ones. The major plates are Indian, Pacific, Antarctic, North and South American, African and Eurasian. Plate boundaries are drawn to coincide with oceanic trenches, oceanic ridge-rift systems, and continental regions of earthquake and volcanic activity (Figure 4). A plate is assumed to be represented by a continental land mass and surrounding ocean floor up to the boundary. Because the continental plates are lighter than the basaltic oceanic crust, they "float" and are carried along by the moving ocean floor. The uniformitarian nature of plate tectonics creates a cyclic picture of plates colliding, joining and separating. This cycle is assumed to be repeated throughout eons of geologic time.¹⁹

Plate Tectonics and the Geologic Evidence

Plate tectonic models have attained wide-spread popularity and, therefore, are taught with varying degrees of certainty as scientific fact. However, there are major problems between what is predicted by theory and the geologic evidence. A sampling of these problem areas is highlighted below.

A. Africa. The African plate includes the continent



▶ represents area of supposed subduction along the Peru-Chile Trench.

Figure 4. Mercator projection of Earth showing "boundaries" of major lithospheric plates. Note that the African plate is surrounded by oceanic "spreading" zones (After Forsyth, D., and Uyeda, S., 1975, *Geophys. J.* 43:163).

and a surrounding "ocean floor spreading" zone. Assuming that Africa has separated from the other continental land masses, plate tectonic theory requires an area of crust larger than the African continent to have been subducted.²⁰ But between the Atlantic and Indian ocean spreading ridges, there is no trench system available to swallow "older" crust. In fact Africa is surrounded by a spreading ridge-rift system as shown in Figure 4.

Plate tectonic theorists have suggested that the African plate has remained stationary while new ocean floor growth has been accommodated by the Pacific trench system and towards Antarctica. As Carey observes:

The Peru-Chile Trench then has to swallow more than 1600 km of Africa's share, plus more than 1400 km of South America's share, plus 3700 km from the South Pacific, making a total of 7000 km of lithosphere underthrust below the Andes.²¹

Towards Antarctica, the Kermadec Trench between Australia and Africa would have had to subduct 1300 km of oceanic crust.²² Is there any evidence that this massive magnitude of subduction has occurred? The answer is "No."

B. Peru-Chile Trench. In order for the Earth's radius to remain constant the trenches around the globe must swallow oceanic crust at the same rate that ridge-rift systems are producing new ocean floor. However, the sediments deposited on the ocean floors would not all be subducted. Sediments are lighter than the basaltic crust and would "float" on the denser mantle rocks. Scrapings of the lighter sediments should pile up in the trenches and at continental margins. Massive volumes of ocean floor sediments should be found within the trenches and at continental margins. Geological surveys of the Peru-Chile Trench have revealed a different picture. Some sections of the trench are empty of sediments, whereas, other sections contain *undisturbed* Tertiary sediments (see Figure 5).²³ Geologic evidence for massive oceanic crust subduction does not exist in the Peru-Chile Trench.²⁴

C. Antarctica. Plate tectonic theory causes even more severe problems for Antarctica than Africa. Figure 6 represents the situation for Antarctica. The

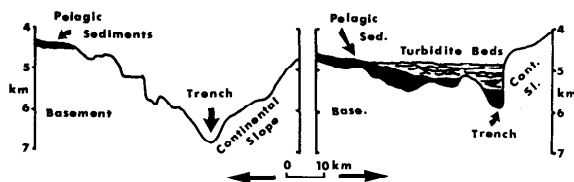


Figure 5. Some regions of the Peru-Chile Trench are empty of sediment "slough" (left above). Other regions contain only undisturbed Tertiary sediments (right above). For the continents to have reached present locations by the processes of plate tectonics, 7000 km of ocean should have underthrust the Andes leaving lighter pelagic sediments accumulated in the trenches and up the continental slope (After Scholl, D., *et al.*, 1968, p. 870).

Antarctic plate is bounded on all sides by "spreading" zones. Again, according to the theory, an area of oceanic crust no less than the size of the continent would have been subducted. No sign of such a massive subduction exists. The only small trench (South Sandwich) in the region is at right angles to the hypothetical spreading zone.²⁵

Theoretical diagrams of ocean floor spreading and subduction may appear convincing. On the other hand, when plate tectonic principles are applied on a global scale, the geologic evidences are lacking.

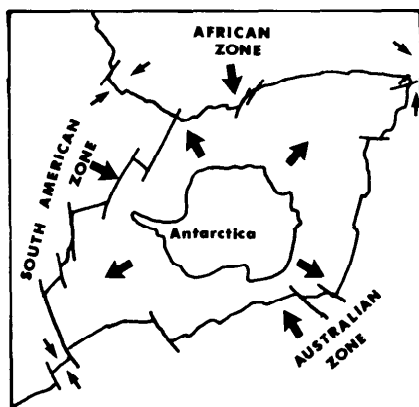


Figure 6. Antarctica is completely surrounded by oceanic plate boundary zones. Where the plate boundaries meet, there are no trenches available to "swallow" the older oceanic crust (After Carey, 1983, p. 383).

D. Convection Currents. Plate tectonics proposes that horizontal plate movements are the cause of all major geotectonic effects. Theoretically, when an oceanic plate collides with a continental plate, the heavier oceanic crust descends beneath the continental plate. To move these plates along, convection currents within the mantle have been assumed.²⁶ A pan of heated water shows thermal convection. The hotter, less dense water rises from the bottom of the pan and at the surface it loses heat to the atmosphere. The cooler, denser surface water descends toward the bottom of the pan. When applied to the Earth's mantle, the idea is "given enough time," the Earth will behave as an ideal Newtonian fluid. If so, mantle rock should show a convection similar to the thermal convection described above. However, experiments with rock deformation under strain indicate the Earth's mantle may have properties which make it act differently from a normal Newtonian fluid.²⁷ The obstacle to knowing is that geophysicists cannot adequately test their hypotheses about the Earth's interior. Fluid properties of the mantle, beyond those required

for isostasy phenomena of the crust, are unknown.²⁸ In fact, geophysicists still are unable to determine mantle composition precisely.²⁹

One geophysicist has recently observed:

The results of our respective investigations and deliberations represent no more than clever speculations or, at best, more or less reasonable working hypotheses. We have not really advanced our theoretical thinking and knowledge much beyond that of our teachers twenty or even fifty years ago. We may postulate, or even believe it fervently, that convection is the ultimate and ubiquitous motor in plate tectonics. Yet we cannot prove that friction between mantle and crust—how else can thermal convection be converted into direction motion?—is sufficient to drive crustal plates, large and small.³⁰

E. Mythical Tethys. A major gapping area is part of all plate tectonic models. When continental land masses are joined on a modern radius globe, a massive gap is created between Asia, India and Australia (Figure 7). This gapping area is assumed to have been ocean and is called Tethys. Supposedly, Tethys was destroyed by subducting under the Asian continental plate as India collided with Asia. Subduction is why Tethys does not exist today.³¹ However, there are problems with this hypothesis. Meyerhoff and Meyerhoff insisted that India has never been "far" from Asia in its geologic history.³² Carey has shown that India has faunal and paleogeographic ties with Australia, Antarctica, Madagascar, East Africa, Arabia, Iran, Afghanistan, Kazakhstan and Tibet.³³ To account for fossil and stratigraphic similarities paleogeographers have found it necessary to "ferry" Australasian islands back-and-forth across this gapping area. Timor is an example.³⁴

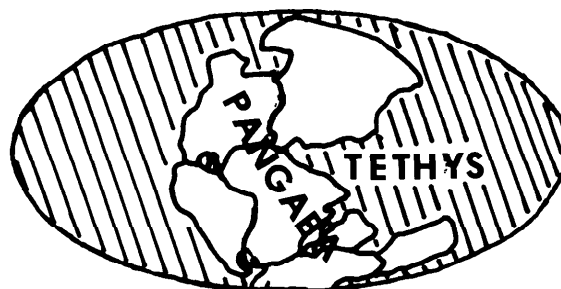


Figure 7. Reconstructions of a single "supercontinent" on a constant radius Earth requires a single superocean. Since the modern ocean is "younger" than the continents, plate tectonic theory supposes that the ancient Tethys was completely subducted into the mantle.

Expanding Earth Models

The failure of plate tectonic models to reconcile theory and geologic data has revived interest among a minority of scientists in expanding Earth models. Most of the early interest in an expanding Earth was from European scientists who were inspired by Wegener's concept of continental drift. Lindemann in 1927 argued that extension and rifting were the predominant features of the Earth's surface. He postulated that continental drift was the result of expansion of the Earth's interior.³⁵ Helgenberg (1933) was the first to assemble a smaller radius globe of Earth showing land masses "fitting" together with the exclusion of oceans.

His model was about 60 percent of a reference globe of modern dimensions.³⁶

Recently, an expanding Earth symposium was held in Sydney, Australia (February, 1981). The meeting of international scientists represented leading proponents of both plate tectonic and earth expansion models. This meeting was followed in November, 1981, by a Moscow conference on Earth expansion. From these meetings evolution-biased theories of Earth expansion fall into four categories:

- (1) constant mass, but a superdense, metastable inner core which has changed in phase with time to matter of "normal" density;
- (2) constant mass, but declining gravitational constant G ;
- (3) mass of the Earth has increased with time from cosmological phenomena, i.e., expansion is a universal phenomenon driven by a function of pressure, temperature and time; and
- (4) significant accretion from asteroidal impacts over billions of years.³⁷

Empirically, expanding Earth models build on the observation that continental surface structures fit together more precisely if the Earth's radius is smaller than today. Owen of the British Museum (Natural History) has noted that geometric patterns of continental fit used by plate tectonists suffer from two major inadequacies: (1) reconstructions are made of relatively small areas without reference to effects on surrounding areas; and (2) "—lack of elementary cartographic competency in workers whose geophysical work is, otherwise, of a high standard." Owen has shown how small 'gaps' occur on correctly projected reconstructions using an Earth radius of modern dimensions. These gaps disappear on smaller radius Earth projections.³⁸

Regarding the massive subduction required of plate tectonic models of the Tethyan ocean, Stocklin has concluded:

Palaeomagnetic data for the late Palaeozoic and earliest Mesozoic, if applied to an Earth of present size, require a wide Tethyan oceanic separation between India and Eurasia; if applied to an Earth of smaller size, no such separation is required. The geology of the Himalaya fails to indicate a Tethys Ocean of Paleozoic-earliest Mesozoic age and in this respect supports the theory of Earth expansion.³⁹

Compression and Mountain Building

If continental separation involved only Earth expansion, the expansive forces alone should prevent crustal collisions. Apparent collisions are, however, part of the geologic record. The Alps are believed to have resulted in a horizontal compression of several hundred kilometers of lithosphere.⁴⁰ To overcome this problem some theorists have proposed models where the Earth expands for a while, then contracts. The major difficulty with expanding-contracting or pulsating Earth models is identification of a reasonable motor that could operate *both* expanding and contracting alternating phases.⁴¹ Carey argues that geosynclinal and orogenic features arise through cycles of lithosphere extension and the diapiric rise of heated mantle, respectively. The orogenic belts are part of

the peri-continental expansion polygon system as are the oceanic ridges. The diapiric rise of mantle exhibits gravity spreading at the surface resulting in ultramafic belts, basement horsts, fanned lineations and gravity nappes (which are mistakenly identified as collision features).⁴²

Ocean Water Accumulation

Increasing the Earth's radius resulted in enlarging the oceanic crust. It has been suggested that Earth expansion has resulted in massive outgassing of water from mantle material as new ocean floor was formed. Estimates of total oceanic water on Earth today have ranged between 1.4×10^{24} grams (Holmes⁴³) and 1.8×10^{24} grams (Anderson⁴⁴). If the radius was 0.6 of the present radius, this volume of water would completely cover the smaller Earth with an average depth of approximately seven to 10 kilometers.⁴⁵ Because of the assumptions and limitations of evolution-biased stratigraphy, such an event is considered impossible. The problem is reconciling outgassing of new (juvenile) ocean waters with the inflated time-frame required by evolution-biased Earth models.

Creationist Earth Models

If the catastrophic Flood-Judgment is accepted as historical truth, then Earth models must reconcile geologic evidences with a Biblically developed chronology and sequence of events. Some creationists have devised Earth models which argue permanent positions for the continents and oceans.⁴⁶ Others have recognized that the distribution of fossils attests to both the catastrophic nature of the Flood, as well as indicating that the present continental land masses were once joined.⁴⁷ Earth models also have been proposed which apply the concepts of plate tectonics to the hypothesis that continental division may have occurred after the Flood.⁴⁸ Biblically, support for a post-Flood continental division may come from Genesis 10:25 where we are told that Peleg was so named because during his lifetime the Earth was divided.

If we conclude from the fossil and stratigraphic evidences that continents now separated by thousands of kilometers of ocean were once joined, then continental dispersion must have occurred. And with respect to Earth global tectonic models, either of two possibilities exists:

- (1) An "older" ocean floor has been destroyed by subduction back into the mantle as the continents dispersed on a constant radius Earth—the hypothesis of plate tectonics; or
- (2) The ocean floor has been produced without destruction of an "older" oceanic crust because the radius of the Earth has expanded.

Glenn Morton, geophysicist and intuitive creationist theoretician, has presented a case for the expanded Earth model and against creationist Earth models built on the plate tectonic hypothesis. Regarding the plate tectonics hypothesis, geodynamic features of mantle convection, when applied to the short time span indicated by Scripture, requires unrealistically high temperatures and massive energy input to move the continents and subduct massive volumes of oceanic lithosphere.⁴⁹ Creationist plate tectonic models also suffer from the same lack of evidence for massive subduction as evolution-biased plate tectonics. Morton

sees only two possibilities to explain a prior fit of the continents:

Either God separated the continents outside of natural agencies or that the earth expanded in such a way that the viscous forces were not involved. The expansion of the earth caused by an expansion of each individual atom due to a change in the permittivity of free space (the electric force) is a possibility which could avoid the viscosity problem.⁵⁰

The lack of evidence for continental uplifting and oceanic sinking and the absence of massive subduction mitigates against models of fixed continents or continental dispersion models involving plate tectonics.

The expanded Earth model which follows will focus on historical consequences rather than mechanism. Whether the motor of this Earth expansion model was miraculous or naturalistic is not the concern of this presentation. A sequence of global tectonic events are described in Scripture and are evidenced in the Earth. It is these evidences that the following Earth expansion model will address.

The Antediluvian Earth

From creation of the Earth until the Flood-Judgment, the Earth's radius was 60 to 70 percent of what it is today. Figure 8 exemplifies the paleogeography resulting from this smaller radius. Land was predominant and the great ocean basins of today did not

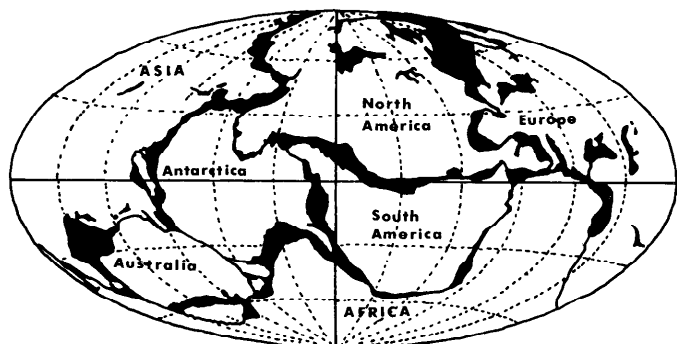


Figure 8. Reduction of the Earth's radius by 60 to 70 percent results in a paleogeography dominated by land possibly separated by narrow seas. (This reconstruction is after Kirillov, I., 1958, in *Expanding Earth Symposium*, p. 22).

exist. Instead the land was partitioned by narrow seas and, possibly, shallow epicontinental seas (or marshes) in some regions of the earth. The hydrospheric equilibrium and atmospheric circulation would have been predictably much different from today due to the pre-Flood proportion of land and sea. Creation scientists have often cited evidence from both Scripture and the fossil record which suggests some of the differences of the antediluvian world:

- (1) Milder temperatures with less range between highs and lows;⁵¹
- (2) Absence of rain with the principal mechanism for watering the pre-Flood flora being dew rising from the ground;⁵²
- (3) Absence of cyclonic winds, but an implied presence of gentle breezes;⁵³
- (4) One central river system, originating in the land of Eden and branching into four rivers which extended into other lands—two branched river sys-

tems are noted as "encircling" (*sobhebbh*) the lands into which they flowed;⁵⁴

- (5) At least five pre-Flood regions are identified—Eden, Havilah, Cush, Asshur and Nod;⁵⁵
- (6) Waters were in existence above the Earth's atmosphere, possibly in the form of a high altitude canopy⁵⁶ and/or as Earth-Moon orbiting ice rings;⁵⁷ and
- (7) Abundant and diverse fauna and flora.⁵⁸

The Flood-Judgment

The term Flood-Judgment stresses that the cause of the global Flood catastrophe was not accidental. It was ordained and executed by God, not as an "act of nature," but as an act of judgment against human rebellion directed at God and His Word. Since Scripture faithfully records the chronological history of this judgment, this historical account provides the framework within which scientists are secure to develop Earth models. All extra-Scriptural frameworks devised by men will lead up blind alleys to the extent that they are contra-Scripture. Table I summarizes chronologically some significant events of the flood as recorded in Genesis.⁵⁹

Table I. Chronology of the Flood-Judgment.

