

Creation Research Society Quarterly

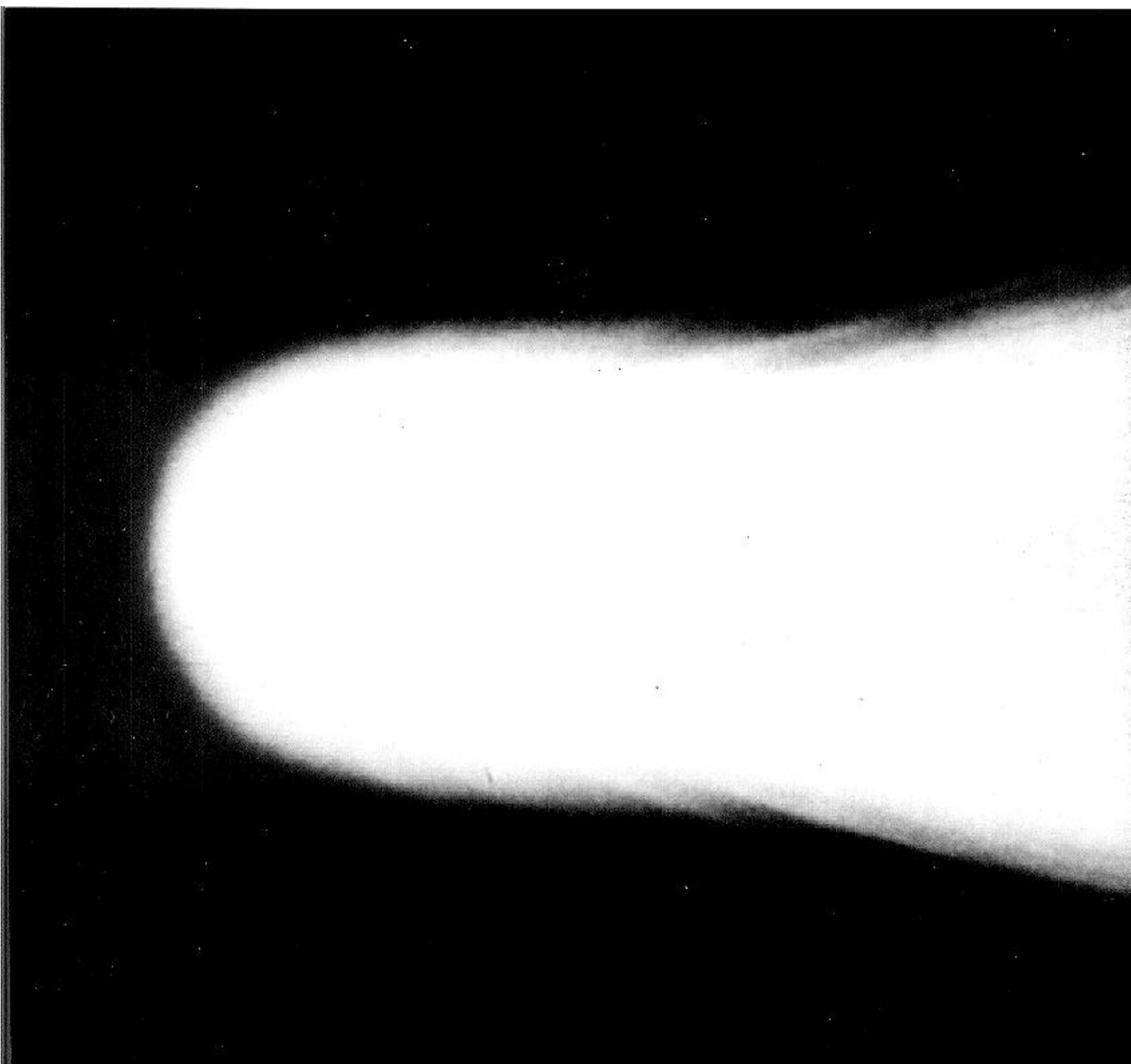
Haec credimus:

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

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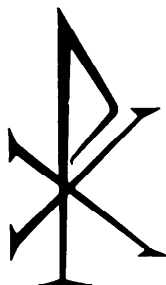
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ERRATA

The captions of Figures 5 and 6 p. 71 of the September 1985 Quarterly should read as follows:

Figure 5. Photograph of Abert Squirrel abdomens. The upper specimen displays the usually white belly while the lower specimen displays an almost pure-black belly. The middle specimen is intermediate in abdominal coloration.

Figure 6. Photograph of Kaibab squirrel abdomens. The upper specimen displays the usual dark belly while the lower specimen displays the lighter colored form. The middle specimen is intermediate in belly coloration.

The captions of Figures 2 and 3 on pages 61 and 62 of the September 1985 Quarterly are correct, however the illustrations are reversed.

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COVER ILLUSTRATION

Head of Halley's Comet as it appeared May 8, 1910. The present return of the comet (perihelion date, February 9, 1986) represents the 30th recorded in the literature, the first being in 240 B.C. Like all comets, it is "losing its glory" as degenerative effects take their toll — George Mulfinger.

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EDITORIAL COMMENTS

Dr. E. Norbert Smith, Director of the Creation Research Society Grasslands Experiment Station, discusses some areas of research that could be performed by creationist biologists. In particular Dr. Smith feels that a new biological taxonomy needs to be developed. Future Quarterlies will contain research work presented from a creationist viewpoint. Dr. George Howe's letter to the editor on keeping the Biblical creationism model separate from the creation science model should interest you. I feel that a thorough discussion of this issue will benefit our readers.

Dr. Don De Young views the properties of water from a design perspective suggesting that these are no accidents

but the result of planning. Ralph Ancil discusses the importance of philosophy in the origins debate. Creationists have capably explored this subject for many years pointing out the need for Biblically-based scientific activity.

The treatise by Dr. Robert A. Herrmann develops some interesting ideas on falsifiability and verification in science. Other interesting concepts are developed in the Letters to the Editor and Panorama. Possibly many of you could contribute to the Quarterly in these sections. Again I encourage you to send your comments to me on any aspect of the creation model of science.

Emmett L. Williams, Editor

INVITED PAPER

THE ROLE OF CREATION RESEARCH IN MODERN BIOLOGY

E. NORBERT SMITH*

Received 23 September 1983; Revised 3 February 1985

Abstract

The research to be performed by creationist biologists is discussed. A new biological taxonomy is needed. Plants and animals are not evolving but are already adapted for their particular ecological niche.

Introduction

There are individuals in the modern world who do not want any reference to God in schools, government, literature or science. Although their activities are detrimental to the Creation Research Society (CRS), they should not be a major concern of our organization. Many contemporary scientists claim that the creation viewpoint is detrimental to modern science, that the creation model is untestable and that "creation research" is counter-productive or impossible. This charge is a serious one and if true should cause us to disband and donate our assets to charity. Members of CRS have rejected evolution for scientific reasons and have proposed to re-evaluate all of science from a creationist viewpoint. What, then, is our role in modern science? This is of particular importance as we begin our experiment station research.

It must be remembered that wholesale rejection of a creationist philosophy by the scientific community is a recent event in the last 100 years. Certainly there have been atheists among the great scientists in the past and evolutionary thought can be traced back thousands of years, but the fact persists that much of the foundations of modern science were laid down by scientists working within a creationist philosophy . . . and that environment was obviously productive. Some historians would agree that the scientific revolution only took place because of the Reformation.

It has been argued that since creationists dismiss all of creation as a supernatural event—a miracle; there is nothing left to study. Nonsense! Science deals with far

more than origins. In a strict sense science is limited to repeatable observations and thus origins is scientifically off limits for both the creationist and evolutionist. However, much of science is descriptive. Obviously the description of some anatomical part, a newly described butterfly, or a recently isolated chemical substance from a cellular organelle may be accomplished equally well by creationists or evolutionists. It is when the origin of the anatomical part, butterfly or cell organelle is considered, that the creationist and evolutionist disagree. Such disagreement in no way diminishes the significance of the descriptive work nor should it raise serious questions about the credibility of the investigator.

Much of the progress of science has been made by disagreement. When science fails to doubt, to cross-examine its basic premises, theories and dogmas, then science as we know it will die. Even if the creationists are totally wrong, science will progress because we have forced a closer examination of the facts. Science is strengthened by learned dissension.

The final test of true science is in its ability to describe nature and make valid predictions. It is on this latter point that the creation and evolution models are diametrically opposed. Testable predictions from the two models will differ in many areas. We must therefore work on clearly defining the creation model, on making predictions from that model and then testing the predictions. If indeed the creation model is more valid than the evolution model then a greater majority of our predictions will prove valid and greater scientific progress will be made. Somehow we must get away from trying to "prove" creation or "disprove" evolution. Such discussions are not central to the business of science.

*E. Norbert Smith, Ph.D. is Director, CRS Grasslands Experiment Station, R.R. #5, Box 217 Weatherford, OK 73096

It has been argued that creationist thinking impedes research. Before showing this statement untrue, it might be pointed out that in some areas, evolutionary thinking has slowed modern science. In their eagerness to prove evolution, fossil hoaxes were made that to this day cloud an objective evaluation of man's fossil record. Ernst Haeckel was demonstrably fraudulent in his eagerness to prove that ontogeny recapitulates phylogeny.

Of a more serious nature is the prediction based on evolution that the human appendix was vestigial. Many healthy appendices were removed routinely during surgery to correct some other life threatening dysfunction. Of course modern medicine now recognizes the function of the appendix and it is no longer routinely removed if healthy. Countless thousands of humans were needlessly subjected to additional surgical trauma and higher risks because of an invalid notion supported by evolution.

Hindsight is normally accurate, but the creationist prediction would have led to retaining the healthy appendix even if its function were unknown since an infinitely wise Creator would not have given man useless organs. It can be argued that our understanding of the function of the human tonsils, thymus and pineal was delayed as a result of evolutionists viewing them as vestigial.

Our understanding of the details of amphibian and reptilian (especially crocodilian) cardiovascular physiology was also delayed because of the acceptance of rigidly held stereotyped views of some sort of progression of pulmonary and systemic circulation on an evolutionary sequence from fish to mammal.

Creationists too have erred in their eagerness to prove creation. Much of the remaining stigma against creationists is attributable to poorly written pseudo-scientific creationist arguments of 25-50 years ago or the dogmatic confrontational style of some current creationists.

While creationists and evolutionists can agree on many areas of descriptive applied science there are many areas where the philosophical differences become obvious. It is in these areas that we must begin defining and redefining our model. Certainly we must not stop with model building, but must get on with the business of scientific research. As members of CRS, we not only reject evolution for scientific reasons but also accept the Biblical account of creation as factual, and from this Biblical creation model see several productive areas of research as evident—proving that creationist thinking does not impede research.

After Their Kind:

Even a cursory look at Genesis 1 reveals its Author was emphasizing the point that several distinct types of plants and animals were created. The phrase "after their kind" (or after its kind) occurs nine times in Genesis 1. It was applied to terrestrial plants, fruit and trees, aquatic animals, birds, terrestrial animals and cattle. Such pronouncement prohibits common ancestry and, along with other passages, provides a basis for creationist taxonomy.

Perhaps no other area of biology needs as much re-evaluation as taxonomy. If evolution is a false premise, then taxonomy must be re-worked from a creationist viewpoint. There will be disagreement among creationists as to what constitutes a Genesis "kind"¹⁻⁵ and the limits of horizontal adaptation or microevolution. We also must use all the modern methods of taxonomy including numerical methods and various biochemical and genetic

techniques. Perhaps creationists can develop a more natural and lasting taxonomy than presently exists.

Certainly, the creation of many separate kinds in the beginning precludes searching for transitional forms. The lack of transitional forms is perhaps the strongest supporting evidence for creation and has been adequately discussed many times.

And God Saw That It Was Good:

A second recurring phrase is a divine value judgment. The phrase that "God saw that it was good" appears seven times in Genesis 1 and is a pronouncement regarding light, land and sea as well as terrestrial vegetation and fruit trees, sun, moon and stars, aquatic animals and birds and terrestrial animals. All of creation (including man) is seen as very good (Gen. 1:31). Besides a value judgment the phrase carries a meaning of completeness or perfection. This statement has endless ramifications and provides a stimulus for research in diverse areas. Since each kind of living form was pronounced good a quantitative homogeneity of adaptation is implied. Each plant or animal is ideally adapted for its particular ecological niche. The approaches to adaptation (qualitative adaptation) are endless, but the degree is constant. In an evolutionary framework, succeeding generations are thought to be evolving in the direction of increased adaptation. Phylogenetically, homeothermic birds and mammals are thought to be more advanced or better adapted for a thermally extreme environment than heterothermic amphibians and reptiles inhabiting the same habitat—quantitative heterogeneity of adaptation. The creationist view is that all organisms from amoeba to elephant are equally adapted for survival albeit they use different approaches. This view has obvious significance in studies of natural history, ecology and zoogeography and should lead to productive research.

That each organism was good or complete at the beginning implies much more. Useless structures did not exist. A structure found today that seems useless either functions in a way not yet understood or functioned prior to the Fall. Either way such anomalies should be studied.