Time-frame	Event	Reference
Day 1	The Flood-Judgment begins. The vast body of water beneath the Earth bursts forth and the waters above the atmosphere rain downward.	Genesis 7:11
Day 40	The meteoric waters, which have descended continuously for 40 days, have ceased. The release of the subterranean waters has also ended. The Flood-waters now cover the highest Archean mountains of the pre-Flood Earth.	Genesis 7:17 Genesis 7:18-21
Day 150	The Floodwaters have continued unabated for 110 days. On the 150th day, the Floodwaters begin to subside. Abatement was triggered or accompanied by a cyclonic wind.	Genesis 7:18-21 Genesis 7:24-8:1
Day 224	After 74 days the tops of mountains begin to appear.	Genesis 8:5
Day 278	Fresh growth of plants has begun—the second dove brought a fresh olive leaf back to the Ark.	Genesis 8:11
Day 371	The land in the vicinity of the Ark is sufficiently dry to allow disembarkation of people and animals from the Ark. It has been 221 days since the waters began to subside and 147 days since the mountain tops appeared.	Genesis 8:14

Increase in the Hydrosphere

Two major Flood-Judgment events resulted in the catastrophic increase in surface water on Earth; the influx of meteoric waters from above the atmosphere

and the breaking of the "fountains of the deep."⁶⁰ Creationists have interpreted these fountains as being subterranean water sources. The water source for the great river branching out from Eden in an environment of little or no rain also suggests a subterranean supply.⁶¹ Some have suggested that the waters from the "fountains of the deep" were the major contributor to the increased surface water volume.⁶²

The old evolution-biased idea that the oceans originated from condensation of a primitive atmosphere has lost support during this decade. An alternative hypothesis is that ocean water resulted from the outgassing of magma as it ascends from depths of higher temperatures and pressures.⁶³ For example, geochemists have observed that granitic magma is capable of holding six to nine percent water in solution. This applies to magmas having crystallized at pressures indicative of 1,220 to 3,650 meters depth and temperatures not in excess of 870°C.⁶⁴

During the initial stages of the Flood-judgment it is reasonable to assume that both "free" subterranean water (source of ground dew and the Edenic river system) and plutonic water were the waters released by the breaking of the fountains of the deep. Outgassing of magma would also inject gases (other than water) into the atmosphere.⁶⁵ Rapid outgassing would mean that both the hydrosphere and atmosphere would be in dynamic disequilibrium, both chemically and physically. Magmatic outgassing would also elevate the temperature of the increasing Floodwaters. The hotter plutonic Floodwaters would be cooled by loss of heat to the atmosphere and through mixing with meteoric water, "free" subterranean waters and pre-Flood surface seas and rivers. Overall, warmer world-wide Floodwaters could be expected. Oard has proposed a model where post-Flood warm oceans initiated the "Ice Age"—massive glaciations of the northern hemisphere and ice caps of the north and south poles.⁶⁶

Earth Expansion and Ocean Basins

Morton has considered the distribution of sediments left by the Flood-Judgment. If continents and oceans existed during the Flood as they are now, sedimentation dynamics require the deposition of thicker sediments in the ocean basins. Since the opposite is true, Morton concludes that the ocean basins have formed after the Flood. Further, the modern global sediment profile suggests an Earth radius, when covered by Floodwaters, of approximately 58 percent of the present radius.⁶⁷

If the oceans were, in fact, created after the major load of continental sediments had been deposited, the thinner and "younger" oceanic sediments can be explained. The ocean basins would have formed in between the continents as the Earth expanded. This delayed expansion would imply that during the initial stages of the Flood, release of both outgassed plutonic and subterranean "free" waters would have occurred either before Earth expansion or at a faster rate. The current volume of oceanic water on a smaller Earth (60 percent of the modern radius) would result in an average Floodwater depth of approximately seven to 10 kilometers.⁶⁸ This Floodwater depth is adequately excessive so that some Earth expansion could have occurred during the initial 40 days of the Flood-Judgment. However, if this initial expansion did

occur, either it ceased after the 40 days or both expansion and the production of plutonic waters occurred at equivalent rates thus maintaining the Floodwaters for the additional 110 days (Table I). The rate of outgassing elements from mantle rocks depends on many factors; for example, solubility, complexes, and temperature and pressure gradients.⁶⁹ To suggest geochemical mechanisms for the production of plutonic waters in an expanding Earth model is beyond the scope of this article.

Psalm 104 provides additional information about events during these 221 days in which the waters receded from the land:

- (1) Verse six affirms that the waters of the Flood-Judgment enveloped the whole Earth, even to the extent of covering the Archean (pre-Flood) mountains;
- (2) Verse seven affirms that the Floodwaters began to abate only after Divine Intervention and that the waters receded rapidly once God gave the command;
- (3) Verse eight adds that the Floodwaters flowed over the mountains and into the valleys (tension rifts) as they receded off the continents; and
- (4) Verse nine suggests that a geological boundary exists so that the Floodwaters collected in the ocean basins can never again cover the continental land masses.

Earth expansion would have resulted in dispersion of the continents. The dramatic nature of this dispersion can be seen by comparing the paleogeography of a smaller radius Earth (Figure 8) to the projection of an Earth of modern dimensions (Figure 4). Where continental lithosphere rifted apart, new oceanic crust appeared. Basaltic ocean basins formed with the Floodwaters receding to expose new land. As expansion continued, gravity would dominate and the Earth's curvature would change with the expanding radius. Carey has noted that lithospheric plates described by plate tectonic theory could actually represent "primary polygons" (Figure 4) with their boundaries of tectonic and seismic activity being zones of spreading diaphers (vertical rises of magma).⁷⁰ The primary polygons are thousands of kilometers across and may represent rupture of the entire mantle down to the fluid core. These primary polygons are also forced by tensional and gravitational forces into smaller second-order polygons. Second-order polygons are hundreds of kilometers across, representing tensional adjustments down into the asthenosphere of the mantle.⁷¹ Holmes identified these second-order polygons as "basins and swells."⁷² Carey argues that these basins result, not from surface depressions, but rather from a lag in rising as the Earth expands. The swells, on the other hand, are regions of tectonic activity showing background seismicity, higher heat flux, faulting and some rift valley formation. (Figure 9). The polygonal pattern dominates the Earth's surface. In a statistical analysis of the lengths and angles of various Earth polygon boundaries, Rickard has made the following observation:

The preponderance of near 120° intersections suggests that, as in the case of polygonal systems in other materials,—e.g. mud, permafrost, and

basalts, etc.—these polygons were formed in tensional stress field.⁷³

As the Earth expanded the continents dispersed, the ocean basins formed and the water receded from the continental platforms.



Figure 9. Basin and swell pattern of "secondary polygons" representing tensional adjustments to Earth expansion down to the asthenosphere of the mantle (After Holmes, 1945, in *The Expanding Earth*, p. 42).

Asteroidal Impacts

There is ample evidence from fossil craters that during the Flood-Judgment the Earth, indeed the Solar System, was exposed to a massive influx of asteroidal bodies.⁷⁴ By comparison to Earth's nearest neighbor, the Moon, there are surprisingly few large impact structures. This is best explained by reasoning that evidence of impacts which occurred during the Flood-Judgment would be destroyed along with the rest of the Antediluvian world. Only those impacts occurring on land after the Floodwaters had sufficiently abated would leave their mark. Asteroidal impacts could have contributed a massive heat flux during the Flood.⁷⁵ The energy released could have weakened the mantle triggering further expansive forces thereby hastening Floodwater abatement. When the Floodwaters began to recede, Genesis identifies a great wind associated with this event.⁷⁶ Clyclonic windstorms could be predicted from changes in atmospheric heating resulting from the massive asteroidal encounters during the Flood-Judgment.

Quaternary Rifting

Tensional and gravitational forces continued to stabilize after the water receded from off the continental platforms and into the ocean basins. This post-Flood tectonic activity continues through the present although at a much reduced intensity. Major foci of tectonic activity are concentrated primarily at the polygon boundaries (Figure 4). As previously suggested, warm oceans hastened the rapid post-Flood glaciations. World climatic and weather patterns would have varied from one decade to the next as oceanic and atmospheric circulations adjusted to the changed geography and changing temperature gradients. A few large asteroidal impacts continued into this "Quaternary Age."

After the Babel confusion of languages, the human population migrated from Mesopotamia into the unexplored regions. They adapted to a hunting and gathering lifestyle as they continued to push into new environments. In the north an apparently milder climate existed which allowed large herds of cold-

adapted animals, such as mammoth and woolly rhinoceros, to graze the tundra and steppe meadows of Siberia to Alaska.⁷⁷ In the Southern Hemisphere, Australia was much wetter than today. Regions now desert were places where chains of freshwater lakes occurred.⁷⁸ Megafauna, such as mammoth mastodons, giant ground sloths, giant kangaroos, lived after the Flood-Judgment and all adapted to the regions into which they migrated after the Flood.

The Pelegian Extinction

A later article will cite evidences for a short episode of concentrated tectonic activity that occurred soon after the Babel dispersion had begun. The overall result was a penultimate glaciation in the Northern Hemisphere and the rapid desertification in all areas south. The megafauna, as well as some smaller species, suddenly became extinct. Many herds of cold-adapted giant herbivores in the north were quick frozen.⁷⁹ In the Southern Hemisphere giant marsupials in Australia died as the freshwater lakes quickly dried and the surrounding grazing lands became arid.⁸⁰

The Pelegian extinction was catastrophic and linked to rapid climate change. Post-Flood tensional rifting can be seen on a massive scale on the continents; e.g., the East African Rift Valley. Volcanic activity is evidenced along the boundaries of the primary polygon features and along some 'swell' features of secondary polygons. Changes in sea level isolating the post-Flood continental bridge between Asia and America and rifting separating Australia from Indochina are possible activities that occurred during the life-time of Peleg. Such post-Flood geological activity would have divided geographical regions and isolated human and animal populations which could explain many biogeographical enigmas concerning biologists today.

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PANORAMA OF SCIENCE

Reality and Radioisotope Age Determination

Randal Mandock¹ covers many topics on radioactive dating in detail. Such subjects as the effect of trace element distribution and isotope enrichment analysis on radioactive "ages" of various minerals are discussed. The very important consideration of the effects of cooling times of subsurface objects is covered. Obviously, not all of a mineral body or a geologic formation cooled at the same instant or at the same rate. This differential cooling would drastically affect any measured radioactive "age" of a crustal material.

Other topics covered are isochron mixing, so-called concordance of various dating methods vs. actual cases of discordance, volume diffusion of daughter products such as radon, and pleochroic halos. Concerning the latter Mandock notes:

... the halos are created by alpha particle emission from radioisotopes. Halos from ²¹⁸Po are found in granitic crystalline rocks at various depths on every continent surveyed. ²¹⁸Po has a half-life of about three minutes, and no identifiable precursors have been observed, i.e., ²¹⁸Po appears to be

primordial. This implies that the rocks which contain the halos must have been crystalline when the halos were created, but not crystalline for more than three minutes before halo creation. This further implies that the granitic minerals must have cooled and crystallized almost instantaneously. This presents a problem since no igneous rock can cool or crystallize this rapidly. (p. 142)

Mandock concludes that since so many unknowables and incorrect assumptions are built into the radioactive dating methods, they indicate only a scale age rather than a measure of absolute time. Anyone preparing an in-depth analysis of radioactive dating from a creationist viewpoint should consult this excellent literature review and discussion.

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Contributed by Emmett L. Williams

QUOTE

One sees in this argument St. Thomas's transformation of Aristotle, his elevation of Aristotle's insights into the *beingness* that Plato tends to deny to creation, raising Aristotle's insights to the level of Christian doctrine. But one also sees a variety of matters other than doctrinal history. More to our immediate concerns are the local, contemporary effects of the abandonment of that doctrine that have been progressive in our history since the Renaissance. For instance, one might discover under the light St. Thomas's argument casts upon our immediate attempts to discover reality, certain modern failures of intellect that consequently leave us confused in the midst of a multitude of ideological contenders. Though we may introduce illustration only in an abbreviated way here, we may at least consider the effect upon our present intellectual climate of those Puritan deconstructions of the Thomistic doctrine, the doctrine that brings Aristotle and St. Augustine into an accommodation with nature through Thomas's seeing nature as the *creatura* of the Creator. The Puritan deconstruction is largely accomplished now. It begins at the time of the opening of the colonies in the New World, in so far as those deconstructions may be said to bear directly upon our national life. Since then it has become so deeply engrained in our institutions and hence in our thought on public matters that it seems now an indelible part of our political character as a nation, though there are still local and regional oppositions.

But to begin with the New World Puritan and his deconstructions: If the "thing itself," if the sense object that we tend to speak of collectively as *nature*, is indeed a first principle of our knowledge of God, as Thomas argues, it simply will not do to speak of a portion of nature, the New World upon whose shores William Bradford debarked, as "a hideous desert wilderness" of "a wild and savage hue," any more than it will be theologically acceptable to manipulate that wilderness toward establishing our desires in the world. One cannot, to the good health of mind and spirit, be indifferent to the wilderness as a creature of God, let

alone hostile, as many colonial leaders like Bradford were. For from the orthodox theological point of view, one might say that the "wilderness" is Eden seen from the outside, through our fallen nature, without full recognition of that separation in the Puritan mind. Thus to manipulate that world that we may build "a city on the hill" reaching toward Heaven has implicit in its vision the gnostic's separation of Creator and creation, of the imminent from the transcendent, rather than the reconciliation of the two that obtains in orthodox doctrine as the duty of our stewardship.

One may not say then, as unmitigated praise, that the New Englanders are "a people of God settled in those, which were once the devil's territories," as Cotton Mather does. For such a prescriptive judgment upon nature outlaws nature, makes of it fair game for foraging beyond the concerns of theological implications or consequences. If nature is, as St. Thomas argues, an objective reality created by God which provides us through the senses with the first principles of our knowledge of the Giver, God, those principles have been nevertheless distorted and manipulated and eventually rejected in the long development of the Puritan mind as it evolves into the Pragmatist mind in our nation. In those deconstructions, the Christian sense of stewardship becomes considerably altered, affecting public policy to a degree not adequately recognized by current contenders over public policy.

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Asimov on Planets Outside Our Solar System

The prolific science writer Isaac Asimov, in his regular column in American Airline's complimentary flight magazine¹ has commented on the reported discovery of a new "planet" outside our own solar system. Asimov notes the relevance of such discoveries to speculation about extra-terrestrial life: "If there are no planets circling other stars, it seems unlikely that there is any life elsewhere."

Until recently it has not been possible to claim observational evidence for the existence of other planetary systems. However, evolutionist astronomers have presumed the existence of other planets, and subsequently have speculated that there is a high probability that extraterrestrial life exists². A belt of dust which is claimed to represent planets in the process of formation has been reported around some stars, but Asimov says that this is not the same as discovering true planets.

The difficulties in observing other planets if they actually exist are discussed by Asimov. Notably, the main problem is that planets can be viewed by conventional techniques only by the reflected light of a nearby star, since planets do not emit their own light.

One of the newer methods of looking for stars with planetary systems is based on the "wobble" observed as a star moves. Normally, a star moves in a straight line, but it is theorized that the presence of an unusually large planet, due to its gravitational pull, would make the star wobble as it moves along its path. Asimov points out that, in the past, astronomers have thought that wobble data was unreliable.

A new technique using infrared light, called

“speckle interferometry” is said to permit the detection of small objects very close to stars. In 1984 such an object was detected near a star named VB8 which, in 1983, had been reported to wobble. Whether or not this object is a planet is apparently subject to debate. It seems to be different from planets as we know them in that it is hot and glowing rather than cold and dark. Its red-hot status is explained by Asimov on the basis of evolutionary assumptions about planet formation. Asimov questions whether this object should be called a planet since it is so different from planets with which we are familiar. Neither can it be referred to as a star since its shining is not the result of nuclear fusion. While some astronomers refer to the object as a brown dwarf, Asimov prefers to call it a substar.

This discovery may be important to both evolutionists and creationists in that it is something never before seen. It seems clear from Asimov’s description, however, that VB8’s object is not capable of bearing life, and that the existence of true planets outside our own solar system has yet to be demonstrated.

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Contributed by Glen W. Wolfrom

Pollen Research Update

In 1983 the Research Committee of the Creation Research Society (CRS) authorized E. L. Williams, G. F. Howe, G. T. Matzko, and W. E. Lammerts to collect, process, and examine rock samples from Grand Canyon for possible presence of fossil pollen. In 1966 and 1972 Clifford Burdick had reported finding pollen grains from seed plants in Precambrian Hakatai shale of Grand Canyon.

Since that time one creationist researcher (Chadwick, 1981) reported that he was unable to isolate pollen grains from Hakatai shale using a different method of maceration and processing than Burdick had used. Naturally, CRS Directors were interested to discover if yet another performance of this experiment (using Burdick’s original method with minor modifications) would demonstrate the existence or the absence of such spores from these supposedly ancient strata.

The strategic importance of this study rests in the fact that most macroevolutionists (based on macrofossil stratigraphy) assume that seed plants and simpler land plants did not arise until the Permian or the Silurian respectively—millions of years *after* the Precambrian “times” of Hakatai shale. Thus seed plant pollen and even land plant spores in Hakatai shale (as claimed by Burdick—1966 and 1972) present a serious stratigraphic anomaly, to say the least. They are “out-of-order” microfossils that should elicit wholesale revision or even abandonment of the usual macroevolutionary scenarios covering the origin of plants.

As was expected, Burdick’s studies were widely criticized by those who maintained that the spores must have been recent contaminations rather than



Figure 1a. This pollen grain (?) was isolated from a sample of Hakatai shale (Precambrian) rock. If it may be assumed that it was disaccate grain with an attachment at the bottom like the one at the top, its measurements are 32 x 58 microns. This object closely resembles the photograph of a pollen grain in the 1972 paper, p. 29, Figure 2 which Burdick labeled as a vesiculate gymnosperm grain comparable to *Alisporites opii* (Daugherty.)



Figure 1b. This pollen grain or spore (?) was isolated from the same sample of Hakatai shale (Precambrian) rock as the object in Figure 1a. Nearly spherical, it measures 32 x 31 microns. Several other putative spores and pollen grains have been recovered from this sample of Precambrian rock—a serious stratigraphic anomaly because land plants and seed plants are not supposed to have existed at the time these strata were deposited. This grain and the one in Figure 1a had a deep yellow and an orange cell wall coloration respectively, which would fit with the belief that they are actual fossil grains and not contaminants. Photographs and discussion of many other grains will be made in a series of three papers soon to be published.

fossil pollen grains from the rocks in question (see Solomon and Morgan, 1973, for example). Yet Burdick maintained that he had taken strict precautions against such contamination in both the collecting and processing of the samples.