Embryonic development too must be viewed from a functional viewpoint making the recapitulation of alleged phylogenies absurd. If man goes through a stage where gill slits are present (and this is debatable), then the slits function outright in some way or are necessary for the orderly development of later structures.

Implied in a perfect creation also is the concept of natural regulation of animal populations eliminating the need for starvation, illness and predation to limit animal populations. No doubt the curse altered many aspects of natural history, but studies of predator-prey relations and the natural regulation of animal (and plant) populations should be instructive to the creationist.

Conclusions

As creationists we must strive for excellence in research. We must demand the highest possible training for ourselves and our students. We must not stop interacting with secular scientists. We must continue to publish research in peer-reviewed, secular, scientific journals and attend scientific meetings. A re-evaluation of science demands interaction. Let us be judged on how our testable predictions perform in the open arena of science. Indeed, there is a place and need for good research by creationists in modern science.

References

1. Jones, A. J. 1982. A Creationist critique of homology *Creation Research Society Quarterly* 19:156-75.
2. Jones, A. J. 1982. The genetic integrity of the "kinds" (baramins): a working hypothesis *Creation Research Society Quarterly* 19:13-18.
3. Strickling, J. E. 1980. After their kind and in His image *Creation Research Society Quarterly* 17:106.
4. Jones, A. J. 1972. Boundaries of the min: an analysis of the Mosaic lists of clean and unclean animals *Creation Research Society Quarterly* 9:114-23.
5. Jones, A. J. 1972. A general analysis of the Biblical kind (min) *Creation Research Society Quarterly* 9:53-57.

EDUCATIONAL COLUMN

THE WATER OF LIFE

DON B. DEYOUNG*

Received 16 November 1984; Revised 9 April 1985

Abstract

The solid, liquid, and vapor states of water are discussed from a design perspective. Many physical properties of water such as heat capacity are described and compared with other materials. The importance of the hydrogen bond is emphasized. Implications of water's behavior regarding evolution, the hydrologic cycle, and the anthropic principle are summarized.

Introduction

It pours down on the earth at the rate of 1.5 trillion tons a day. It covers 72 percent of our planet's surface, 70 billion gallons for every person alive. This common compound called water has long been considered a cheap and humdrum resource with the lowly formula H_2O . Many people assume that the world owes them a pure stream from their faucet. However, closer inspection reveals that water is by no means an ordinary resource. In space it is an extremely rare compound—only slight traces are found on other planets. On the earth, its physical properties are carefully matched with the needs of the land and its inhabitants.

Consider a cup of cool, clear water. In the absence of dissolved gases and minerals it is colorless, tasteless, and odorless—nothing could be plainer. But what is really within this refreshing and essential drink? A few swallows comprise about 10 "moles" of water, a measure of the quantity of matter. One mole consists of 6×10^{23} molecules, also called Avogadro's number. At 10 moles, the simple cup of water contains hundreds of more water molecules than the total number of stars in the entire visible universe! An individual molecule is just under one-billionth meter in diameter. This small size results in immediate benefits to us. That is, water molecules are able to readily pass through our body membranes in vital fluid circulation. In the cup there are actually 18 varieties of H_2O molecules. This results from the fact that hydrogen is available in the isotopes H^1 , H^2 (deuterium) and H^3 (tritium). The latter two have one and two neutrons in the nucleus. Oxygen also takes the isotopic forms O^{16} , O^{17} , and O^{18} , giving rise to 18 different possible H_2O combinations altogether. By far the most common form is $H^1_2O^{16}$, since these particular isotopes dominate. The molecule $H^2_2O^{16}$, called heavy water, was discovered in 1934 by Harold Urey. It occurs naturally to the extent of 200 parts per million, so trillions of these heavy molecules are harmlessly swallowed with every drink. As with all materials, heavy water has many useful purposes. Thus far it has been

found most useful as a neutron moderator in nuclear power reactors.

The water molecule is very stable, breaking down into separate hydrogen and oxygen atoms only at about $3000^\circ C$. It simply cannot be destroyed in the environment, only polluted. Of course water does not burn, even though hydrogen alone is very explosive in the presence of oxygen. And just what are the water molecules doing in a filled cup? Rather than lying still, in which case the water would be frozen, they are in rapid motion. At room temperature their speed averages 1,000 miles per hour! With each molecule experiencing millions of collisions each second, the surface of the water is deceptively smooth. A few molecules are continually being given higher than average speeds by rear-end collisions. These molecules, if at the liquid surface, are able to leave the cup altogether and evaporate into the air. A few stray water molecules in the air are also continually falling into the cup! And beyond the liquid state, gaseous water vapor and solid ice likewise display countless intriguing properties. Water's characteristics have been discussed by others, usually from the perspective of "coincidences" or "eccentricities" of nature.¹⁻⁹ Instead, the purpose of this study is to explore the wonders of water in praise of the infinite Creator.

The Liquid State

*I will send down showers in season;
there will be showers of blessing.*

Ezekiel 34:26b

PHASE CHANGE The liquid state for any material is bounded by two temperatures. The low temperature is the melting or freezing point where the solid and liquid may exist together. This particular temperature depends on the strength of molecular bonds and also on the molecular weight of the material. Similarly, the boiling or vaporization temperature also is a function of molecular interaction. It is interesting to compare water with some other substances that have a similar molecular and electron structure such as H_2S , H_2Se , and H_2Te . The elements oxygen, sulfur (S), selenium (Se), and tellurium (Te) all occur

*Don B. DeYoung, Ph.D., is Professor of Physics at Grace College, Winona Lake, IN 46590.

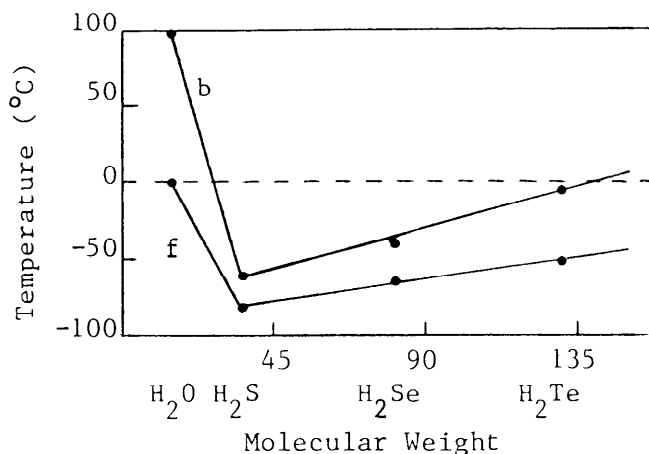


Figure 1. Boiling (b) and freezing (f) points for water and similar compounds.

in the sixth column of the periodic table since each has six outer electrons. Thus the compounds are indeed similar. Figure 1 compares the transition temperatures of these materials with their respective molecular weights. Hydrogen telluride has high melting and freezing temperatures since its molecular weight is by far the greatest. More effort is thus required to either melt or vaporize H₂Te. In technical language, London dispersion forces are larger for heavier molecules. It is also expected that H₂O, the lightest molecule of the set, should have the lowest temperature changes. Figure 1 shows how unusual water actually is. Its boiling and freezing points are nearly 100°C above their predicted values. In fact, water *should* be a gas at room temperature! It is water's unique molecular attraction that makes the unexpected difference possible. Much extra energy is needed to break water's strong intermolecular hydrogen bonds, and the transformation temperatures are consequently much higher. Thus, water is the only naturally occurring material that readily exists in all three states (solid, liquid, gas) at earth temperatures. Such extraordinary properties are essential for water to carry out its many functions in our bodies and throughout the environment.

HEAT CAPACITY Remember the last time you ordered a baked potato in a restaurant? The outside silver foil was easily torn and removed with the fingers. But watch out for the potato itself! Handle it with care or you will be burned. The food seems to hold *more* heat for a *longer* time than the wrapping does. The enclosed water, 90 percent of the potato by weight, has a "heat capacity" over four times greater than that of aluminum. This heat capacity is a measure of a material's ability to absorb heat energy. Table I compares the heat capacity of water with several other common materials. Other than ammonia, water's heat capacity is higher than any known liquid or solid in nature. Water's value of 1.0 calorie/gram°C is used as the basis for defining heat absorption in general.

The large heat capacity of water has many implications. Practically, water is an ideal reservoir and transfer agent for heat. Hot water heaters, automobile radiators, nuclear reactors and cooling towers utilize this property. The heat-reservoir property of water also is responsible for "evening out" temperatures on

the earth. Solar heat is readily absorbed by the seas and other surface waters, then re-emitted to the atmosphere when needed to moderate temperatures. Without this thermostat, temperature fluctuations would be extreme, perhaps similar to the moon's $\pm 200^\circ\text{F}$ variation between darkness and light. Likewise the Gulf Stream which circles the North Atlantic basin picks up an immense quantity of heat from the Gulf and delivers it to Western Europe and the Arctic region. This vast current, equal to 1000 Mississippi Rivers in volume, warms Northern Norway as much as 28°C higher than the average for its latitude. In the Arctic, 150,000-ton icebergs may be melted in a single week by the Gulf Stream. Water's heat capacity definitely controls the climate of the world.

In our bodies the rapid movement of heat is also essential. Besides water's large heat capacity, its high thermal conduction together with fluid circulation helps the extremities of the body stay warm. As a thermostat, the water content of our bodies helps maintain a constant temperature while preventing any damaging cold or hot spots.

UNIVERSAL SOLVENT Water will dissolve practically anything. It is a solvent for more materials than any other liquid. Salt and silicon, oxygen and oil—all are eventually dissolved by water. There are a multitude of implications to this dissolving ability. Plants thrive by taking in dissolved nutrients from the soil with water as the carrier. Gases dissolved in sea water provide a reservoir that keeps the atmosphere stable in composition in spite of men's best efforts to upset the balance. If too much carbon dioxide accumulates in the air from burning coal, increased solution of the gas into the sea occurs. Contrarily if there is a CO₂ shortage so that the health of plants is endangered, gas will move back from sea water to the air. Such built-in regulation systems abound in our world. In our bodies, 70 percent water by weight, dissolved oxygen, carbon dioxide, and nutrients are freely circulated. The continuous processes of digestion, absorption, secretion and excretion all depend upon water transport.

A liquid's dissolving ability can be measured in terms of its dielectric constant. This quantity depends on a material's polarity, the extent of charge separation within the molecules. Water has an extremely large polarity (Table I). In the H₂O molecules, an oxygen atom shares the hydrogen electrons and thus becomes negatively charged. The hydrogen atoms become positively charged because they have partially given up their single electrons. This covalent bond for a water molecule may be diagrammed as follows, where dots represent the outer oxygen electrons and x's the hydrogen electrons:



Actually the angle between the hydrogen atoms for a free molecule is 104.5°. The covalent bond for water is very strong; most water molecules do not break down until temperatures exceed 3000°C. Figure 2 shows what happens when an ionic material such as salt, NaCl, is added to water. The polarized water molecule is symbolized by an ellipse with oppositely

Table I
Average Physical Properties of Several Substances Including Water.
 Blank Spaces Represent Unknown Quantities. cal (calories), gm (grams), and cm (centimeter)

Substance	Melting Point (°C)	Heat of Fusion (cal/gm)	Liquid Heat Capacity (cal/gm°C)	Boiling Point (°C)	Heat of Vaporization (cal/gm)	Surface Tension (dyne/cm)	Dielectric Constant
Acetone C ₃ H ₆ O	-95	23.4	.506	56.5	125	26	
Ammonia NH ₃	-78	108	1.2	-33.4	302	23	22
Benzene C ₆ H ₆	5.5	30.3	.389	80.1	94.3	35	2.28
Carbon Tetrachloride CCl ₄	-22.8	4.16	.198	76.8	46.4	27	2.24
Ethyl Alcohol C ₂ H ₅ OH	-117	24.9	.54	78	204	22	
Hydrogen Selenide H ₂ Se	-64	12.9		-42			
Hydrogen Sulfide H ₂ S	-86	16.8		-61			9
Hydrogen Telluride H ₂ Te	-49	12.9		-2			
Mercury Hg	-39	2.8	.033	357	71	487	
Methane CH ₄	-183	14.5	.53	-164	138		1.7
Oxygen O ₂	-219	3.3	.394	-183	51	13	1.5
Sulfuric Acid H ₂ SO ₄	-10.5	24	.27	330	122	55	
Water H ₂ O	0	80	1.0	100	540	75	80

charged ends. The positively charged sodium and negative chlorine atoms are quickly surrounded and shielded from each other by water molecules. As rapidly as salt is added, its components are separated into the brine solution. The salt remains indefinitely ionized in the solution without recombination. Water is not as successful at dissolving *unpolarized* materials such as oils, except over longer periods of time.