In February, 1984, CRS scientists Williams, Howe, and Lammerts secured samples of various Grand Canyon strata under a National Park Service collecting permit. In the months that have followed, these samples have been macerated by Matzko and subjected to pollen extraction by a procedure that is a minor modification of the original Burdick method and one that is very similar to the hydrofluoric acid technique of Chadwick (1981). When 10 percent hydrochloric acid (HCl) is employed to disaggregate the Hakatai shale particles, Matzko and Williams have noticed that a vigorous reaction occurs. Also in preliminary disaggregation studies, Williams observed that a violent reaction develops when hydrofluoric acid (HF) is added to shale particles. Since excessive exposure to acids can destroy fossil pollen grains the HF treatment as used by Chadwick (1981) is too destructive and unnecessary. The HCl disaggregation step is sufficiently effective and a prolonged exposure



Figure 2. A Hakatai shale (Precambrian) pollen sample filtered, mounted and gold coated for analysis by scanning electron microscopy is shown here. Note the closely patterned objects which Williams reports do not look like shale particles also present in the sample. These objects (cellular or non-cellular?) measure 28 x 30 microns. Workers who are familiar with viewing SEM photos of cellular and non-cellular materials are welcome to correspond with the editor regarding the identity of these objects or the ones shown by light microscopy (Figures 1a and 1b.)

to this acid also will be detrimental to the fossilized pollen.

Recently the pollen extracts have been examined under light microscopy by Howe and with the scanning electron microscope by Williams. From one Precambrian Hakatai shale sample we have isolated and photographed (see Figures 1a and 1b) numerous objects which are apparently pollen grains of seed plants and spores of other plants!

Using slightly different techniques on another Hakatai shale sample, Williams has produced scanning electron microscope photographs of certain objects that do not resemble shale particles but do in fact appear to be cellular in nature—see Figure 2. It should be noted in passing that the grain (?) in Figure 1 bears a close resemblance to an object which Burdick recovered and photographed (Figure 4, p. 29, 1972)—calling it a vesiculate gymnosperm grain comparable to *Alisporites opii* (Daugherty.)

The details surrounding the history, methods, and results of this finding will be related in a series of three papers, soon to be published in this quarterly. In the meantime, readers interested and skilled in the identification of spores and pollen grains are invited to correspond with the Editor and possibly become directly involved in this ongoing project.

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Contributed by G. F. Howe, E. L. Williams,
 G. T. Matzko, and W. E. Lammerts.

Kaibab and Abert Squirrels

The editor visited the Smithsonian Institute's Museum of Natural History on October 1 & 2, 1985. One of the displays in the section entitled Speciation-Habitat Barrier concerned Kaibab and Abert squirrels with the following discussion:

The squirrels of the Kaibab Plateau are isolated from their ancestral stock, the Abert squirrels, by the Grand Canyon. The adverse topography of the canyon and its lack of yellow pine which these squirrels need for survival have prevented interbreeding.

The Kaibab squirrels were long considered a distinct species, but recent studies have suggested that they have not been isolated long enough.

Readers should refer to the article, Origin of the Kaibab Squirrel (*CRSQ* 22:68-78) by John R. Meyer in which he reaches the conclusion that the age of the Grand Canyon is quite young. Thus the Kaibab and Abert squirrels have indeed not been isolated long enough!

Contributed by Emmett L. Williams

Wordsworth vs. Sartre¹

Two statements expressing dramatically divergent visions of human existence and experience spanning as they do a century and a half, summarize and exhibit the violent dislocation of sensibility which threatens to erect a psychological "iron curtain" between modern man and all that has gone before. The first is from Wordsworth's 1798 poem *Tintern Abbey*:

And I have felt

A presence that disturbs me with the joy
 Of elevated thoughts; a sense sublime
 Of something far more deeply interfused,
 Whose dwelling is the light of setting suns,
 And the round ocean and the living air,
 And the blue sky, and in the mind of man:
 A motion and a spirit, that impels
 All thinking things, all objects of all thought,
 And rolls through all things.

The second is taken from a 1951 technical pamphlet entitled: *Atmospheric Homeostasis by and for the Biosphere*.

The first cautious approach to a classification of life, reached general agreement as follows: Life is one member of the class of phenomena which are open or continuous reaction systems able to decrease their entropy at the expense of free energy taken from the environment and subsequently rejected in a degraded form.

The first extract reflects a spirit of cosmic piety, of awe, reverence and a corresponding humility. Few, perhaps, have felt the presence of a transcendental power with the intensity of the young Wordsworth, and even he found the experience virtually incommunicable. Only a spiritual pauper, however, could pass through life without sharing, albeit to a diminished degree, that "sense sublime," and that instinctive knowledge (apprehended rather than comprehended) that life is more than mere atoms and a void. Nor, in the past, was such piety confined to poets and mystics. Newton toward the end of his long life wrote movingly of what his contemporaries considered to be his

almost super-human achievements: "I do not know what I may appear to the world, but to myself I seem to have been only a boy playing on the seashore and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, while the great ocean of truth lay all undiscovered before."

The second, self-styled "cautious approach to a classification of life," not only illustrates, under the thin guise of caution, that dogmatic materialism which Hardy suggests is the greatest threat to the soul of modern man, but also provides a classical example of reductionism *ad absurdum*. For the mind responsible for the formulation of such a statement is itself subsumed within that which is being defined away and is therefore itself, implicitly and ineluctably, part of the

total *non*-importance and *non*-sense predicated by the definition. Lest the reader feels that I am giving undue prominence to an obscure and irrelevant example of scientific gobbledygook, consider one statement from *Saint Genet* by that powerful molder of contemporary thought, Jean-Paul Sartre, which illustrates well enough the close relationship between dogmatic scientific materialism (scientism) and reductionist philosophy: "In any event, even after man does take a stand, his act is without significance, because we are still impossible nullities."

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EDUCATIONAL COLUMN

TEACHING ABOUT ORIGIN QUESTIONS: ORIGIN OF HUMAN BEINGS

JOHN N. MOORE*

Abstract

In three previous "how to" articles on teaching about origin questions in a fair and just manner the author discussed (a) the nature of scientific activity in generation of inquiries by scientists, based upon some of the presuppositions of founders of modern science, who accepted belief in Eternal, Personal Creator God Who created all things (CRSQ 21:115-119); (b) identified that professional scientists deal primarily with inquiries to explain "present" natural phenomena resulting in the science of cosmology, for example in contrast to "Historical" Theories, which include evolution cosmogony (Evolution Model) and creation cosmogony (Creation Model) about the origin of the universe (CRSQ 21:189-194); and (c) analyzed and critiqued the five stages of mechanistic, materialistic, reductionistic "chemical evolution" as basis for presentation of circumstantial evidence for a Creator origin of life on the earth as believed by Pasteur, Mendel, and many leading biologists who founded the biological sciences (CRSQ 22:20-25). This article contains discussion of contrasting basic conceptualizations regarding the origin of human beings.

Introduction

As stated at the beginning of this four-part series on "Teaching about Origin Questions," to protect the integrity of a pluralistic educational curriculum, a positive alternative to the majority "establishment" interpretation of first origin questions is needed in American schools. A viable contrasting position to the "conventional wisdom" of the mechanistic, animalistic origin of human beings is needed as an integral part of curriculum in both public and parochial schools.

Again, in introduction, science as a proper and orderly profession entails specifically the direct and/or indirect, *repeatable* observation(s) of *natural* objects and/or events that occur or exist in the physical environment.

However, Total Creationism (based upon belief in Eternal, Personal Creator God Who created all things), and Total Evolutionism (based upon the belief that all things derived from some Eternal, Impersonal Matter-Energy condition) involve *unnatural* objects and/or events (singularities). Thus both of these viewpoints cannot possibly be submitted to scientific study.

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Nevertheless, professionally qualified scientists of the majority do present objective, scientific facts in support of Total Evolutionism; and, also, professionally qualified scientists of the minority do present objective, scientific facts in support of Total Creationism, as fully listed in the December 1984 article in this series, and given for origin of human beings in Table I. Certainly teachers must understand "how to do it" if they are to supplement the majority ideas of "evolutionary" origin of modern male and female human beings.

Actually the question of the origin of human beings involves concepts that have been changing, ever changing—since Charles Darwin's second book, *The Descent of Man*, published in 1871. Because of such changing views and interpretations careful, open-minded discussion of human origin is required to protect the integrity of science education. Yet, currently, a certain majority view of the origin of human beings is proclaimed and taught exclusively, monopolistically as an intellectually acceptable *substitute* for the traditional view of human origin held by founders of the modern scientific discipline.

Table I. Two Sets of Evidence

A. Circumstantial Evidence for Animal Origin of Human Beings

1. Similarities of skeletal, muscular patterns, and brain form

2. Similarities of embryonic structure
3. Similarities of DNA and RNA components of life
4. Similarities of hemoglobin, cytochrome c, and other biochemical aspects
5. Human behavioral similarities to emotional, territorial, and aggressive animal-like behavior involving reaction to signs, signals, and perceptual thought

B. Circumstantial Evidence for Creator Origin of Human Beings

1. Abrupt appearance of fossil forms separated by systematic gaps between fossil forms
2. Distinctness of DNA, chemical components, and pattern (design) of morphological similarities
3. Laws of Mendel: combination, recombination always results in easily recognized plant, animal forms; *conclusive* evidence of fixed reproductive patterns (designs)
4. Distinctness of human self-conscious awareness, and metaphysical concern
5. Distinctness of human personality involving moral and ethical concern; reflective, symbolic, abstract, conceptual thought

To be precise there have been and still are only two basic contrasting conceptualizations regarding human origin: (1) the primary, initial thesis that the Eternal Creator God breathed the breath of life into the dust of the earth and man became a living soul, with woman made from man—both endowed with physical, cultural, and intellectual capabilities unique and distinct from all other life forms; and (2) the nineteenth century substitute that somehow both male and female human beings “evolved” *at the same time* from the same anthropoid origin.

Admittedly the later animalistic view of evolutionists has become *the popular view* to the extent of seeming obliteration of the view of the supernatural, special creation of human beings. Nevertheless, the special created view of the first origin of human beings was *the widely accepted* view during the 18.5 centuries prior to Darwin. That view had been part of a written tradition for many centuries B.C. as specialists have deduced from tentative, limited translations of some of the Ebla clay tablets (2500 or 2300 B.C.) found in northwestern Syria since the mid-1970's.

Current Scenario of Human Origin

Generally evolutionists begin the earliest “history” of *Homo sapiens sapiens* within the perspective of presumed sequence of cosmic evolution, molecular evolution, and organic evolution. Such an orientation was provided with the first article (“Evolution” by Ernst Mayr) in the September 1978 *Scientific American*, widely distributed to afford citizens with the then latest status of evolutionary thinking. In fact Richard Leakey and Roger Lewin opened their “history” of mankind (*Origins*. 1977. E. P. Dutton, N.Y.) with a chapter on “Humanity in Perspective” that they set in the context of the earth being in relation to the sun in the Milky Way galaxy, which the authors presume was generated from some cosmic “big bang.”

In brief statement, megaevolutionists maintain that human beings came from an animal origin; and they think they can trace vertebrate ancestry to some invertebrate forms, and to changes presumably ini-

tiated in unicellular life after spontaneous generation of first life supposedly occurred on the earth from inanimate matter. Yet the answer is quite negative to one of the questions posed in the first article of this series: Is it possible to study scientifically the origin of mankind? No scientist, as a scientist, was there when the first male *and* female human beings appeared on the earth. Therefore all teachers should be prepared to critique the proposed *Australopithecus (afarensis or africanus?)*-*Homo habilis?*-*Homo erectus*-*Homo sapiens sapiens* scenario of megaevolutionists.

Points of Critique

Specific points of critique of the above mentioned scenario are basic to any presentation of an alternative interpretation, that is, a creationist scenario on the origin of *Homo sapiens sapiens*. A few of the points are: (1) Evolutionists must resolve the ambiguity about the kind of change intended in the meaning of the term “evolution,” i.e., megaevolution (macroevolution) vs. microevolution; (2) Megaevolutionists exhibit a predisposition or prior commitment to an animal origin of human beings; (3) The popular scenario of the origin of human beings is “staged” within imagined millions and millions of years that followed some presumed, *unnatural* “big bang” explosion of some dense substance of unknown origin; (4) Darwin's analogy breaks down since changes in domestic organisms are always consequential to selective *criteria* of human breeders (“artificial selection”), whereas in the natural environment there was (and is) *no* set of criteria by which presumed selection occurred (“natural selection”)—essentially only *differential survival* (or differential elimination) occurs in the natural environment; and (5) The popular megaevolutionary scenario does *not* rest upon any measurements of time, but only upon *estimates* of time “before the present” (B.P.) (See my 1983 book, *How To Teach Origins (Without ACLU Interference)* for more detailed discussion of these points.)

Furthermore, there are specific problems in any discussion of human origin. The overall picture of human origin is not simple. Due to the unique problems involved in the study of anthropology, neither creationists nor evolutionists have reached a clear conclusion within their framework. Evolutionists are still attempting to clarify the supposed ancestral relationships while creationists are trying to differentiate between human and apelike remains. Again the teacher of human origin should approach the subject in an open and critical manner.

Many of the fossil remains used in analyzing human origin are very fragmentary. Non-*Homo* finds seldom contain more than a few bones, and often “constructions” of appearances are merely speculations by artists based on minimum data. Until more complete remains are possibly found the “relationship” between man and apes will be confusing at best.

Even if an abundance of fossil finds were available, there would still be classification problems. Anthropologists are influenced by their own presuppositions and desire for recognition. For example, many remains which are within the range of modern man are sometimes assigned to *Australopithecus* by evolutionists because they are found in strata thought to be older than when *Homo* “evolved.” Anthropologists have

Table II. Abbreviated Table of Misinterpretations of Human Fossils.

Numerous interpretive errors of human fossil remains have been made since 1848 to the present. This abbreviated diagrammatic representation shows the date of the original misinterpretation and the date of the correction. Note that the interpretive errors have been away from modern man and the corrections have been in the direction of modern man.

Popular Name	Genus Other Than Modern Man		Genus of Modern Man	Genus and Species of Modern Man
Java Man (Trinil) 1981	<i>Pithecanthropus erectus</i> -1894	→	<i>Homo erectus</i> 1940	
Heidelberg Man 1907			<i>Homo heidelbergensis</i> 1908 → <i>Homo erectus</i> -1963	
Peking Man 1921	<i>Sinathropus pekinensis</i> 1927	→	<i>Homo erectus</i> 1940	
Rodesian Man 1921			<i>Homo rodesiensis</i> 1921	→ <i>Homo sapiens rhodesiensis</i>
Solo Man 1932			<i>Homo soloensis</i> 1932	→ <i>Homo sapiens soloensis</i> 1964
Sangiran I, Java 1937	<i>Pithecanthropus II</i> 1938	→	<i>Homo erectus</i> 1950	

often confused the situation by assigning the remains to new genera and species which were eventually found to be unacceptable. In assigning remains to taxonomic categories one must keep in mind the possible limits to variation as well as put aside any desire for personal recognition. (See Table II for misinterpretations of human fossils.)

In order to understand the problems involved with the classification of *Homo*, students should be made aware of the importance of variation. For instance the brain capacity of normal intelligence in modern adults ranges from 850 cc. to over 2000 cc. A fossil with brain capacity of 1000 cc. could be claimed by evolutionists to be an early ancestor of man (i.e., *Homo erectus*), or could be claimed by creationists to be a fully developed human within the acceptable range of *Homo sapiens*. Often the strata of the fossil find or the scientists' presuppositions take precedence in the classification of a new find. The range of variation among living and fossil forms must be given a more important role in studying human origin.

The "humanness" of fossil finds is often determined by their association with cultural artifacts. The problem is in determining which artifacts are associated with which bones. "Peking Man," a collection of skulls discovered during the 1920's in a cave system in China, is a good illustration. Experts continue to disagree whether the stone tools also discovered in the general area belonged to the Peking fossils or to other "more human" fossils which possibly used the tools to prey upon the "Peking Man" victim.

And the time problem should be considered when presenting the topic of human origin to students. Megaevolutionists do not consider any creationist idea to be credible primarily because it violates their assumed time scale. The time frame involved in the creation view of human origin is much different than that of the evolutionary scenario involving millions of years. It is important to stress to students that, in general, a "date" is not assigned to fossil remains

directly, but rather time estimates for fossils are usually assigned by attempting to determine the "age" of nearby strata.

It becomes evident to those who study the time assignments for *Homo* fossils that the derivation of time estimates of human-like remains is not a precise science. For example, the 1470 Skull discovered by Richard Leakey in 1972 was originally "dated" at 2.6 millions years. However many anthropologists objected because then the more modern 1470 Skull would predate all its supposed ancestors. Thus 1470 was "redated" until a more "acceptable" estimate of 1.8 million years was adopted.

There is also the problem of assigning cultural remains to a certain era based on the "advanced" or "primitive" technology represented by the finds. It is now recognized that periods supposedly occupied by Paleolithic Man, Mesolithic Man, and Neolithic Man may have been contemporaneous; just as the Indians in North America were still in a Stone Age when the Industrial Revolution began in Europe, and some Australian aborigines were still in a Stone Age when the first atom bomb was dropped on Hiroshima.

A Creationist Alternative: Where Did Human Beings First Appear?

A broader understanding of the problem of human origin can be gained if teachers will lead an open and candid discussion of the traditional explanation of human origin and creationist concepts alternative to the "conventional wisdom" of megaevolutionists.