SURFACE TENSION There is an attractive force between liquid water molecules which causes them to "stick" together. This force results from hydrogen bonding and is responsible for most of water's unique properties. The hydrogen bond acts between molecules containing hydrogen and any of the electronegative elements fluorine, nitrogen, or oxygen. In water, a hydrogen atom that is covalently bonded to an oxygen atom is also electrically attracted to surrounding oxygen atoms. The hydrogen bond is 20 times weaker than water's inherent covalent bond, but it still is very influential. Thus the separate water molecules in a sense "hold hands," especially in the solid state. When ice melts, about 85 percent of the hydrogen bonds remain active. Next to mercury, water has the largest surface tension or "stickiness" of any common liquid (Table I). Many common phenomena depend on this cohesiveness. A needle, razor blade, or insect will easily float on water's skin. Rain, fog, and cloud droplets assume a spherical shape as the molecules pull inward on themselves. Moisture clings to our joints for lubrication and to our mucous membranes and eyes for protection. When a narrow straw is inserted into water, the liquid will rise up into the tube somewhat. The first molecules are attracted upward to the surface of the tube itself, then other molecules are pulled upward after them. The smaller the channel is, the higher the water will climb against gravity. Absorbency of a blotter or towel is due to this capillary action. It also explains how sap is able to climb upward in trees to heights of over 100 feet. Without water's outstanding cohesiveness, trees simply could not grow tall. Flowers and plant leaves would also be in trouble. It

is changing water pressure in tiny plant tubes that folds leaves by night and opens blossoms by day. It was not man who first designed hydraulic action!

POLYWATER Around 1970 many technical articles discussed a new polymerized form of water called polywater.¹⁰ First reported by Russian chemists, the unusual water was said to boil at 1,000°F and to stay liquid down to -40°F. The differences from ordinary water supposedly resulted from a slight change in oxygen-hydrogen bond lengths. Instrumental in the formation was the presence of silicon dioxide (glass) which could initiate the process. Researchers at the National Bureau of Standards quickly confirmed the existence of the new water allotrope and began studying its properties. A few scientists even warned that polywater was a threat to life on our planet. A loose sample might rapidly duplicate itself in the environment and turn all natural water into polywater which would neither freeze nor evaporate. The hydrologic cycle would cease and all land areas would become deserts.

Notice that the preceding description of polywater is in the past tense. It was an exciting story but not

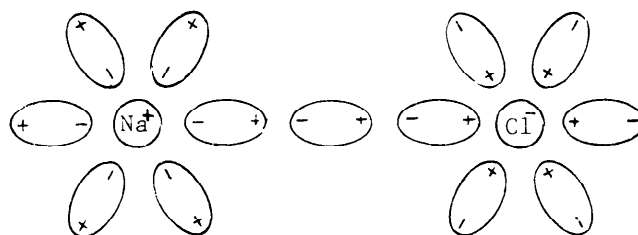


Figure 2. The dissociation of salt in water. The sodium (Na⁺) and chlorine (Cl⁻) ions are shielded from each other by surrounding polar water molecules.

a correct one. Spectral analyses of the anomalous water showed that the material apparently was a *combination* of natural water and silica. The system of

two components had wrongly been taken as a single new substance with unique properties. The initial reports of polywater have long since been explained away; the subject is no longer discussed. However there is a lesson to be learned from this episode. For a time the science establishment rushed to "jump on the bandwagon" and explore this fascinating new material. Even though polywater did not exist, its preparation, transition temperatures, bond lengths, and dangers were fully described. Fortunately, science was self-correcting after a couple of years in this case. But it does cause one to wonder about many other currently popular ideas of science. Some are correct; others are most certainly false. The time-scale for self-correction may be long or short, if there is indeed self-correction in every case. The big bang, evolution, geologic chronology—all may be ideas standing in need of such major correction.

EVOLUTION In evolutionary theory life is assumed to have originated in an ancient sea. The reasons are several, though they are rather bizarre and without a sound basis. *First*, attention is called to the salt content of all body fluids—whether blood, sweat or tears. This is supposed to show a connection between primordial life and sea water. Also stressed is the fact that the human body is 70 percent water by weight, every cell of which has a fluid interior. *Second*, emphasis is given to the fluid environment of the human embryo and also its alleged early tadpole shape and gill-like slits. *Third*, water is assumed to have given ancient molecules mobility to permit their eventual arrangement together. In fact, Miller and Urey used boiling water as the molecule carrier in their 1953 origin of life experiments. *Fourth*, water has a liquid temperature range over which proteins are stable. Also water's large heat capacity is seen as providing a constant temperature and favorable environment in early seas. The list of reasons could be continued, but one soon gets the point that water's especially designed properties are being called forth to deny the Designer!

Just one fundamental problem will be mentioned here, since the preceding reasons are inherently inadequate anyway. The problem concerns the condition of the evolutionists' early earth, assumed to have been accreted as a hot mass—too hot for surface water to exist. Thus only 10 percent of present day surface water is thought to have been present on the original earth. However, plentiful sea water is essential for life development in the secular scenario. Thus it is guessed that the remaining 90 percent of present day surface water was volcanically outgassed from the earth's interior *after* the planet cooled. Such conjecture is certainly permitted, but should not be promoted as scientific fact.

The Solid State

Have you entered the storehouses of the snow or seen the storehouses of the hail?

Job 38:22a

THERMAL EXPANSION Imagine a fictional world where ice is different in that it sinks rather than floats. Broken water pipes due to freezing would no longer be a problem for ice would contract instead of expand. Iceberg collisions would also be a thing of the past

since ice formations would quickly sink to the sea bottom. But other problems would be evident. With no floating layer of insulating ice, lakes would freeze solid from the bottom upward, perhaps during a single winter. Thick ice layers would quickly form at the bottom of polar seas. Such subsurface ice would have devastating consequences on the earth's hydrologic cycle. Frozen lakes would only partially thaw during the summer season. Less fresh water would therefore be available for precipitation. The seas would grow colder and more saline, probably killing most sea life. Human life itself would soon be endangered by this ecological upset.

The preceding scenario sounds ridiculous. After all, everyone knows that ice floats. However it is this property that again sets water apart from other materials. A piece of solid H_2S would quickly sink in its own liquid solution. So would H_2Te , H_2Se and practically everything else. The very few materials that expand with lowering temperature include the elements germanium, silicon and bromine. Consider a fresh water lake which is cooling in the Fall. At high temperatures, water acts like other materials. That is, a lowering of temperature results in a slight contraction and an increase in water's density. This is the principle of the mercury thermometer. Cold lake water in the Fall thus sinks beneath the warmer water. The process continues until the entire lake is cooled to about $4^\circ C$. This "Fall overturn" of oxygenated surface water is very important to the lake's biological activity. When the surface water continues to cool below $4^\circ C$, it no longer sinks. Instead, the water begins to expand as the temperature is further reduced to the freezing point. The resulting ice provides a floating insulation blanket that protects the entire lake from freezing solid. The expansion behavior of water is sketched in Figure 3. Note the minimum volume

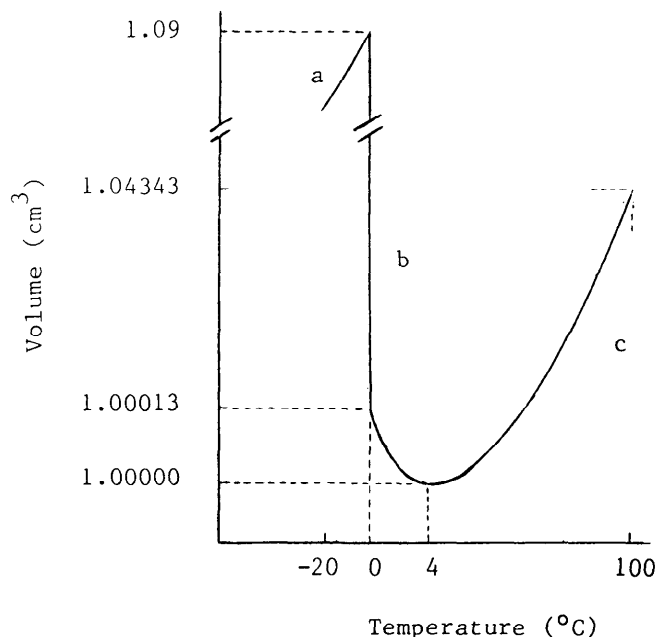


Figure 3. The expansion of water above and below the $4^\circ C$ minimum volume. Both the temperature and volume scales are exaggerated for clearness. The broken vertical line (b) on the graph at $0^\circ C$ represents the liquid-solid phase transition. Curve (c) represents cooling or warming of liquid water. Curve (a) represents cooling or warming of solid ice.

(maximum density) at 4°C, slightly above the normal freezing point.

The forces involved in the expansion of ice are remarkable. Many people have experienced broken water pipes or cracked engine blocks which were allowed to freeze. New England farmers once split large granite boulders in their fields by boring small holes in the rock and filling them with water. Today this mechanical weathering process continues on our northern highways, resulting in a fresh crop of "pot holes" each spring! The expansive pressures generated when ice forms amounts to several thousand pounds per square inch. This is large enough to shatter any container of freezing water, sometimes violently.

The unusual expansion of ice is due to hydrogen bonding, as described earlier. The intermolecular bonds for ice are illustrated in Figure 4. The structure is actually three-dimensional. Each H₂O molecule has four nearest neighbors to which it is hydrogen bonded. Notice the open structure of ice. It is this unusual low-density arrangement that results in the unique floating ability of ice.

HEAT OF FUSION Melting is a cooling process. When a material turns from solid to liquid form, heat energy must be added. This heat of melting, or fusion, is likewise given off when the material converts back to its solid form. On earth water continually makes this transition in both directions. Rain changes to snow, cloud droplets freeze, and accumulated ice melts. Table I compares the heat of fusion for several materials. The value for water is obviously extremely high, certainly a fortuitous circumstance. The alternative is not a pleasant one. If the value were small all available water in lakes and pipelines would quickly freeze in cold weather. Frostbite would become a much more common and serious problem. Earth's total weather system would be upset. The spring thaw of ice, if there were a spring season, would bring a sudden flood. No ice would remain in the mountains to supply water and power during the summer months. It is the large heat of fusion that slows water's melting.

SNOW Are there any two snowflakes that are exactly alike? The question is like asking if there are two people exactly alike—most certainly not, but it is hard to prove! There are innumerable snowflakes, about 20 million in every cubic foot. At the same time, the possibilities for their interior and exterior arrangement of water molecules are endless. The outward form of snow depends on the temperature of formation. The familiar star shape occurs when cloud temperatures are between 3 and 10°F. Above and below this range, small ice "plates" grow. The intricate shape of snowflakes can be partially understood from the bonding mechanism of ice. As Figure 4 shows, the sharing of hydrogen atoms between molecules leads to a "chickenwire" pattern. The entire snowflake crystal which contains trillions of molecules shows this beautiful hexagonal symmetry.

The variety of crystal shapes in nature and their growth was studied by Robert Boyle and Robert Hooke around 1700. They concluded that crystals such as snow "receive their regular figures from the texture or nature of their own parts."¹¹ Today, active study continues on the "fine structure" dendrites of ice crystals.^{12, 13} The many patterns are at least partially con-

trolled by the previously described heat of fusion. When a group of water molecules freeze together a significant amount of heat is released (80 calories per gram). This heat exchange shapes nearby parts of the ice crystals by local melting. But this microscopic melting depends on air temperature, wind currents, humidity, nearby snowflakes, etc. One can understand why no two flakes are identical, either on the outside or inside, since each microenvironment is unique.

Although snow encourages many northern people to flee south for the winter, the material nevertheless provides a wealth of benefits for the earth. *First*, a snow cover provides a "warm" protective blanket from the cold for plants and ground animals. A two-foot thickness of snow can result in as much as a 40°C differential in temperature between top and bottom. *Second*, falling snow clears the atmosphere. Each snowflake begins its growth around a dust speck. As the snow falls it then filters additional pollutants from the air. Also absorbed from the air is nitrogen which is eventually carried into the soil for plant use. *Third*, winter snows ensure an even flow of moisture into the subsurface water table. A rapid spring thaw may cause some local flooding but the majority of new water soaks downward. The list of practical benefits of snow could go on indefinitely. Upon reflection, however, perhaps the creationist should not always look for such economic blessings in nature. After all, the Creator has ordained the occurrence of snowflakes and that is surely sufficient reason for their existence. The usefulness of snow to us and the enjoyment we get from its beauty are secondary. Can anyone actually enter into a full understanding of the "storehouses of the snow (Job 38:22)" or any other part of the magnificent Creation?

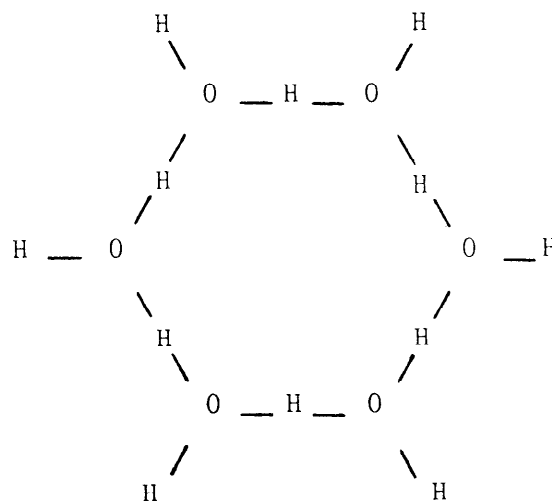


Figure 4. The hexagonal crystal structure of water in the solid state. The oxygen atoms are 2.72 angstroms apart in ice.