A. Traditional Explanation

Prior to acceptance of an evolutionary origin of mankind, scholars had agreed that the "Cradle of Mankind" was in Asia Minor, or in some portion of the Middle East on the basis of immense caches of data in the form of pottery and other artifacts of human activities. According to the traditional interpretation mankind began with the creation of Adam only a few thousand years ago, which was the same theistic

position on the origin of human beings accepted by the founders of modern science. (See the first article in this series.)

Many creationists contend that eight members of only one family survived a major catastrophe by flooding that resulted in complete obliteration of all human civilization that had developed from Adam and Eve. Noah and his family of three sons and their wives had survived a major flood catastrophe aboard an ark that was grounded somewhere in the highlands north of Mesopotamia. There are many, many extended traditions about a few people who survived some great catastrophe. (Also there is a long list of circumstantial arguments for a world-wide Flood, including ubiquitous sedimentary rocks supposedly formed under water, and also multiple examples of polystrate fossils and massive graveyards of plants and animals apparently water deposited.)

Until the nineteenth century scholars believed that, in the course of time, three distinct families of human beings became established from the initial family pattern represented by the sole survivors. On the basis of their patriarchal lineage the three families have appropriately been termed Japhethites, Hamites, and Shemites. In modern terminology these groups would be recognized as Indo-Europeans (Caucasoids), Mongoloids and Negroid people, and Semites (Hebrews, Arabs, and some more ancient branches of the family such as the Assyrians, etc.)

However, since the early 1900's especially due to the diligent leadership and ardent efforts of the late Louis Leakey, his wife Mary, and son Richard, many hominid fossils have been found in Africa. Thus the Leakey family "pushes" their claim that locations in Africa (Olduvai Gorge, Lake Rudolph, and other nearby sites) are possible beginning places for mankind.

Because of the Leakey family successes and the work of other physical anthropologists more recently, many intellectuals have turned away from the previously accepted interpretation that the Tigris-Euphrates river area was the "Cradle of Mankind." Megaevolutionists seem to ignore the extensive pottery collections and other archaeological finds of previous decades.

The point, then, should not be missed during creation/evolution discussions of the origin of human beings that *interpretations* of data are involved primarily. Mary Leakey, Richard Leakey, and others simply seem to disregard the traditional interpretation (based upon pottery and other artifacts) in favor of their own interpretation (based upon skull features and other skeletal fragments).

Hence teachers need not feel that the traditional Tigris-Euphrates river region as the possible "Cradle of Mankind" has been denied by megaevolutionists. Rather teachers of human origin should encourage and help students interested in human "roots" seek an explanation that involves *all* groups of data: pottery, skeletal fragments, and other artifacts, as well as geographic distribution.

B. General Migration-Dispersal Model

According to the traditional interpretation the three survivor families of Noah kept together at first, but very likely within a century or so they would have moved away from each other due to a type of

population pressure. Possibly some of the family of Shem, some of the family of Ham, and even a few of the family of Japheth reached the southern section of the Mesopotamian Plain.

Using many sources some creationists emphatically support the following generalization: All lines of migration of human beings, which are at all traceable or deducible, seem to radiate like the spokes of a wheel from the Middle East. (Leakey and others have "reversed" this concept with their claims for and implications based upon the discoveries in South and Central Africa.) And this generalization holds whether attention is given to fossil materials, ancient civilization, contemporary or extinct native peoples, or the present nations of the world.

In general, according to abundant evidence, the direction of movement tends to be reflected in the gradual *loss* of cultural artifacts. This is particularly true whenever complex items are found. For example, certain Minoan pottery vessels are clearly copies of metal prototypes. Logically, if the earliest migrations were quite rapid, then there would be marked tendency toward *loss* of cultural items common to the center as the people migrated out.

And accompanying such cultural *losses* in initial spread of early people, according to a Creation Model, creationists interpret that a certain coarsening of the human physique would be expected. Dietary disturbances undoubtedly affected the normal growth patterns of the young.

That food deficiencies have definite effects upon the form of the human skull can be shown by certain studies. Also according to other studies variations in pituitary gland secretion have direct causal effect upon body size and skull structure. Thus bone structure of so-called prehistoric people that evolutionists want to call ancestors of mankind may be deformities or at least modified bone structure of "normal" human beings. Noteworthy is the fact that the earliest collection of Neanderthal bones contained significant evidence that certain individuals had bone disease, such as rickets or some type of osteoarthritis. Syphilis also causes bone deformations and skeletal aberrations.

Creationists, then, include a general condition of degeneration and degradation of migratory people in a Creation Model. If early migrants were in isolation and suffered deprivation of food, clothing, and shelter, then any possibility of their living for a hundred years or perhaps even longer would add further complications. Evidence can be found that early human beings lived long spans of time, though declining after the Flood catastrophe. In fact the skull sutures are almost obliterated in some fossil specimens, which might reasonably be interpreted as evidence of very extreme old age. Might the conventional "man-ape" form be a consequence of isolation, deprivation, and old age?

Analysis of Geographic Distribution

Though the problem of time still is not really resolved, teachers of human origin can help students consider this plausible and reasonable Creation Alternative on human origin by leading classroom analysis of the geographic distribution of *four* major groups of fossil materials that have been found around the world from the 1900's to the present. The following brief



○ Australopithecines △ *Homo Habilis* ■ *Homo erectus*
 ▲ Early types of *Homo Sapiens* ● Cro-Magnon Man

Figure 1. Locations of Fossil Finds.

discussion will require repeated reference to the geographic distribution of fossil finds shown in Figure 1.

1. Please note that the fossil finds of *Australopithecus* (the most "primitive" in the evolutionary scenario) are located in South Africa and East Africa. Thus the Australopithecines are found furthest away from the center of the Tigris-Euphrates area; they are clearly in an area peripheral to the Middle East region. If Australopithecines are part of the human ancestry, might they have been some that migrated first from a center of civilization, and changed the most and suffered the greatest loss of cultural practices and physical degeneration? (Of course certain specialists consider these fossil materials as that of some ape. If so these remains would not be part of the ancestry of human beings.)

2. Likewise the site of fossil finds of *Homo habilis* are located in South Africa and East Africa. Were they some of the earliest migrants from the Middle East area? (Certain specialists question the legitimacy of this fossil material as a separate species of genus *Homo*. If considered an Australopithecine, it might even be excluded from the ancestry of human beings.)

3. The sites of fossil finds of *Homo erectus* are located in Java, China, East Africa, North Africa, and Europe. Though these forms are widely scattered they are notably peripheral to the Middle East area, but they are somewhat closer than the Australopithecines. There seems to be a more even distribution of *H. erectus* than the Australopithecines, since they are found on all the large land masses of the Old World except Australia.

4. Though the sites of fossil finds of *Homo sapiens* are also widely scattered and located on all the large land masses, most of the fossil materials have been clustered in Europe and to the west and north of Mesopotamia, along with the more isolated finds toward the periphery in Australia and North America. Were *H. erectus* and *H. sapiens* (that is, Neanderthal, Swanscombe, Mt. Carmel, and Solo forms) those individuals who migrated last from the Middle East area, pushing out *H. habilis* and *H. erectus* from previously occupied areas?

Population Analysis

Space is not available in this short article to deal adequately with various aspects of population analysis. Two points are relevant:

a. In small groups of people living in comparative isolation, specialists have found a wide variation in

physical appearance and a marked conservatism in cultural development. Reasonably the survivors of the Flood catastrophe were a small population that could have varied widely in physical appearance, and tended to be highly conservative in cultural and social behavior.

b. In contrast, when human beings are found living in large conglomerations there is a strong tendency for uniform physical appearance, but a rather wide cultural diversification is noted. Again some creationists hold that as migrating survivors radiated from Mesopotamia they could have established large local populations (n.b. "founding principle" of population analysis)—each of uniform physique; and yet each group could have gradually practiced more freedom in cultural behavior.

Of course science teachers can use principles of modern genetics to help students realize that, in any small population where *inbreeding* occurs, the genes for all characteristics contribute to the appearance of a marked variability in physical form. And remarkable variableness in physical appearance is the condition that is observed in fossil hominids when finds from all the various widely scattered geographic sites are compared. The range of skull forms is amazing.

Concluding Remarks

Some creationists assert that the facts of variability are best accounted for when three assumptions are made: (a) that a small population of individuals began at some central area, (b) that successive waves of migrants of probably only a few individuals in any one group moved along migration lines to establish a succession of centers, and (c) this migration pattern was repeated again and again, until early man had spread into every inhabitable part of the world.

Creationists are aware of the geographic distribution analysis of the four groups of fossil forms touched upon briefly. Megaevolutionists consider these groups favorably in developing their scenario for the origin of mankind. Creationists hold that such prehistoric forms of presumed human ancestry could very well be examples of diseased, degenerate, and degraded, inbred and isolated survivors of waves of migration from the Middle East (the traditional "Cradle of Mankind").

Of course creationists admit that all this contradicts evolutionary scenarios. However teachers of human origin can present the facts that support the contention that lines of migration of human beings do *not* radiate from some points in Africa (or the Far East, as some evolutionists have also claimed, based primarily upon skeletal material).

Teachers can give serious credence to the migration-dispersal Creation Alternative, based upon (1) archaeological evidence about cultural patterns, (2) consideration of physical diversity of fossil hominids, and (3) known principles of genetics relevant to small breeding populations. There is excellent logical sense and reasonableness that human beings were making long treks to the uttermost parts of the world *at the very same time* that civilization was "blossoming" at the center, i.e., the Middle East (still the most logical "Cradle of Mankind," when all facts are taken into consideration).

Of course megaevolutionists, who follow the pri-

mary emphasis upon skeletal data utilized by the Leakey family and other prominent paleoanthropologists (who seem to summarily disregard the abundant archaeological and philological evidence), will continue to bring into question the geographic position of the "Cradle of Mankind" contained in the Creation Alternative presented here. However, acknowledging that many "primitive" people have recollections of a former higher cultural standing, I conclude that *all* peoples of the world, prehistoric and historic, came from the family of Noah. And since the events described in Genesis 5 through Genesis 10 can be taken as a reasonable historical account of the ancient peoples of the world, I believe, consequently, from all the above that modern teachers can teach that modern man did *not* begin with the stature of an ape, and did *not* reach a civilized state after a long, long "evolutionary history."

And in closing this four-part series on "Teaching about Origin Questions," readers should be reminded that there are *no legal prohibitions* against academic freedom and open, candid discussion of different interpretations of objective, scientific data in science classes, or in any social studies, history, or anthropology classes. Surely Supreme Court guidelines with respect to State neutrality under the Establishment Clause of the First Amendment prohibit all scientific discussions of origin questions in public schools with the *primary*

effect to advance or hinder religion. Evolutionists could avoid Constitutional arguments by admitting that a creation viewpoint *and* an evolution viewpoint on human origin are both scientifically based. Certainly all students have the right of access to "pro-con" considerations of scientific facts for and against an evolution viewpoint.

Therefore, to assure students that one pattern of beliefs is not favored over another set of beliefs, modern teachers should practice open, candid treatment of origin questions wherein both the viewpoints of Total Evolutionism *and* Total Creationism are presented. Such would be consistent apparently with Darwin's "fully stating and balancing the facts and arguments on both sides of each question," as quoted in the December 1984 CRSQ article.

Acknowledgement

I am very indebted to the extensive writings of Arthur C. Custance, Ph.D., the late Canadian research physiologist and a Fellow of the Royal Anthropological Institute, for features of the general migration-dispersal model that I present here. He held different interpretations of "Historical" Geology. However I refer serious readers to his books: *Noah's Three Sons*. 1975, and *Genesis and Early Man*. 1975, both available from Zondervan Publishing House, Grand Rapids, MI.

SPECIAL FEATURE

RECORDED INSTANCES OF WRONG-ORDER FORMATIONS: A BIBLIOGRAPHY—PART V

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DEVELOPMENTAL PARADIGMS

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Abstract

This is the third article in the series entitled Nature: The Supreme Logician. In this article the supermind processes associated with the deductive-world model are discussed. The specific scientific object called the developmental paradigm is defined and its unique behavior is investigated. It is shown how this object and supermind processes deterministically generate the entire universe in which we dwell as well as the fundamental constituents of all material microphysical, macrophysical and large scale structures. It is shown that the deductive-world model is a nontrivial grand unification. Two simple models are described that indicate some of the difficulties with uniformitarianism. Using the concepts of supermind choice and superuniform alterations it is proved that the linguistic concepts of random behavior and random cause are theory (i.e. discipline language) dependent and are not absolute in character.

1. Introduction

Thus far in this series of articles, I have not specifically defined the term "science" except as implied by the most general dictionary definition that: "it is a coordinated and systemized collection of knowledge associated with some one subject." I shall continue to refrain from presenting such a personal definition since it would surely lead to protracted and "heated" arguments from individuals who are intent upon classifying their endeavors as "scientific" while claiming that scholarly efforts put forth by others—efforts that do not meet their personal definition—are somehow or other not scientific in character. I have even discovered that the very bland Cohen and Nagel contribution to such a definition is not accepted by all "scientists." Indeed, individuals who have never published any really creative scientific work seem to be the most critical of definitions given by active scientists. To continue, Cohen and Nagel are interested in giving a *very* brief account of the notion of "coordinated and systemized" as expressed in such a dictionary definition and as it is generally reflected within the most basic requirements of the "scientific method." They state that:

We reserve the term 'science' for knowledge which is general and systematic, that is, in which specific propositions are all deduced from a few general principles. . . . If we look at all the sciences not only as they differ among each other but also as

each changes and grows in the course of time, we find that the constant and universal feature of science is its general method . . . (the) Scientific method is thus the persistent application of logic as the common feature of all reasoned knowledge.¹

Our concern will continue to stress the end result of any assumed scientific endeavour—the rationally presented and communicated documentation. As an illustration consider the "science" of mathematics. Rather than attempt to describe in a relatively complete manner the research methods of such a highly intuitive subject, I will analyze some properties of my publications and give a brief account of how the results are obtained. Each of the hundreds of stated "theorems" and "applications" is presented for the first time within these documents. The abstract conclusions are presented in a special analytical form that scientists consider to be ordered by the most logical and systematic method known to mankind. However, the majority of these results were NOT discovered nor conceived of in this harmonious manner. Experientially, I conceived of the majority of them in a totally *intuitive* manner. I "feel" and somehow or other "know" that based upon a given set of hypotheses a conclusion is true mathematically or that a certain description from another discipline language L can be mathematically modeled. But, I usually have no specific idea of exactly how to properly establish the result or—in the case of modeling—how to verbally express the correspondence between the mathematical structure and various primary entities from L.

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For pure abstract results, it is only *after* a result has been formulated and verbally presented that the long and exhausting search begins for a logical sequence of statements that will adequately establish its validity. I am convinced that these statements were not present mentally prior to the conjecture. It is this mental search for “just the right” combination of specialized word-forms that is the major aspect of abstract mathematical research. These efforts are related to the methods that have been inculcated into an individual by experience, training and tradition. Within abstract mathematics, no matter how “obvious” your intuition may appear, the abstract results are not accepted formally until the majority of mathematicians agree, as if they were a jury, that you have indeed established your conclusions properly.

Mathematical modeling of natural or philosophical systems appears to be much more difficult since you “intuitively” know that such a modeling is possible, but you must *discover* the correct combination of descriptive terms within a metalanguage that will develop a comprehensible correspondence between portions of the discipline language L and an abstract mathematical structure. Moreover, the correspondence must be consistent and must, usually, preserve some of the logical “hypothesis $\rightarrow$ conclusion” sequences previously established within the language L itself. Once this correspondence is obtained then new concepts that tend to parallel the mathematical structure present themselves and an extension of the discipline language to L' is appropriate. However, you often express a description from L' and your mind indicates literally that these word combinations or even pictorial information do “not quite” delineate correctly the “new concept.” This obviously indicates that the *new* concept being considered was neither verbally nor pictorially presented originally since not only are new descriptive terms required but their meanings are not in complete accordance with what appears to be some nonverbal and nonpictorial mental impression. You must transfer what I believe are such “feelings” or “intuition” into a comprehensible verbal description or pictorial display. Personally, I am almost never satisfied with the adequacy of such descriptions and for this reason I am searching continually for refinements that will convey a deeper conceptual meaning to the reader. Of course, this remarkable process of transferring new creative concepts into descriptions within a new language permeates all significant and creative science.

Now according to Cohen and Nagel it is the logical order and harmony—the logical sequence—of transferring hypotheses into conclusions within a discipline language and combining their descriptions into non-contradictory harmonious collections as prescribed by the discipline itself that is the common feature of all reasoned science. Of course, it is self-evident that such sequences are the mainstay for the predictive aspects of numerous theories, especially if they correspond to a parallel mathematical structure. Please notice, however, that depending upon L' certain mathematical terms are also utilized to express an orderly behavior. Such terms as “continuous” or “continuum” and the like are descriptively employed and as shown elsewhere² these terms have no meaning relative to systematic behavior unless an individual

has *additional intuitive* comprehension produced by experience with these particular mathematical concepts. Also note what I have not written. As discussed in the second article in this series³ if a conclusion F_1 is a logical consequence of hypotheses Γ_1 , and F_2 a consequence from Γ_2 , then even though $F_1, F_2, \Gamma_1, \Gamma_2$ are all portions of the same “scientific theory” it may not, as yet, be possible to logically obtain F_1 and F_2 as conclusions from a third *acceptable* set of premises Γ . A vast amount of mental effort has been expended by theoretical scientists in their attempts to produce such unifying premises Γ . It appears to be the concept that I have previously defined as “psychological uniformity” that is the driving force behind the belief that such unification should be possible.

It is often difficult for scientists (including this author) to believe that certain statements F_1 and F_2 , due to their apparent similarity, are not reconcilable by some nontrivial set of premises Γ . This leads to a philosophical belief that such efforts are acceptable scholarly activity worthy of personal reward. In contradistinction to past history, within our present scientific environment, such theoretical activities are considered the “highest” form of scholarly effort. (Unfortunately this is not considered acceptable for some other scholarly activities.)