The Vapor State

*He draws up the drops of water,
which distill as rain to the streams*
Job 36:27

WATER VAPOR Suppose 10 moles of water is changed to gas, either by heating or by evaporation. At standard atmospheric pressure it will expand 1244 times to 224 liters, about the volume of a desk. The

gaseous water molecules will have greatly increased their speed and will exert a large outward force as a consequence. Steam engines which utilize this pressure were instrumental in uniting our nation's states and powering the industrial revolution.

HEAT OF VAPORIZATION Just as in the solid-to-liquid transition, materials also absorb energy in turning from liquid to vapor. This energy is needed to separate the individual molecules into the gaseous state. For water vapor the molecular separation is about 10 times that of the liquid. As expected from the trend of this study, water has a very unusual heat of vaporization. It is not low or even average, for this would be disastrous. Surface waters would readily evaporate and our own bodies would suffer from overheating. Instead water absorbs a very *high* 540 calories for every gram vaporized. Thus only limited amounts of surface water evaporate from lakes and equilibrium is soon reached. One can only imagine the alternative: dried up rivers, 100 percent humidity, increased atmospheric pressure, and perhaps even a permanent vapor canopy.

The number 540 calories/gram has much to do with our personal health. Water is part of our internal cooling system. When we are hot, moisture is released at the surface of our skin from a million pores where it can evaporate. Since much heat is absorbed from the body in the process, perspiration is an essential and efficient process of heat regulation in spite of society's frown! Even a cup of hot tea is able to cool a person on a warm day. Its eventual evaporation from the skin removes about 10 times the original intake of heat. Many animals do not have the skin perspiration mechanism that we have. A dog, for example, removes excess heat largely by evaporation from its tongue and mouth. Its panting habit and exposed tongue are necessary to prevent heat stroke. Pigs also lack sweat glands on their bodies. Their inclination to ooze in the mud is a health requirement for the removal of their excess body heat.

CLOUD FORMATION Water's large heat of fusion results in a remarkable stability of the weather. Consider the formation of a cotton-like cumulus cloud on a summer day. Initially, warm moist air rises from the earth's surface. Water is carried along since its molecular weight is less than the molecular weight of "air" molecules. As the bouyant air mass rises it encounters regions of lower atmospheric pressure. Expansion and adiabatic cooling of the air follows. However, the cooled air now cannot hold as much moisture as it initially did. Droplets are "squeezed" from the expanding air, thus constituting the visible cloud. For each gram of water that condenses, 80 calories are given off to the surrounding air. This flow of heat limits the formation of more droplets and thus limits the size of the cloud. As the air mass moves to a higher altitude, more cooling and condensing can occur. You can watch this activity in a cloud as it slowly changes shape and bulges of visible white droplets appear. Incidentally, the droplets in a cumulus cloud are typically a million times smaller than rain drops. They are similar to the fog particles that sometimes bring traffic to a halt on the ground. How these cloud droplets, unlike fog, eventually group into larger raindrops is not known. Fortunately, the Crea-

tor by His laws directs the process of pleasant raindrop formation without fail.

HYDROLOGIC CYCLE King Solomon described the constant flow of rivers 3000 years ago:

All streams flow into the sea, yet the sea is never full. To the place where the streams come from, there they return again. Ecclesiastes 1:7

The world has many essential interlocking cycles of energy flow. These include the movement of nitrogen, carbon, oxygen, water, and even rocks through the environment. The transfer of water from the earth's surface to the atmosphere, and back again, is called the hydrologic cycle. Figure 5 illustrates the process with some numerical estimates. Average world-wide precipitation is 80 cm/year. This moisture is put in the air by solar evaporation and also by transpiration. Plants carry out the latter step with their leaves and cool themselves in the process. Just one apple tree may transfer as much as 2,000 gallons of water into the air during a single six-month growing season. Once water is precipitated as rain or snow, it begins its movement back toward sea level. Along the way it carves the topography of our planet. Many canyons, valleys, and plains result from water erosion. On the land's surface the flow may be rapid. Underground water slowly percolates through soil and permeable rock. A rough estimate of the *average* time for a given molecule of water to move from the sea to the land and back again is 1000 years or more. Of course not all water participates in the active cycle. Fully two percent of earth's water supply remains locked in ice with only small glacial movement. This ice covers seven percent of the earth's land area, most of it in Antarctica. Figure 5 indicates that the quantity of moving underground water is seven times that of the surface flow. Rivers and lakes are impressive but most of water's activity is out of sight! This ground water provides the earth with a remarkable purification system and reservoir. As water slowly moves downward toward the saturated water table, cleansing by the breakdown and filtering of contaminants occurs. Mil-

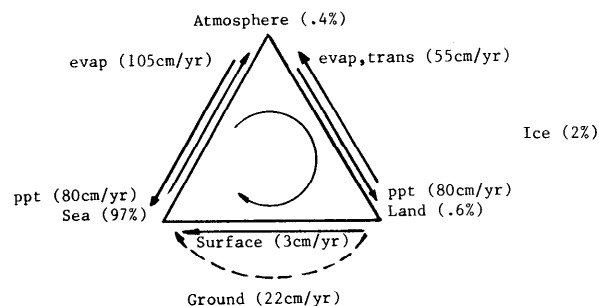


Figure 5. Diagram of the hydrologic cycle. Abbreviations: (evap), evaporation; (trans), transpiration; (ppt), precipitation; (cm/yr), centimeters of water per year. Distribution of the earth's water is shown by percentage.

lions of Americans pump water from home wells and consume it without a thought of its purity. Unfortunately this efficient ground water system is beginning to feel the effects of abuse. Poisoning of ground water and lowering of the water table may soon lead to a water crisis of far more significance than the energy shortage.

The hydrologic cycle is driven by the sun's evaporation work. But beyond solar distillation it is the Creator that directly controls the weather. Job 37:13 even supplies three of His motives:

He brings the clouds to punish men, or to water His earth and show His love.

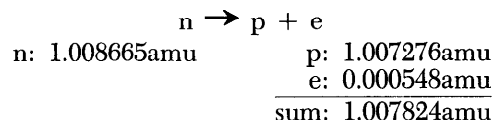
First, storms may provide correction or discipline for men. From Noah to Jonah to Dunkirk, the Lord clearly commands nature to direct history. *Second*, varieties of weather are given for the good of the land. Precipitation, wind, lightning—each detail has its own purpose, of which our understanding is yet limited. Notice that it is *His* land that is watered; we are only stewards of the earth. *Third*, the Creator's mercy and love are clearly shown in the rain and in the rainbow. Even deadly storms, a sad consequence of the curse, have important lessons to teach us concerning our dependence on the Lord.