With respect to a developing natural system that is assumed to alter its descriptive or observed behavior with respect to time—is it reasonable to search for some logical unification for two apparently disjoint descriptions F_1 and F_2 ? Suppose that F_1 describes the system or constituents at time t_1 and F_2 at time t_2 , where $t_2 > t_1$. The fact that we have a time ordering tends to lead to the suggestion that some unification is possible. First observe that all significant pictorial or audio representations can be reproduced by a narrative description involving encoded computerized information and subsequently displayed on various types of terminals. Now within a theory certain possibilities exist. (1) The descriptive forms F_1 and F_2 can be predicted from a more fundamental and nontrivial set of premises Γ , where Γ is within an extended theory. (2) You predict that F_2 is the “effect” that will follow in a logical sequence from the “cause” F_1 . (3) There is a logical relation between F_1 and F_2 described by a third descriptive form F_3 . (4) Neither (1), (2) nor (3) appears to be true, at present. It is when case (4) occurs that the question is asked whether it is reasonable to spend our efforts in an attempt to reduce this case to a type (1), (2) or (3) unification? Philosophically our personal desires for the elimination of case (4) can be traced, at least, to an Aristotelian implication. Aristotle wrote with respect to an ultimate cause that: “a single harmony orders the composition of the whole . . . by mingling of the most contrary principles.”⁴ We need simply replace the word “whole” by the words “natural system” to restrict his philosophy to that of system development.

We have previously quoted in this series from the personal beliefs of various scientists that the humanly perceived patterns we describe within our “minds,” or on various written documents, must not only be rational to the extent of being noncontradictory but they must also be associated with the logical properties of human comprehension. This can be simply stated for a (time) developing natural system as follows: For

the human being to place two statements F_1 and F_2 within a general description for a developing and named natural system S_1 —statements that claim to describe by means of a physical language some ordered behavior—it must be *mentally recognized* (i.e. intuitively deduced) that F_2 is related to the natural system being described and does indeed follow statement F_1 with respect to a time sequence. That is to say that some type of mental process is apparently necessary in order to recognize that statements F_1 and F_2 are indeed time ordered members that partially describe a portion of the development itself. On the most simplistic bases, the human being must recognize that a development of the natural system is taking place.

In November 1981, a search began to justify *scientifically* the philosophical belief that type (1), (2) or (3) unification is possible and that the concept of a developing natural system is logical. The scientific methods utilized are those of the science called Mathematical Logic and this article discusses the general methods and results thus far obtained.

2. Developmental Paradigms

In this section the “supermind” concept is discussed, a concept based upon hundreds of years of evidence and first analyzed 2300 years ago,⁵ a concept that came to fruition after it was observed that natural systems change in their appearance with respect to cosmic time.

Suppose that using $L(D)$ (i.e. a discipline language) an individual transcribes what is *claimed to be* a consistent and faithful description for the behavior and characteristics for a natural system and its constituents as they would be observed by assumed human or machine sensors at a given moment. As previously mentioned, computer techniques allow the verbal description to contain actual visual or audio “displays.” After such a description is formulated then other individuals, who by experience and training intuitively comprehend the technical language contained in $L(D)$, “read” such a description and mentally correlate *portions* of it to what is alleged to be “actual” reality. As discussed in the second paper in this series⁷ this correlation to “actual” reality should not be artificially forced upon an individual but is a personal acceptance and is totally within the mind of the reader. Of course, individuals also utilize such things as an educated imagination and indeed this is often the method by which speculative “reality” is made to correspond to a description and conversely.

Is there a simple process that underlies the basic notion for the *development* of a natural system? Viewed externally each description may be considered a specially constructed *single* entity within $L(D)$. The major results in this section are obtained from a strong mathematical model for the logical processes that characterize the exterior procedures that can actually produce a sequence of natural system descriptions—the *development*—when we view such descriptions as single entities. No matter how chaotic adjacent descriptions may appear I will show that there is a “single harmony” that orders the natural system, a basic principle that will yield an actual development for the system. Of course, one of the major goals of the scientist is to describe these “basic principles.”

Prior to describing the concept that we have termed the “D-world model” I mention that a D-world (i.e. deductive-world) procedure investigates analytically how distinct descriptions such as F_1 and F_2 may be transformed one into the other logically. Indeed, a D-world technical language that is exterior to $L(D)$ is constructed in order to characterize such transformations. These D-world characteristics are meaningful to modern science since, as will be shown, they indirectly “explain” many known paradoxical states of affairs generated by $L(D)$ ’s and that have not yet been otherwise reconciled.

In the first article in this series⁸ I gave a general overview of what the term “D-world” signifies. A refinement of this previous discussion appears necessary. The D-world model is one of the general names given to an evolving theory that is expressed both in terms of various discipline languages and *new* associated languages.

In 1961, Abraham Robinson made a significant fundamental discovery relative to what is now called *standard mathematics*, which is composed of almost all of the subject matter taught at both the undergraduate and graduate university level.⁹ First Robinson, and then many others, contributed to this new mathematical language and defined such new mathematical terms as the monad, α - monad, θ - monad, *-real numbers, star-real numbers, hyperreal numbers, *-continuous, hypercontinuous, S-continuous, infinitesimals, subtle logics, *-words and hundreds of others. The general discipline that has developed from the methods instituted by Robinson is called *nonstandard analysis* and produces an extension of standard mathematics. One of the most important features of nonstandard analysis is that the mathematical structures utilized not only behave approximately like the standard structures but they possess significant additional properties that are not shared by the standard structures. For example, the three hundred year old “dream” of Leibniz and Euler to rigorously justify the mathematical existence of the infinitesimal or ideal real numbers has been achieved since they mathematically exist within the hyperreal numbers.¹⁰ However these new infinitesimals do not behave in the manner first envisioned.

In the first section of this article, I gave an outline of how a mathematical structure is correlated to another scientific discipline language L and that it might be necessary to extend L to a new language L' . When nonstandard structures are corresponded to certain disciplines such as Physics, the theory of Natural Systems and Logic it is necessary to construct such an extension L' . In general, for disciplines dealing with natural phenomena, if “ N ” denotes the name for the discipline, then descriptions using new terms from L' are called *nonstandard N paradigms* or nonstandard N reality, the new terms form a *nonstandard N language* and L' is a *nonstandard N* , while the original language L — *the standard language* — corresponds to a standard mathematical structure.

As an example of this extension process we consider Logic and Economics. When the discipline $L(L)$ that we term Logic is interpreted within a standard structure and this standard structure is embedded inside of a nonstandard structure then certain operators are called “subtle logical operators” and other objects

“hyperwords.” This produces the extension $L(L)'$. Now for the D-world description these nonstandard terms in $L(L)'$ are reinterpreted and called “supermind processes” and “superwords” due to their application. Within mathematical structures associated with Economics $L(E)$ ¹¹ an “infinite star-finite set T ” is called a “set of (nonstandard) traders or agents.”

It is within this series of articles that I attempt to produce an intuitive understanding of the behavior of these new concepts by showing mainly how they compare to well-known standard language concepts. I am completely aware of the difficulty in comprehending the forthcoming descriptions. They do not parallel our everyday experiences. However, I am confident that substantial understanding will be achieved if the following material is reflected upon, and some of the references are consulted. Some confusions that might be experienced in attempts to grasp some of the “deeper” features of the D-world model should be eradicated by the last article in this series where I interpret portions of the D-world model in terms of a theological language.

One of the basic requirements for this analysis is a “time partitioning” of an assumed description for a developing natural system. A time interval $[a, b]$ ($a \neq b$) is partitioned into at least a denumerably infinite set of subintervals. The reason that we have chosen an infinite partition is so that our modeling process does not have a built in bias. Many models of natural system behavior assume a “continuous” predicted alteration in behavior over a finite time period. Indeed, we even have Bohm’s alternative interpretation of Quantum Theory—an interpretation that predicts the same behavior as does Quantum Theory—but permits: “the representation of quantum mechanical effects as arising out of an objectively real [natural] sub-stratum of continuous motion, existing at a lower level . . .”¹² Now for each such subinterval $[t_{i-1}, t_i]$ a finite string of symbols F_i (a word) is assumed to be a consistent description for *the behavior and characteristics of a named natural system S_1 as well as the behavior and characteristics of named constituents contained within S_1 at time t_i .*

Within the definition for F_i the meaning for the terms “behavior” and “characteristics” are entirely intuitive and remain the selection of the individual that constructs F_i . The object F_i may include any subsidiary information one chooses, such as applied mathematical models $C_n(M)$, predictive methods and the like; we only assume that F_i is consistent. Indeed, we shall consider various “subdescriptions” and theories in a later part of our analysis. Further, special variations between distinct F_i and F_{i+1} may be accounted for within the descriptions themselves and, of course, F_i need not be totally narrative in character but may include computer encodings. We are only interested in a possible logic for a development. Notwithstanding these additional features, each F_i is a finite set of symbols that can be modeled by means of a strong mathematical structure for logical processes—the Grundlegend Structure. Each F_i is called a *frozen segment*. In many instances, each F_i may be assumed intuitively to represent the sensory appearance of the natural system at instant t_i . Moreover, *potentials* P_i may be included that describe within a subinterval i the predicted behavior that may occur within *some*

other developmental time interval. Any collection of frozen segments, one for each i , is called a *developmental paradigm* (a D.P.). I will show later that even though a human can only select finitely many such frozen segments, the D-world itself can select the possibly infinitely many F_i needed for the entire partition. For those models that require only finitely many partition points $a = t_0' < t_1' < \dots < t_n' = b$ for the time interval $[a, b]$ and thus finitely many frozen segments for a developmental paradigm the following is an appropriate procedure. Assume that a subinterval $[t_{i-1}', t_i']$ contains infinitely many partition points from our first subdivision of $[a, b]$. Now simply allow all of the frozen segments associated with each of the infinitely many subintervals of $[t_{i-1}', t_i']$ to be identical strings of symbols and denote them by the single symbol F_i' .

If the interval $[a, b]$ is one second long (i.e. $b - a = 1$) and we consider it subdivided into say $m = 10^{10}$ or infinitely many subintervals, then the m or infinitely many frozen segments would yield a D.P. that when “played back,” by an ultrafast machine would yield by the persistence of mental “vision” a description of exactly one second of the development of a natural system or its constituents. Notice that for any instant t_i there exists infinitely many distinct frozen segments from which to choose. The entire set of all frozen segments that can be used for the instant t_i is called a *totality*, T_i . Distinctly different D.P.s are obtained by allowable choice processes from the set T of all totalities.

Additional analysis is possible when D.P.s are encoded and embedded into a structure called the Extended Grundlegend Structure (EGS).¹³ This structure is used to model the 2200 year old concept of infinitesimal reasoning. For these strong mathematical models for logical processes the interpretation method will utilize the following customary technique. First, such phrases as “a description of” or “a description for” are changed to “a representation for.” The final step is to drop the phrases “a representation . . .” and the like. This produces statements written in a pure discipline language such as a physical language or what is sometimes termed “physical reality” or “realism.” Keep in mind the correct process for N-world behavioral modeling. A mathematical language corresponds to a discipline language. The discipline language then may or may not correlate to actual reality. As discussed in the second paper in this series¹⁴ that portion of the discipline language description that corresponds to *actual* reality is often unknown and its acceptance or rejection as an actual real world description for real world behavior is a philosophical stance.

Prior to embedding the developmental paradigm entities into the EGS and constructing the exterior D-world physical language an example is given of how mathematical structures are interpreted in a physical language where actual reality may be in doubt. In Quantum Measure Theory a certain finite set of symbols representing an infinite process occurs and is considered as a basic component. The customary interpretation has been to assume that this set of symbols did not correlate directly to a physical language description. You might call such mathematical or $L(Q)$ entries *catalysts* in that they are necessary

within the theory in order to predict a physical statement but they may not correlate directly to a physical language phrase or actual reality, respectively. One very serious, widely reported and analyzed solution to this catalyst "problem," if one assumes that it is indeed a problem, is the Everett-Wheeler-Graham (EWG) interpretation for this particular portion of the Hilbert Space formalism:

The theory holds that (1) [the infinite process] must be interpreted as literally as it can be; namely, as expressing the *splitting of the universe* into many branches. . . . We as human observers who are not external but are also described by a state vector, are also split into many copies. Each copy interacts only with his branch . . . and so is aware only of what goes on in his branch. It seems to him that only one of the possible outcomes has occurred . . . that the observer is himself part of a superposition in which all the outcomes are linearly combined just as predicted by quantum mechanics. Each time a measurement is made, anywhere in the universe, another occurs.¹⁵

The question is, is this splitting of the universe into various distinctly different copies simply a physical language description or do some consider it a real and actual event? Bryce DeWitt writes:

I shall focus on one that pictures the Universe as continually splitting into a multiplicity of mutually unobserved but equally real worlds in each one of which a measurement does give a definite result. . . . This is constantly splitting into a stupendous number of branches, all resulting from the measurement-like interactions between its myriads of components, moreover, every quantum transition [change] taking place on every star, in every galaxy, in every remote corner of the universe is splitting our local world on earth into myriads of copies of itself . . . the laws of quantum mechanics do not allow us to feel the splits . . . the splitting of the universe is unobservable. . . . This concept is alien to experimental physics because it involves many elements of the superposition at once, and hence many simultaneous worlds, that are supposed to be unaware of one another. . . . All the worlds are there, even those in which everything goes wrong and all the statistical laws break down. If the initial conditions were right, the universe-as-we-see-it could be a place in which heat sometimes flows from cold to hot . . . it can never receive operational support in the laboratory . . . the view from where Everett, Wheeler and Graham sit is truly impressive.¹⁶

Notice that DeWitt appears to consider these multiple universes "equally real worlds" and further he claims that their existence can never be supported by laboratory experiment. Nevertheless, he claims that this work is "truly impressive."

In contrast to the EWG interpretation for a mathematical expression where certain phrases such as "a splitting universe" were not part of the original physical language but are in an extended language, all of the physically orientated terms employed in the next paragraphs correlate directly to mathematical objects within our strong mathematical structure—they are not simply selected from some exterior language. As

far as the humanly comprehensible portion of a developmental paradigm is concerned we follow the usual assumption that to each time subinterval there would exist a frozen segment that yields (partially describes) the behavior and characteristics of the natural system under investigation and that *natural* human logic is restricted to entries that are finitely long strings of symbols. In what follows the phrase "humanly unknowable" means there is no *standard* language that can be used to communicate information about the entity under consideration. The term "humanly incomprehensible" means that the logic that produces the entity under consideration cannot be reproduced by any logic within our standard model for natural human reasoning. Recall that we are able to describe partially the behavior of these humanly unknowable or incomprehensible entities by using a special nonstandard language that is exterior to the standard language of discourse we associate with applied logic and communication.

What follows are direct translations or interpretations from a strong mathematical model for logical processes into our nonstandard physical language. These are but a few of the hundreds of such statements that can be generated logically by the applied mathematical structure. Not all of the numbered statements that we present need to be included within a descriptive D-world model. Following a numbered statement we give a brief but in depth explanation of some of its more salient features as viewed from the D-world model.

(2.1) *There exists a D-world process, a uni-word process $\star S(\{w\})$, that in a superuniform manner produces the behavior and characteristics of a named natural system as well as the behavior and characteristics of named constituents contained within the named natural system as it develops with respect to cosmic time.*

The object w in (2.1) is a single pure D-world object. It cannot be explicitly written down as an expression from any human language standard or not and hence there can be no natural process applied to w that will yield N-world (i.e. natural or standard world) behavior. However, if we assume that logical combinations of members from $L(D)$ yield N-world behavior, then w can be characterized as yielding D-world behavior. Also there is no finite set of statements X from any $L(D)$ such that $S(X)$ generates a developmental paradigm. The concept of "superuniform" means approximately that when the pure D-world operator $\star S$ is applied, then all results such as F_i , among others, are obtained throughout the entire process by means of an extremely refined and "small" step-by-step procedure. The mathematical definition of a "superuniform logic" is within abstract topology and, in this case, it is not numerically describable except in terms of comparable behavior. If you conceive of human deduction as a sequence of steps from an hypothesis to a conclusion and this sequence is represented by distinct positive real numbers where the difference between two successive numbers yields a measure of the step size, then from the D-world viewpoint a superuniform logic has step sizes that are infinitesimal. Hence, the steps are infinitesimally more refined than any of the logical steps in any logical sequence produced by the natural mind.¹⁷

(2.2) *The D-process yields, at certain moments, a system development for which the behavior and characteristics are humanly unknowable or humanly incomprehensible.*

Statement (2.2) follows from the proposition that for various D-world moments of time that occur within any natural time interval there are characterizing objects G_i produced by $*S$ that are not members of any $L(D)$ and no natural logic exists that can produce such objects as G_i . Further each G_i necessarily exists in this model and following the interpretation scheme each G_i may be interpreted as yielding, at present, unknown D-world behavior.¹⁸

(2.3) *The superuniform D-process yields for certain time interval a system development that is humanly knowable, predictable and humanly comprehensible while over other time intervals a system development that is humanly unknowable, or humanly incomprehensible.*

When you restrict the outcomes of $*S(\{w\})$, to members of any standard language then only the specific members of the developmental paradigm (i.e. the D.P.) and their simple logical consequences are produced in their proper time ordering. This shows that the operator $*S$ is not trivial since no other N-world behavior is exhibited except that displayed logically by the D.P.¹⁹ The set of logical consequences can be reduced while still retaining the original D.P. by application of a very unusual logical operator called “strong reasoning from the perfect.”²⁰ The “humanly comprehensible portion of this statement will be discussed after statement (2.5) is analyzed. The “unknowable” portion of the development is an extension of (2.2) to an entire natural subinterval.

(2.4) *This D-world D-process has many of the characteristics we associate with the simplest form of human deduction and many characteristics that cannot correspond to human deductive processes in any form.* This statement follows from the fact that all of the mathematically modeled properties of ordinary simple propositional (sentential) deduction hold true for $*S$ logic when they are properly interpreted with respect to the D-world model. However, $*S$ applies to behavior in the D-world that internally resembles finite N-world behavior even though, technically, it may be infinite in character. Such processes are called “hyperfinite.” When this logical process is viewed from a logical sequence point of view, a similar phenomenon occurs. A consequence requires hyperfinitely many steps to obtain.²¹ It has recently been shown that the theory of propositional deduction is undecidable.²² Thus if we embed it into the EGS then we would obtain infinitely many pure D-world expressions that technically give information and properties about the logic $*S$, properties that do not hold true for standard propositional deduction.

(2.5) *The D-world deductive process that yields all of the above results produces infinitely many results not obtainable from any form of natural human deduction, but when restricted to humanly knowable objects it completely parallels one of the simplest forms of human deduction. For these and other reasons to be delineated, this D-world uni-word process is called a “superdeduction” or a “supermind” process.*

Statement (2.5) follows from the above discussion

since infinitely many consequences of $*S(\{w\})$ are not equivalent to any behavioral statement for any natural human language. Thus they cannot be the logically produced consequences of any natural form of human deduction and would not be humanly comprehensible as representatives for natural system behavior even though they are D-world comprehensible. On the other hand, whenever $*S$ is restricted to the simplest propositional language—the sentence language we all use in our everyday discourse—then $*S$ has all of the properties of one of the simplest forms of natural human deduction, the propositional deduction.²³ Relative to the term “supermind” it will become obvious that a large portion of the D-world model is an interpretation of the extreme differences between results that are obtainable by human reasoning processes and those obtainable by supermind processes.

To see how $*S$ also preserves all forms of “predictable and humanly comprehensible” logical sequences consider each frozen segment as subdivided into subfrozen segments. Since each F_i is composed of “sentences” then we let each subfrozen segment H_i contained in F_i be composed of “sentences” taken from F_i . This produces a *subdevelopmental paradigm* d_1 , such that each member of d_1 is an H_i . Assume that H_i logically predicts H_{i+1} (a member of d_1) that characterizes a portion of F_{i+1} for an adjacent time interval. Then there exists a superword w_1 such that once again $*S$ applied to $\{w_1\}$ yields each and every member of d_1 including, H_i and H_{i+1} . Moreover, regardless of how many subdevelopmental paradigms, d_j , are obtained from the original D.P., there exist superwords w_j for each d_j . However, there is also an ultimate superword w that not only generates the original D.P. but also has, as its consequences, each of the superwords w_j for each of the subdevelopmental paradigms. Thus application of $*S$ to the superword $\{w_1\}$ not only yields the original D.P. but the results of any acceptable predictive theory as well.²⁴ This obviously indicates that supermind operators and superwords are more “fundamental” in character than any of the assumed fundamental natural or standard objects discussed within your favorite “standard” theory.

Another significant feature of these conclusions is that the exact same supermind operator $*S$ generates the theory of subparticles—objects that may be considered as fundamental building blocks for the possible natural microphysical world.²⁵ If we assume that there is a developmental paradigm that yields the entire N-world universe in which we dwell, then $*S$ and the D-world model yields an ultimate unification. It not only generates the entire universe, and all comprehensible refined behavior, but also the very fundamental constituents of all material microphysical, macrophysical and large scale structures. Observe that the D-world mode is a complete “grand unification” of type (1).

3. Supermind Choice

Is it possible that every actual developmental or subdevelopmental paradigm can be deterministically selected “prior” to the application of $*S$?

(3.1) *From the viewpoint of the D-world model, there are infinitely many possible behaviors and characteristics for any developing natural system or its constituents.*

Any $L(D)$ has infinitely many different representations for developments. The same must hold for the D -world.

(3.2) *Within the D -world there exists a D -process that selects a complete and unique development for any natural system and its constituents in a manner that is not absolutely statistically random.*

It is a well-known experimental fact that no human can make a finite choice from a potentially infinite set of objects in an absolutely random manner.²⁶ All of science as practiced by mankind is based upon finite choice. We appear to "finitely choose" what to observe sensorially, the conclusions of our deductive reasonings, theoretically obtained predictions, statements to verify, and the like, from potentially infinitely many entities. Even though we may not, at present, be able to predict successfully many of our finite human choices beforehand, science does not consider such choice methods as absolutely random. Indeed, for machines as well there are very strong and obvious arguments by Bohm,²⁷ and others, that such machines can not produce an absolutely random choice and for this reason we often term machine choice as "pseudo-random."

When consequences of deductive processes are examined, individuals often select certain portions as part of their arguments and reject the remainder as extraneous. When finite choice and such restricting procedures are modeled within the D -world, it is discovered that there is a specific deterministic and a D -world nonabsolutely statistically random procedure (hyperfinite choice) that yields each and every $D.P.$ and no other N -world behavior.²⁸

(3.3) *Within the N -world there can be absolutely no direct nor indirect observation or measurement that will reveal that such a very special deterministic process is being applied.*

The above process is what is called an "external" process and the interpretation of such processes within the D -world model is taken to have these characteristics. Notice that this interpretive aspect of the D -world model has exactly the same property as the Everett-Wheeler-Graham theory in that the EWG theory cannot be "operationally supported in the [N -world] laboratory."

(3.4) *There may exist from the point of view of the D -world a set of rules utilizing a pure D -world language that yields the selection of these unique developments. These rules are humanly unknowable.*

On the one hand, we model within the D -world the psychologists claim that such "rules" may exist. Then on the other hand we also model Gödel's incompleteness conclusion that implies, from one of the most recent treatments, that the intuitive methods utilized for any scholarly discipline that employs the basic notions of the natural numbers cannot be specifically described by means of one fixed set of rules taken from any $L(D)$.²⁹ These intuitive methods include the processes that one uses to obtain intuitive conclusions and intuitive choices.

4. Superuniform Alterations

(4.1) *Within the D -world model there exists a superuniform, supercontinuous, supersmooth altering D -process that transforms the behavior and character-*

istics of natural system S_1 as well as the behavior and characteristics of constituents contained within S_1 at time t_i into the behavior and characteristics of system S_1 or system S_2 as well as the behavior and characteristics of constituents contained within S_1 or system S_2 respectively at time t_{i+1} .³⁰

Statement (4.1) refers to a much stronger type of superaltering process than expressed by statement (2.2) which only refers to the consequence operator itself. The D -world agents for such inter-related alterations may be subparticles.³¹ The mathematical techniques used to establish (4.1) are somewhat complex; however, a more easily grasped model for material alteration has been constructed for a possible N -world discrete change (β -decay)—a model that apparently solves the discreteness paradox.³² Notice that the above D -process may be restricted to subdevelopmental paradigms that reproduce refined behavior.

In order to justify the statements in (4.1) in a more meaningful manner, consider the following additional statements relative to the interior logical construction for systems S_1 and S_2 .

(4.2) *Let r_i be a mathematical measure (real, complex, vector) that yields a characteristic for system S_1 or a constituent within S_1 at time t_i . Let r_{i+1} be a mathematical measure for the same characteristic for system S_1 (or S_2) or a constituent within S_1 (or S_2) at time t_{i+1} . Then there exists a supercontinuous, supersmooth, superuniform functional D -process that changes r_i into r_{i+1} . If there exists a continuous or smooth or uniform humanly comprehensible functional process that changes r_i into r_{i+1} , then there exists a supercontinuous, supersmooth, superuniform functional D -process that changes r_i into r_{i+1} and the restriction of this D -process to the N -world is the above aforementioned functional process.³³*

Recall that an applied mathematical process that changes r_i into r_{i+1} is usually interpreted in the language $L(D)$ as a physical process that actually alters the characteristics being measured. We may continue interpreting the statements in (4.2) by writing that from the D -world viewpoint all of the measurable properties for natural systems and their constituents are considered to be inner-related and they are dependent upon D -world supercontinuous, superuniform, supersmooth processes even though these processes may be humanly unknowable or incomprehensible. Notice that this yields a type (3) description in that there exist logically generated relations between various characterizing representations or measures for system behavior in terms of these new D -world concepts.

When the supercontinuous, supersmooth or superuniform concepts mentioned in statements (4.1) and (4.2) are investigated then it is discovered that these types of D -uniformities are beyond any of the ordinary types of uniformities employed throughout humanly knowable N -world descriptions for the regular or ordered behavior of a natural system (i.e. uniform continuity, differentiability, etc.). These D -processes are more uniform than anything that the human mind has previously either perceived or conceived. Moreover, many of these D -processes are highly complex and infinite in character when they are described from

the *exterior* D-world viewpoint. However, from the viewpoint of the internal D-world they can be described as behaving in the same simplistic manner as *finite* processes behave from the human viewpoint. (One of the significant features of the D-world is that there exist three viewpoints: the standard, the internal and external.)

5. Long Term Developmental Processes

We previously discussed the doctrines of the local and universal uniformity of nature;³⁴ however, a slightly deeper investigation appears necessary. Let F_i represent the behavior and characteristics of a natural system S_i and its constituents at time t_i . Let F_i contain statements (subwords) W_i that represent assumed first-principles (i.e. "laws of Nature") and "universal constants" as well as predictor statements P_i . We assume that the W_i can be directly verified only within an immediate space-time neighborhood of t_i .

Much of modern science proceeds with the following extrapolation process. The W_i representations are assumed to be space and time independent. Then the predictive operator P_i is applied and within the theory language it is claimed, based upon the ad hoc doctrine of the universal uniformity of nature, that the predicted statement F_j is "true in reality" at time t_j . Obviously, depending upon the value of t_j , the statement F_j may not be verifiable directly. On the other hand, the F_i are consequences of the F_j , W_i and predictive methods and the F_i may yield, if verified, *indirect* evidence for the acceptance of F_j . However, there exist many alternative representations F_j' taken from $L(D)$ that also predict the same statement F_i .³⁵ Interestingly enough, it appears that a highly regarded theoretical explanation or certain cosmologically orientated F_j now requires that the W_i statements be *slightly altered*.³⁶ The existence of such alternatives implies that the doctrine of the universal uniformity of nature is neither directly nor indirectly verifiable since it is a statement exterior to the physical language $L(D)$ and is *about* theories or models. Relative to induction John Stuart Mill also made this same observation in 1843.³⁷

Developmental paradigms give a second illustration of the difficulties encountered in assuming the universal uniformity of nature. Suppose that for S_i , F_{i+1} represents the behavior and characteristics of S_i and its constituents during a cosmic time interval denoted by $i + 1$. The frozen segment F_{i+1} may include mathematical models, theories, interpretations, experimental methods and the like as well as assumed first-principle statements and assumed universal constants. Let F_i represent the behavior for a prior cosmic time interval denoted by i . Assume that F_i is consistent and differs from F_{i+1} in that it contains some distinctly different first-principles or universal constants from those that appear in F_{i+1} . We assume that the prior interval is so far in the past that there is no experimental documentation available that might tend to verify the W_i . Statements (4.1) and (4.2) show that from the viewpoint of the D-world model there are various superuniform processes that change behavior F_i into the behavior F_{i+1} , altering the so-called first principles or universal constants W_i . It is very important to note that these changes occur along a time boundary (i.e. say along a hypersphere in the

sense of Riemannian geometry). Thus they occur throughout the entire system S_i at that particular moment. (System S_i need not be the entire universe in which we dwell, but is any natural system.) Observe that there is an apparent D-world mechanism that can yield such changes. If the N-world changes appear to be discrete, then *pure* supercontinuous, superuniform processes manifest themselves when they superharmoniously bind together what may appear from the N-world point of view to be discrete behavioral alterations.

Now any information that could have been transmitted by means of any N-world describable process from cosmic time interval i to the interval $i + 1$ using processes internal to the developmental paradigm would totally conform, from the viewpoint of an observer internal to the space-time neighborhood associated with $i + 1$ and system S_i , to the principles, laws, numerical constants and behavior characteristics given by the description F_{i+1} . The consistency and logical implications stated within F_{i+1} are maintained. It is not difficult to construct an analogue model of this effect. Simply assume that we and our local system S_i are embedded inside an anamorphoscope that takes all N-world informational transmissions that are "distorted" by the unknown first-principles exterior to our local system and conforms them, in a superuniform manner, to the "normal" properties interior to the anamorphoscope. The standard experimental and scientific methods of investigation that are used to infer the "truth" of first-principles or numerical constants since they are restricted to F_{i+1} cannot differentiate between an extrapolated F_i description and F_i . Thus assuming only local uniformity, the hypothesis called the universal uniformity of nature that purports to yield a valid description throughout a system's development is not capable of refuting all rationally generated alternatives such as F_i .

For some reason, it has recently become scientific heresy to reject a humanly knowable or comprehensible set of first-principles or a humanly comprehensible uniformity of nature that is claimed to apply throughout the entire development of a natural system, even though there is no scientific N-world process that can establish the universal uniformity of nature. If one does not accept the universal uniformity of nature that determines the entire development of a natural system completely, then, as has been shown, one need not abandon the concept from another more fundamental viewpoint. Since whether or not such humanly comprehensible universal first-principles exist, it may be rationally assumed that such superuniform processes or D-world first-principles do exist. Unfortunately, the human being seems to have difficulty when he attempts to eliminate completely a doctrine of the uniformity of nature since our daily personal experience depends upon many perceived uniformities within our *local* space-time environment. The "beauty" of this local and internal uniformity sustains our human existence; but, it may be assumed rationally to be a restriction of a more fundamental D-world superuniformity that can produce, even within the local environment, system behavior that is not humanly comprehensible even though it may be humanly observable.³⁸ We repeat, however, that internal to the system S_i there is no known scientific

method for determining whether or not W_1 has or has not been so altered.

6. Absolute Randomness

Previously I gave a few *personal* and operative definitions for the concepts of *determinism*, *causal processes*, *determinism in the broad sense*,³⁹ *statistical randomness*, *random cause*, and the philosophical concepts of *absolute statistical randomness*, and *absolute random cause*.⁴⁰ These definitions may not be accepted by some scholars since they are so operative in content.

For the purposes of this article, I accept any reasonable definition for these concepts and point out three D-world consequences. (A) Section 2 indicates that from the viewpoint of the D-world model we may assume that all members of a developmental paradigm, d , are related explicitly and nontrivially one to another by being specifically generated by $\star S(\{w\})$. The mathematical relation is as follows: Let w be one of the superwords such that for each F_i in d , F_i is a member of $\star S(\{w\})$. Then the relation is $\{(x, y) | x, y \in L(D) \text{ and } x \in \star S(\{w\}) \text{ and } y \in \star S(\{w\})\}$. (B) Sections 2 and 3 indicate that from the viewpoint of the D-world model we may assume that a developing natural system has a "cause" that is partially representable by our new D-world language. This "cause" includes the operative properties expressed within section 2 and the concept of hyperfinite choice as discussed in section 3. (Of course, THE absolute cause could be considered as being described partially by all present or future D-world statements.) (C) Section 4 indicates that from the viewpoint of the D-world we may assume that at each moment t_i in the development of a natural system S_1 the behavior of S_1 and its constituents is strongly related to the behavior of itself or any other system S_2 at an adjacent moment t_{i+1} .

Various terms such as (1) "randomness" or (2) "random cause" are utilized within many mathematically based theories for system development. Can such terms be corresponded to the $L(D)$ related terms "absolute statistical randomness" or "absolutely random cause" respectively? Since the descriptive D-world model exists and yields standard theory predictions then statements (A) (B) and (C) imply that the terms (1) and (2) cannot be replaced operationally by these "absolute" terms.

With our ability to disseminate immense amounts of popularizing and pseudo-scientific information most literate individuals have the opportunity to insert these "scientific" descriptions into their own personal belief-systems. Obviously, these insertions should not yield a contradictory personal philosophy. This author contends that it is when such insertions take place that the correspondence between realistic N-world languages and "actual reality" occurs within an individual's mind. For various *philosophical* reasons, external to most scientific languages and methods, individuals apparently attach to some or all such "realistic" terms the additional notion that they are describing actual reality and are not mere catalysts. Also individuals accept or reject portions of substratum models. The entire D-world model that is external to the N-world may be considered as a catalyst (a partial Positivism)—in which case the terms (1) and (2) may be associated with actual reality. On the other hand, philosophi-

cally, various portions of background models such as the D-world—models that predict the same verified N-world consequences—may be personally selected as describing a more fundamental and actual reality. This would force such terms as (1) and (2), among others, to become catalysts.

Since individual belief-systems are not immutable, in general, then it is possible, usually, to influence an individual's acceptance of a belief-system by presenting evidence that a scientific model satisfies the standard criteria for its acceptance as a *working model*. If enough evidence is presented, then individuals *may* by their own "free" choice modify their belief-system in a consistent manner in order to accommodate this new model. Once distinct hypotheses are placed upon a "balance scale" then whether or not one hypothesis takes precedence over another often depends upon its degree of speculation and (indirect) evidence. In the next article in this series actual indirect evidence will be compiled that will tend to shift the balance towards the acceptance of some type of D-world hypothesis. Actual evidence will be presented that will show how the D-world model eliminates some of our most perplexing scientific controversies and may indeed be the most fundamental of all unifying models.

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17. Herrmann, R. A. 1984. NSP-world alphabets, Monograph #155. IMP Press, P. O. Box 3410, Annapolis, MD 21403. This paper is also in Monograph #130. Since there are denumerably many members of a D. P. then theorem 3.1 on page 4 applies. Also see reference 13, theorem 4.4 and discussion on pages 12 and 13. With respect to a numerical comparison the concept of "superuniform" can be technically expressed as follows: A real valued function f defined on a set A is superuniform if and only

- if for $x, y \in *A$ such that x and y are infinitesimally close it follows that $*f(x)$ and $*f(y)$ are infinitesimally close.
18. Herrmann. 1984. Reference 17. Consider the proof of theorem 3.1 on page 4. Then for each infinite number $\lambda \in *N - N$ such that $\lambda \leq \eta$; $*h(\lambda) \in *S(\{w\})$. Since $\lambda \neq k$ for any $k \in N$ then these $*h(\lambda)$ may be interpreted as the C_i . All such $*h(\lambda)$ are purely subtle objects and are not members of any $L(D)$. Let P be the language generated by the set d as the primitives (atoms) of a propositional language. Also see reference 13, theorems 2.1 and 3.3.
 19. *Ibid.* The set P on page 2 is minimized by considering it to be generated by the set of all F_i in the $D. P.$ as primitives. Then only the $D. P.$ and its logical consequences are obtained when $*S$ is restricted to any $L(D)$.
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 29. Uspenskii, V. A. 1974. An elementary exposition of Gödel's incompleteness theorem. *Russian Mathematical Surveys* 29(1):63-106. Let a "proof method" in this article be that

portion of a "rule" that selects a finite subset of A^* , which selects a particular member of A^* . Note that since there is no such rule expressible by means of the algorithms (in this case Markov) presented in this article then, assuming Church's thesis, there is no humanly expressible rule. Since each "rule" is finitely expressible by the objects it selects, its "proofs" as here defined, then this forces the set of all possible rules to be infinite. For otherwise, each rule separated by a disjunction would produce a "proof" of finite length that would yield the entire $T \subset A^*$, where T (the set of "true assertions") equals the set of all frozen segments. Thus we can apply the discussion on page 6 of reference 9.

30. Herrmann. Reference 13.
31. Herrmann. 1985. Reference 8.
32. Herrmann. 1983. Reference 2.
33. Herrmann. Reference 13, theorem 5.1 and page 18.
34. Herrmann. 1985. Reference 3.
35. *Ibid.*
36. Wilczek, F. 1980. The cosmic asymmetry between matter and antimatter. *Scientific American* 243(6):89 suggests a theory where baryon numbers are not conserved in an early universe. With respect to cosmological effects of assumed microphysical particles, we also have the well-known procedure within quantum field theory that violates the macroscopic conservation of energy in order to produce virtual particles and the well publicized theory of quarks that gives an internal structure to certain elementary particles that by definition are not supposed to be composed of any other microphysical objects.
37. Mill, J. S. 1843. A system of logic. Book III. Collected works of John Stuart Mill, Vol. VII. University of Toronto Press, Toronto, p. 310.
38. Notice that w is humanly unknowable and that $*S$ is humanly incomprehensible. But the consequences F_i , the $D.P.$ and the sub $D.P.$ are humanly knowable.
39. Herrmann. 1985. Reference 8.
40. Herrmann. 1985. Reference 3.

BOOK REVIEWS

Creation and Evolution: The Facts and Fallacies by Alan Hayward. 1985. SPCK, Holy Trinity Church, London NW1 4DU. 232 pp. £2.75.

Reviewed by David C. C. Watson*

This is an interesting little book by a physicist who calls himself a Bible-believing ancient-creationist and tries to prove that both theistic evolution and 'recent-creationism' are wrong. It is divided into three parts: I. The Genuine Scientific Objections to Darwinism. II. The Age of the Earth. III. Bible Teaching on Creation. Writing primarily for laymen, Dr. Hayward is easy to read, keeping his chapters short. Documentation is good and notes at the back elaborate important points. He feels he has been guided by Providence to correct the bad impression made by "extremists" (e.g. CRS members!) on the scientific community. Has he succeeded?

With Part I we have no quarrel: Hayward has little difficulty in showing the confusion in the ranks of neo-Darwinians faced with ever-increasing evidences against mega-evolution. Useful extracts are made from Grassé, Willis, Hitching, G. R. Taylor, and other 'doubters'. Part II comprises half the book and carries the main thrust of the argument: that the earth is indeed millions of years old. Those familiar with the writings of D. E. Wonderley and Davis A. Young, will find little new here. As a non-scientist your reviewer will not attempt to evaluate Hayward's critique of the young-earth model, but it is noticeable that he refers only twice to CRSQ articles. One would have expected that (e.g.) John Woodmorappe's studies in geology

and radiometric dating would have been mentioned—but no, not once! Either Hayward is not up to date in his reading or he has found these articles too difficult to answer. On the other hand he refers no less than 17 times to the stridently anti-creationist journal *Creation/Evolution*, including R. A. Moore's nonsensical caricature of Noah's "impossible" voyage (Winter 1983).

In Part III Hayward follows the well-worn path of attempting to prove that Genesis One does not mean what it says. Like other "Bible-believing" scientists he has his own peculiar theory of how the words can be re-interpreted by inserting parentheses, hypotheses, and false analogies; and, like them, he fails to convince. Not a single eminent Hebrew scholar is quoted in support: the traditional interpretation is dismissed with a wave of the hand because Luther misunderstood Joshua's Long Day. Perhaps the best epitaph on all such theories has been written by Professor James Barr:

By completely ignoring the literary form of the passage, its emphasis upon the seven-day scheme, and all questions involving the intentions of the writers, this interpretation is as effective a denial of the truth of Genesis as any atheist writer could produce. . . . These are all transparent devices for *making the Bible appear to be factually accurate by altering its meaning* at the awkward points (*Escaping From Fundamentalism*, 1984, p. 137).

In a personal letter to your reviewer, the author admits he is a Unitarian. It is true that many Trinitarians do not believe in the literal truth of Genesis 1-11, but this unbelief is *inconsistent* with their faith in the literal truth of the New Testament. On the other hand it is absolutely *consistent* for a Unitarian to

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accept Genesis 2-3 as literal but "re-interpret" Genesis One, because this is what all Unitarians do with the New Testament—accept most of it but "re-interpret" the verses which clearly teach the Deity of Christ. So Dr. Hayward's book, like a wreck on a motorway, reminds us of St. Peter's solemn warning that those who wrest the Scriptures do it "unto their own destruction." They begin by tinkering with Old Testament history and end with denying essential Christian truth. Nevertheless, if we wish to eliminate bad arguments and sharpen our good ones, this critique of creationism is worth studying.

In the Beginning: Science Faces God in the Book of Genesis by Issac Asimov, 1981. Crown Publishers Inc., New York, 234 pages \$10.95.

Reviewed by Jerry Bergman*

Issac Asimov, probably the best known science fiction writer today, has produced over 230 fiction and non-fiction books on almost every area of science and literature. Asimov's writing talents are legend, running the topical gamut from pornography (his *Still More Lecherous Limericks* is advertised for sale to adults over 21 only) to Biblical commentary (*Guide to the Bible*, two volumes). In addition to being prodigious, his writings are engaging and concise.

In the Beginning was written for the high school or undergraduate college level reader. It is readable and flowing, although at times somewhat condescending to religious persons. *In the Beginning* is a verse by verse commentary of Genesis and, although it contains much good information, it is unfortunately rather superficial. No references or bibliography are given.

Asimov accepts uncritically the assumptions and conclusions of liberal scholars as, for example, the idea that Genesis is a "scissors and paste job" of materials from four separate sources. This "JEPD theory" is presented without ever acknowledging the many criticisms against it (one of the latest was reviewed in *Time*, Dec. 7, 1981). *Time* reported that a five-year computer study found that Genesis is more likely the work of a single writer and the JEPD theory, which has hardened into liberal orthodoxy, must be rejected or at best thoroughly revised. This conclusion came from Dr. Radday, a respected scholar who, according to *Time*, earned wide acclaim for his computer analysis of other books of the Bible.

The tone of Asimov's book is set on the first page with such statements as:

Against these strong, unwavering and undeviating beliefs (referring to people who believe that the Bible is God's Word) the slowly developing views of scientists have always had to fight. (p. 1, parenthesis added).

This superficial oversimplification evidences little knowledge of the history of science. Sometimes Asimov is misleading. Early in the book he states:

What does the Bible say, and what does science say? . . . (this book) does not argue one way or the other. It offers no polemics. It merely considers the verses of the Bible, line by line and, indeed, word by word, discusses the content and meaning

and compares them with the scientific view that pertains to the passage. (pp. 1-2, parenthesis added.)

As Asimov later admits, however, his book does no such thing. Rather than being objective and unbiased as the above statement promises, his purpose seems clearly to be to persuade his readers that, though having historical value, the Bible is not God's word but merely reflects the unscientific beliefs of the ancient Hebrews.

Yet, Asimov has many good things to say about the Genesis account. He admits that

The Biblical writers . . . labored to produce something that was as reasonable and as useful as possible. In doing so, they succeeded wonderfully. There is no version of primeval history, preceding the discovering of modern science, that is as rational and as inspiring as that of the first eleven chapters of the Book of Genesis. (p. 3)

One interesting comparison Asimov notes is that the Scriptures teach that the earth was at one time "without form and void," or disordered which corresponds, interestingly, with the modern theory that the solar system was formed from a vast cloud of dust and gas. As another example: whereas most scientists formerly believed that the universe has always existed, Asimov points out that most scientists now believe that the universe had a definite beginning as the Bible states.

He acknowledges that while religionists have had their squabbles over interpretation of the Bible and religious points, likewise science too has seen its share of arguments, disputes and polemics. A difference, Asimov insists, is that scientific opinion eventually swings one way or the other according to the facts, but religious opinion does not. This claim is, of course, simply not true. Right or wrong, some large religious denominations have moved radically away from their original stress. Many people of science would also beg to differ with his differentiation; we are still arguing some old "scientific" controversies (as anyone who has spent much time in science is well aware) and many religious controversies have been settled long ago. Paul, Peter and the Apostles settled many of these centuries ago—how many Christians today argue about whether a Christian must be circumcised as a condition of salvation? Asimov's statements may be more true in physics and chemistry, but are by no means true for many of the sciences. According to Kline (1980, pp. 307-27) in science there are more debates today than ever before.

Other reviewers have also noted Asimov's evident lack of Biblical knowledge. Gordon Stein, writing in *The American Rationalist* 26(3):47 states,

. . . Asimov brings a broad breadth of scientific knowledge to his examination of Genesis. How great his Biblical knowledge is, one never can be quite sure. He does seem quite positive about many of his interpretations of the Biblical text, even when theologians have been arguing among themselves over the meaning [of them] for years.

Asimov recounts how the view that outside intervention was needed to account for the universe has been slowly discarded in Science. Scientists, he writes:

grew increasingly reluctant to suppose that the

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workings of the laws of nature were interfered with . . . in short, the scientific view sees the universe as following its own rules blindly, without either interference or direction. (p. 11)

He adds the rather sweeping and highly debatable conclusion that "So far, scientists have not uncovered any evidence that would hint that the workings of the universe require the action of a divine being." (pp. 11-12). He admits, though, that "On the other hand, scientists have uncovered no evidence that indicates a divine being does not exist." (p. 12).

Asimov also rehearses some of the old debates, i.e. God as the answer to where the universe came from causes him to ask "but who made God?" (p. 12). Asimov does accurately describe the chief conflict between creationists and the evolutionists, namely,

The Bible describes a Universe created by God, maintained by him . . . while scientists describe a Universe in which it is not necessary to postulate the existence of God at all. (p. 13).

As a whole, Asimov is rather dogmatic in many of his interpretations of *both* Scripture and science. For example, in Genesis 1:11, "The heavens," Asimov is sure, refer to a vault of the sky and the permanent objects connected to it (p. 14) and, further, this vault is a solid steel semi-circular dome covering the earth. One might wonder how he could be so sure about this interpretation, especially in view of the fact that many Bible scholars have come to other conclusions.

Asimov also indulges in much fanciful speculation. He claims that the cosmic egg (the single body of matter, often described as about the size of a pin head that existed in the "beginning" and from which all that exists came from), exploded in the:

largest conceivable explosion [the big bang which was so large that] . . . its fragments [were] at first entirely too hot for matter, as we know it, to exist. Initially the products formed in the explosion are energy. In tiny fractions of a second, the temperature dropped precipitously, and the Universe became cool enough to form certain fundamental particles of matter. Today, however, the Universe is *too cool* to allow these particles to exist. A full second after the big bang, the temperature of the Universe had dropped to ten billion degrees, about what it is at the center of the largest stars, and the ordinary subatomic particles we know today came into existence. Later, ordinary atoms were formed (p. 23). [parenthesis added]

This information, although presented as factual science, is pure speculation based on our current limited knowledge and much assumption and, some add, extremely fanciful speculation. Of course there is nothing wrong with speculation. It does serve a very important part of doing science, but it should be clearly labeled as such. This Asimov does not do. He is also evidently unaware of the difficulties of arriving at "truth" from the scientific method (Robbins, 1978; Bergman, 1983).

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knowledge edited by Lakatos, Imre and Alan Musgrave. *Creation Social Science and Humanities Quarterly* 1(2):13-17.

The Lost Cities of Cibola by Richard G. Petersen. 1985. G & H Books, Phoenix, AZ. 252 pages. \$22.50 postpaid.

Reviewed by Erich A. von Fange*

History buffs will appreciate this Sherlock Holmesian attempt to solve the mystery of the seven cities of gold which forever eluded the Spaniards in the Southwest of the United States during early colonial times. In this book, which includes 71 plates and nine figures, the author builds his case on evidence that the fabled cities must be Hohokam cities in the Phoenix area which were flourishing in 1539 but unaccountably abandoned about 150 years later. Why were the Spanish explorers unable to find the cities a second time? Petersen believes the cities and surrounding area were suddenly and completely destroyed by some enormous catastrophe. He discusses and illustrates examples of melt-rock in this area and show that ancient canals no longer make sense in relation to the present terrain in places. He attempts to show that Easter Island was affected by the same destructive phenomenon. Petersen explores the mystery of loess deposits around the world which formed rapidly and which may be much more recent than usually thought. Another item of interest is examples of wild discrepancies in C14 dating and the conflict of accepted C14 dates with expert opinion on when the canals were last in use. If the author's conclusions are to be taken as credible the melt-rock must be shown to be a non-volcanic flow of molten rock, such as the calcined or vitrified forts and walls of the British Isles and elsewhere. Similarly, there ought to be partly melted buildings, walls, and artifacts. These remain to be found and photographed.

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The Mystery of Life's Origin: Reassessing Current Theories by Charles B. Thaxton, Walter L. Bradley and Roger L. Olsen. 1984, Foundation for Thought and Ethics, P. O. Box 830721 Richardson, TX 75083. 228 pages \$16.50 hb, \$10.00 pb postpaid. Texas residents add 6% tax.

Reviewed by Emmett L. Williams*

The authors very carefully explored the theories that have been developed and the laboratory work that has been done to demonstrate the plausibility of so-called chemical evolution and found them seriously lacking. Many of the objections covered in the book can be found in the creationist literature of the past 20 years but the authors elucidate these points in greater detail and utilize some more recent work. The entire book is written in a positive manner to appeal to practicing scientists and engineers and can be understood by people not versed in chemical evolution scenarios.

Concerning the actual laboratory investigations, it is pointed out that the experimental conditions have been so artificially simplified as to have no bearing on any process that could have occurred on the "primitive earth." Interfering cross-reactions are seldom con-

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sidered. Investigator interference (the introduction of intelligent guidance) which is so common in chemical evolution experiments is totally unrealistic.

Many of the current theories are questioned. For instance the title of chapter four is *The Myth of the Prebiotic Soup*. It is noted that the postulated prebiotic oceanic soup would have been too dilute for chemical evolution. The supposed reducing atmosphere of the early earth is questioned. The possibility of oxygen in that atmosphere and the destructive influence it would have on the production of biomonomers is covered. All claims by the authors are backed with referenced data. This is one of the strong points of the book.

The authors note that very little effort has been expended by naturalists in applying the first and second laws of thermodynamics to chemical evolution. Thus a brief introduction to these principles is given and a discussion of the system and equilibrium concepts is presented. Applications to chemical evolution are carefully handled emphasizing that the concept of an open system with an influx of solar energy (evolutionary buzz words/escape hatch) cannot account for complex biological molecules. The subjects of order and complexity are discussed in detail (much needed to clear the air in any discussion as to how much ordering can be expected from natural sources). Distinction is clearly made between thermal and configuration work necessary for forming complex structures. This reviewer does not fully accept the negative entropy concept mentioned briefly but this is a matter of personal taste.

The section on protocells points out that the assemblages found thus far in laboratory work are no more than collections of molecules attracted together by physical forces alone. The likelihood that these substances offer any hope for a naturalistic origin of life scheme is remote. A careful delineation is made between repeatable science and the subject of origins referred to as operation science and origin science respectively.

This review cannot do justice to the many arguments set forth in this treatise. It is an excellent work and I recommend it to anyone interested in the subject. Thaxton, Bradley and Olsen suggest and argue for special creation as a definite possibility for the origin of the earth and life. They seem to leave the door open for some evolution and appear to accept the geological timetable. However, these are certainly no drawbacks to the main thesis of the work. Hopefully this volume will receive wide circulation.

The Natural Limits to Biological Change by Lane P. Lester and Raymond G. Bohlin. 1984. Zondervan Publishing House, Grand Rapids, MI. 207 pages. \$6.95.

Reviewed by John W. Klotz*

This book is one of the most significant contributions to the creation/evolution controversy that has appeared in recent years. It is a thoroughly objective review of Neo-Darwinism and punctuated equilibrium together with the suggestion that there is "another alternative"—creationism with its suggestion that there are limits to the amount of biological change.

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The authors avoid emotional pleading. They freely admit that their approach is conditioned by what the Scriptures say but do not argue in support of their point of view from the Scriptures; rather they present scientific evidence to support their position.

It is very clear that living things change. The idea of a static creation is a straw man that those who oppose creationism set up, a caricature of what creationists hold. The authors recognize that there is a grain of truth in what evolutionists have built their theories on—that there is variety, that there is change, and that there is adaptation to the environment. These are certainly recognized today by all creationists.

It is the main thesis of the book that Neo-Darwinism and punctuated equilibrium fail because genetics, which must supply the mechanism for the changes which these theories demand, does not do so. In both evolutionary theories the conclusion must be so far as a mechanism is concerned "no evidence." Indeed as the authors point out the very opposite is true; the evidence from a study of possible mechanisms is entirely negative.

The authors also discuss the reasons why punctuated equilibrium has become so popular—the obvious failure of Neo-Darwinism to explain how the wide variety of living things has developed. At the same time they make it quite clear that those who support Neo-Darwinism and punctuated equilibrium are still committed evolutionists. Their attack on these theories has not led them to a repudiation of evolution.

The authors suggest the use of the term "prototype" to substitute for the concept of "kinds" in Genesis. They feel that "kinds" is too general a term and they point out that "species" is not the equivalent of the "kinds" in Genesis. In a "Response" V. Elving Anderson expresses the opinion that this term probably will not catch on, and I am inclined to agree with him. This reviewer does not believe that it is possible to develop a better term than "kind" or that it should be equated with any of our present taxonomic categories.

The book is a careful objective evaluation of the two currently advocated theories of evolution, Neo-Darwinism and punctuated equilibrium. An unbiased reader will conclude that there is as much evidence for the other "alternative," a limit to the amount of biological change, as there is for the two evolutionary theories.

ARTICLE REVIEWS

I. Thus Spake the Scientist: A Comparative Account of the New Priesthood and its Organizational Bases. pp. 79-103 in the *Annual Review of the Social Sciences of Religion* Vol. 3 (1979), Mouton Netherlands, 236 p. by Eileen Barker.

II. In the Beginning: The Battle of Creation Science Against Evolutionism. pp. 170-200 in *On the Margins of Science: The Social Construction of Rejected Knowledge*. Roy Wallis (ed.) Sociological Review Monograph no. 27, U. of Keele Staffordshire, 1979, 337 p. by Eileen Barker.

Reviewed by Paul Gosselin*

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I

This paper by Barker begins with a short historical sketch of the rising and waning prestige of science in the Western world. At the height of its prestige, it seemed science had done religion in (or at least was about to). But as Barker notes:

The science which had been heralded with such messianic zeal began itself to contribute to its own demise—at least in its role of Provisor Absolute. Science, especially, but by no means exclusively, to an increasingly vocal youth lacked something. It was incapable of reaching the transcendent heights of humanity. It reduced, it materialized, it objectified, it dehumanized. It understood quantity, not quality; it did not understand love. . . . The beauty of creation was lost in the destruction of Hiroshima. Auschwitz laughed at progress. (p. 80)

With this drop in the prestige of science, religion and religious beliefs have become popular once again. Western man has taken a step away from the rational. But despite this break from "progress," western man is reluctant to part with an older piece of his "cultural baggage": the notion of truth. He still insists (or hopes) that his world view will be proven to be true, and the only people he knows who are capable of providing this validation are . . . scientists. The main impact of this article is summed up by Barker on p. 81:

. . . what follows is a description of something of variety of ways in which members of the contemporary scientific community meet the consumer demand (for truth—P.G.) through the supply of reassuring resolutions of any possible tensions which could arise from competing epistemological or metaphysical claims of science and a particular belief system. This they do in the role of a new priesthood which can stamp a scientific seal of approval on the different theological and ideological packages that are on offer.

The main portion of Barker's article is devoted to the analysis of six ideal belief systems, their positions on the issues of origins (creation vs. evolution) and of truth (Scripture vs. science). The six ideological/religious positions are the following: Fundamentalism, Orthodoxy, Liberalism, Modernism, Agnosticism and Atheism. In each case, examples are given of the various organizations of scientists who support and provide sanction for the ideological/religious position in question. These various groups are compared on the basis of the age and sex composition of their membership, their manner of organization, their attitudes towards one another and also towards sociology.

Creationism, as such, is examined in the section on Fundamentalism. On this subject, Barker makes little effort to avoid patronizing. She does seem to have a minimal understanding of creationism, but this article is lacking in that the better creationist books are absent from its bibliography. Among creationist organizations named are: in the U.S., the Institute for Creation Research; in England, the Newton Scientific Association and the Evolution Protest Movement. Barker goes as far as to admit that some of the arguments for creationism can be fairly complex and that there are, in fact, qualified scientists among the

proponents of creationism, but this seems somewhat hard to swallow.

The arguments put forward by the Fundamentalist priesthood¹ range from the very simple to the very complicated. Many of the members are undoubtedly specialists in their own fields and can certainly succeed in blinding the layman with science. (p. 85)

Barker, at a certain point, seems at a loss to discuss the creationist position analytically and resorts to pompous remarks such as the following:

Perhaps it is not crucial for the majority of lay creationists whether or not the arguments put forward by the scientists are grasped. What does matter is that there are those who undoubtedly possess membership of the new priesthood who claim that the heritage of the ages is validated by criteria of the present. (p. 85)

Barker fails to notice that a comment of this sort is applicable to *all* the positions discussed in her article and as such is inconclusive. Creationists would likely profit in reading the remainder of the article where five other religious² viewpoints and their scientific supporters are examined. Each group works out a different epistemological status for the Bible and for the body of knowledge known as science. In this article Barker also does a good job of pointing out the various social uses of science, society turning to science and the scientists for truth, but she misses a phenomenon which is the individual scientist's need for truth or a more complete world view, which science *by itself* does not provide. In other words the scientist's involvement in the various groups discussed by Barker might equally be accounted for as a search for meaning *on the part of scientists* and I would be inclined to believe this phenomenon is at least as significant as the public's supposed need for legitimation of its particular belief systems.

II

In this paper Barker has produced a study of creationism as a movement and specifically studies creationist *organizations* as providing an environment in which a non-orthodox paradigm (in relation to the predominant evolutionary paradigm) has been able to develop. Beginning the article Barker covers the initial development of evolutionism and the following period in which creationist beliefs went 'underground' largely. (p. 185) Being based at the London School of Economics Barker presents historical information concerning the beginnings of creationism in Britain which is likely to be of interest to creationists in North America, though creationist organizations in the U.S. are also discussed in this paper. British organizations mentioned are the Victoria Institute founded in 1865 (not committed strictly to creationism), the Evolution Protest Movement (1932) and the Newton Scientific Association (1972) and in the U.S.; the American Scientific Affiliation founded in 1949 supporting the Biblical account initially but moving towards theistic evolution in later years, the Creation Research Society (1963) and the Institute for Creation Research (1970).

In one section Barker discusses the views of these organizations in relation to science and Scripture and in another presents a fairly adequate résumé of crea-

tionist arguments against evolutionism. Compared to the previously reviewed article Barker displays a better grasp of creationist material here. Other points in the paper are the demand for creation science (religious groups interested by this paradigm), attitudes of evolutionists, theistic evolutionists and creationists towards one another (especially in Britain), and the creation-evolution confrontation in the schools. Barker points out that in Britain there is no equivalent to the American textbook controversies as there is no system of textbook control in British schools. Controversies *have* occurred though in the context of religious education and Barker cites one case of the dismissal of a religious education teacher in Britain for having taught the Genesis account of origins. Concluding the article Barker alludes (p. 197) patronizingly to creationist scientists' role of comforting the 'ignorant masses' (as in the previous article), but beyond this she does allow that creationism as such may be beneficial to science in the long run.

Detailed arguments over substantial issues cannot be entered into here but a cursory examination of the literature suggests that there is enough sloppy thinking by evolutionists to allow the Creationists to point legitimately to difficulties which

the former all too often smugly ignore. Many Creationist scientists have a sophisticated grasp of the philosophy of science and they are by no means living in a world of their own so far as scientific discoveries are concerned. It could indeed be argued that *because* they work within a 'rejected paradigm' they are sometimes more open to new facts than are those working within 'normal science.' Where the battle of Creation science involves a challenge within the battlefield of science (as defined by the prevailing paradigm) it is Evolutionism which risks the consequences of complacency when it does not pick up the gauntlet. (p. 197)

References

1. All groups in the article are designated in this fashion.
2. Curiously enough, Barker unintentionally provides an excellent argument for the fundamentally religious nature of *all* six positions discussed in her article in that these six positions all fit in so well on the *same* spectrum. It is my own opinion that ideologies (cosmology without God) and religion are all part of the same phenomenon. This view is being held by an increasing number of social scientists who are coming to see western ideologies in a similar manner. To name a few: Ward Goodenough, A. F. C. Wallace, C. Kluckhohn, Thomas Luckman, Andrew M. Greeley and George Steiner.

LETTERS TO THE EDITOR

Metaphysics

In the creation-evolution debate, evolution often is termed empirical and creation as metaphysical. The term metaphysical is generally understood to refer to phenomena which are above or beyond physical reality. The word is from the Greek, *meta ta physika*, or literally, "after the things of nature" or that which exists apart from the physical world and is not amenable to or readily understandable by doing research in the traditional laboratory method. Science not only includes the study of the material world, but also of physical laws which manifest themselves through matter, such as research on energy. Metaphysics, on the other hand, includes that which is more commonly understood as spiritual, specifically the study of God, angels, demons, etc. In discussions of the metaphysical-physical dichotomy, persons today are often inclined to conclude that the only reality which exists is physical, and dismiss the metaphysical. More concern needs to be addressed to the unity and interaction of the so-called physical and metaphysical worlds. At least they share some elements (such as ontology) while being at the same time different in ways that need to be further explored.

Some philosophers, such as Hegel, were "led to the monistic position that there is only one kind of substance and only one true substantial entity."¹ His "one kind of substance" was "an evolutionary pantheism,"² whereas I am proposing to explore the reality of what is popularly termed metaphysical in order to understand the similarities between what seems to be in some ways an artificial dichotomy between the physical and metaphysical.

Certain limitations, such as the necessity of interpreting sensory input, do not preclude an accurate understanding of all of reality, nor advancement of knowledge in this area. Multisensory input, as well as collaboration of conclusions with other means of

investigation, such as experimentation utilizing instruments for input of light and translating these into data which are in turn analyzed, is a way of overcoming this limitation. Thus, in spite of this problem, numerous metaphysical theories which were held for eons in history have been falsified in the scientific sense. Examples include abiogenesis and the phlogiston theory of combustion.

This goal is not to reduce reality to a set of simple mathematical relationships, but to expand reality to complex (possibly beyond the mind of humans) mathematical relationships and being input. Thus, as opposed to obverse reductionism, a fuller understanding of reality will, I believe, result in the rejection of the materialistic-naturalistic reductionism of not only evolution, but of all reality. It will, thus, encourage the acceptance of all reality by whatever means available, whether classified as metaphysical (such as the techniques in theology, including the epistemologies that it uses) or the materialistic epistemologies, such as empiricism.

The Creator may in some ways be ontologically different from the creation, just as humans and plants are different; likewise the Creator has some commonality with the creation (the creation reflects qualities of the Creator) just as plants and mammals have many elements in common (probably more so than they have in contrast).

The term *metaphysical* itself has changed considerably through the years and its use is by no means consistent or clear today. In most of my reading relative to the philosophy of science, the term metaphysical used the definition above, i.e., that "above physics" or that apart from physics, such as the transcendent reality (or an hypothesized transcendent reality). Thus the term is here as commonly used by critics of creationism, not the broader use in vogue by philosophers.

My main concern is that all too often creationism is labeled metaphysical, theological, etc., and thus impermissible to discuss in a science class. The implications are that this reality does not exist, but is illusory. Evolution is termed science and thus it can be discussed in the science class. The anti-creationists often stress that it is impermissible in science to appeal to a Creator or any transcendent reality. All that scientists can deal with is physical reality, and therefore must assume an atheistic orientation in doing science. If one is interested in understanding reality, all epistemologies should be utilized and what is determined by the empirical method is not necessarily more real or valid than that discerned by other methods. Some scientists concede that there may be a God, but the rules of science preclude any appeal to Him to explain anything. This, to me, is totally fallacious in that scientists of the secular sort may well be distorting reality by deliberately ignoring certain epistemologies, and even that which cannot be predicted regularly by manipulation of physical events, such as in dealing with some forms of energy. Their self-imposed blinders may well prevent them from grasping the full reality. Is it not better to accept truth wherever one finds it, and let it take you where it leads?

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1. Hancock Roger, 1972. Nature of metaphysics. The encyclopedia of philosophy, 5:298.
2. *Ibid.*

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A Civil Right Expectation

Please refer to the letters written by Marshall and Sandra Hall (CRSQ 21:155-156) and my previous letter (CRSQ 22:97-98).

The practice of science has uncovered a huge array of evidence consistent with the world view that thinking beings originate all observable organization and information. There is no repeatedly confirmed observation that chance originates anything. These statements are presently observable entities that deserve to be called facts.

Those who believe this should not be subject to denial of continued access to any gainful occupation or profession because they believe it. Those who attempt to enforce the religion that "chance originates and originated everything" need to be legally restrained from their attempts to coerce anyone to accept their particular religion.

We ought to return to a political situation where both points of view are legally tolerated. If we cannot achieve this status again, there probably can be no peace among those holding the two antithetical points of view. Whatever happened to tolerance and academic freedom? Why should anyone be told they must not believe that "thinking beings originated everything"? Or, that they must believe "chance originates and originated everything"? These are both religious points of view, not accessible to the test modes now practiced in the professions we call science. If we are going to have and continue religious freedom, we must have this measure of tolerance.

It is a matter of historic record that persons having either one of these religious points of view have made essential and important contributions to the advancement of scientific knowledge. We do not know why people with such antithetical points of view can be successful in scientific activity, but the fact is, they are. Scientific thinking is not denied to those of either point of view. These facts are also consistent with an assertion that tolerance needs to be continued in this matter. Attempts to coerce either point of view need to be legally prohibited.

This measure of tolerance is needed politically, if democracy is to be maintained. It is needed pragmatically, if the USA is to continue to be competitive on the international scene. We cannot afford to block any potential contributors to our scientific knowledge. Public supported academic organizations must not be a party to a form of bigotry that excludes students because of their religious beliefs. They must not give a favored position to those of a selected religious belief. The dogma that "chance originated everything" is one of our religions. It must not be permitted to be a state religion.

Because religions are always being palmed off as "science," science needs to be properly defined. Certainly observation, repeatable in nearby time, should be an essential requirement. There has been no development of practical use to the public that has not had this property. The public should not be asked to continually support extensive investigative efforts that yield no repeatable results, or have reiterated the outcome that says, no results are observable.

Any persons, that can arrange the required financial support for scientific research themselves, should be free to utilize this support, provided any risks associated with the activity fall primarily on the experimenter or experimenting group.

When the public in general is asked or required to support a scientific activity it needs to have a compelling requirement associated with it. Repeatability in nearby time is a compelling requirement in modern activities called science. National discussion of such matters needs to identify any additional requirements that are really essential.

Other useful properties of scientific activity, such as analysability, predictability, and verifiability should not be viewed as compelling. Such activities are often useful. They should be expected later, after an initial development uncovers a repeatable outcome. They should not be compelling, during the early stages of research and development. Such properties are very hard to define anyway, and they overlap fairly severely.

Henry H. Grimm
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Annville, PA 17003

* * * * *

For the health of our society, the arts must mirror man's dignity and the sciences must not deny God. The failure of both to meet their responsibility is one of the grave ills of our time . . .

Williams, Duncan 1985. Editor's preview of negate the negation! Rescuing Man from nihilist art and materialist science *Imprimis* 14(6):1. Hillsdale College, Hillsdale, MI.

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- Who killed excellence? Behavioral psychology did. Why? Because it is based on a lie: that man is an animal, without mind or soul, and can be taught as an animal. And that concept is based on an even greater lie: that there is no God, no Creator.
 Blumenfeld, S. L. 1985. Who Killed Excellence? *Imprimis* 14(9):5. Hillsdale, MI 49242.

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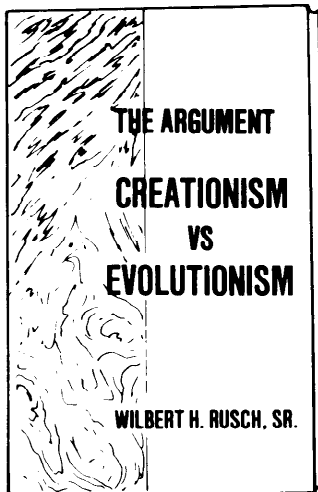
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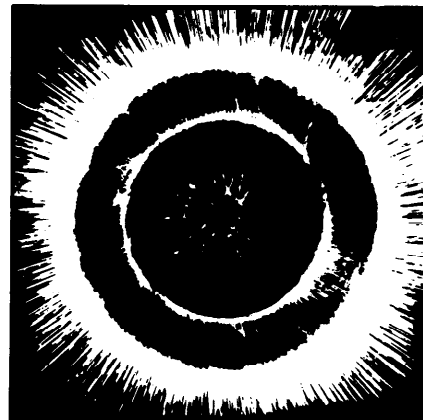


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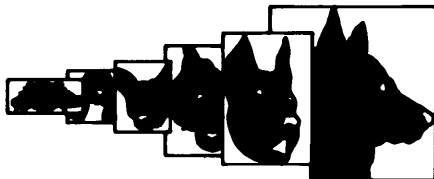
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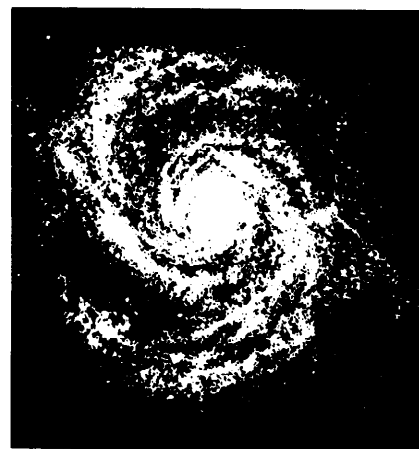
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