For 40 years meteorologists have tried to gain control of the hydrologic cycle by cloud seeding.¹⁴ Dominion over the rain would indeed be an achievement, but we are still far from it. A 1978-81 study was done in Florida regarding the effects of cloud seeding with silver iodide crystals. Three million dollars later it was concluded that the total rainfall had not been increased at all! There were minor changes in the distribution of rainfall, but this only served to upset those neighbors whose rain had been "stolen!" It is certainly to our greater benefit that the hydrologic cycle has not come under man's control.

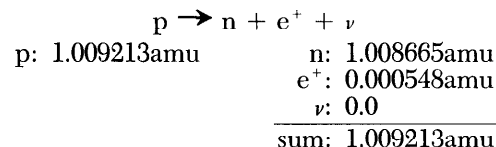
The Anthropic Principle

We have surveyed several of the unusual properties of water. Certainly these evidences point toward a beneficent and wise Creator. However such an argument is challenged in our day. Two full centuries have gone by since William Paley's argument that just as a watch requires a watchmaker, so a complex universe requires a Designer. Today, design or fitness for a purpose in living creatures is usually attributed to the mechanistic progress of mutation and natural selection. We may marvel at the complexity of the human eye, but we are told that such a sensitivity to electromagnetic radiation is an inevitable consequence of evolution! In truth, of course, the evolution argument in no way explains the origin of sight. And when inanimate objects are considered, the evolutionary argument does not even apply. After all, objects such as protons or water molecules cannot be expected to change or improve themselves with time.

The anthropic principle describes the experimental finding that the universe appears to be especially designed for man. Texts refer to "cosmic coincidences," the "delicate balance," and the "exceedingly improbable coincidences" observed in nature. The presence of abundant water on our planet is a good example, but one that is usually missed. Instead, small but intriguing details are studied. One such example involves the proton, a central component of the hydrogen atom, the water molecule, and every other material as well. The "delicate balance" involves the mass of the proton, which is slightly lighter than a neutron. A free neutron (n) spontaneously beta decays into a proton (p) and an electron (e) with a half-life of 12 minutes.



The atomic mass units (amu) of the particles are listed under the reaction equation. This neutron decay is possible because its rest mass is greater than that of the decay products. The net mass lost in the reaction turns into energy. Now what would be the consequence if the mass of the proton was 0.2 percent greater than it actually is? The previous reaction could not occur, and instead the proton would decay into a neutron, positron (e^+), and a massless neutrino (ν).



As a consequence, free neutrons would be stable but free protons could not exist. But a hydrogen atom is essentially a single proton. Hence there would be no hydrogen, a major component of water, as well as the major component of the sun, stars, and the entire universe! Thus a 0.2 percent change in the proton's mass would make the entire universe unstable. Now the finely-tuned mass values of protons and neutrons are either "cosmic coincidences" or else an evidence of the fingerprint of the Creator. There is no physical reason why the neutron is indeed heavier than the proton. In fact logic would say that the proton should be heavier. The particles themselves are very similar except that the proton carries an electric field. One would expect that the proton would be heavier by the amount of mass-energy required to establish the electric field.¹⁵ But the opposite is fortunately the case. Literally hundreds of other unexpected numerical examples occur, including the nuclear force, fine structure constant, electron charge, etc.¹⁶

How does secular science deal with the anthropic principle? Is it a "Paley's watch" argument that cannot fail to turn men toward the Creator? Unfortunately, human minds remain totally blinded to the truth. Instead there is a retreat into the 300 year old philosophy of Leibnitz to find a way around the design evidence. It is thus boldly proposed by cosmologists that there are actually an infinite number of physical universes existing at this very moment. Within this plurality of universes, every possible variation in structure and history exists somewhere. It is concluded that we happen to live in one of the many universes where everything (water, proton mass, etc.) has "just happened" to work out to our benefit. If everything were *not* accidentally balanced, we could not exist to notice it. Thus the multiple miraculous coincidences of the anthropic principle are said to be inevitable! Such metaphysical meddling makes no scientific or common sense, either in Leibnitz's time or today. It does show the extremes to which some will go in denying a beautifully planned universe.

Conclusion

Water is important to our existence and is found to be delicately balanced in all of its physical properties for our benefit. The phrase "Water of Life" is also

found in Revelation 22:17 with reference to salvation. How appropriate that water, the most mentioned natural resource in the Bible, should be used to symbolize the Creator's greatest gift to His creatures. Both are free; both are priceless. May this study help the reader worship the Creator and Giver of every good thing.

References

1. Buswell, Arthur M. and Worth H. Rodebush. 1956. Water. *Scientific American* 194(4):76.
2. Davis, Kenneth S. and John A. Day. 1961. Water—the mirror of science. Doubleday and Company, Inc., New York.
3. Franks, F., (editor) 1972-82. Water, a comprehensive treatise, seven volumes, Plenum, New York.
4. Boyd, T. A. 1974. The wonder of water. *Chemistry* 47(6):6.
5. Anon. 1975. Trademark of the Creator. *Moody Monthly* 75:8, 60 (this article presents a Creation perspective).
6. Stillinger, Frank H. 1980. Water revisited. *Science* 209: 451.
7. Orna, Mary V. 1980. Water, the peculiar molecule. *Journal of Chemical Education* 57:891.
8. Yalsman, T. 1982. Water's wondrous talents. *Science Digest* 90(5):103.
9. Morowitz, Harold. 1982. Ice on the rocks. *Science* 82 3(7):26.
10. Allen, Leland C. 1971. Polywater. *Science* 173:1252.
11. Faul, Henry and Carol Faul. 1983. It began with a stone. Wiley and Sons, New York, p. 42.
12. Maddox, John. 1983. Snowflakes are far from simple. *Nature* 306:13.
13. Taubes, Gary. 1984. The snowflake enigma. *Discovery* 5(1):75.
14. Kerr, Richard A. 1982. Cloud seeding: one success in 35 years. *Science* 217:519.
15. Fritzh, Harold. 1983. Quarks: the stuff of matter. Basic Books, New York, p. 48.
16. Davies, P. C. W. 1982. The accidental universe. Cambridge University Press, New York.

ON THE IMPORTANCE OF PHILOSOPHY IN THE ORIGINS DEBATE

RALPH E. ANCIL*

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Abstract

The importance of philosophy in the origins debate, in addition to empirical science, is underscored. This is done first by outlining some historically older philosophical issues in the areas of epistemology and ontology which allowed for the subsequent acceptance of modern-day evolutionism. Secondly, the effect of some of these views on thought in general and in relation to some aspects of biology, physics and origins in particular is examined. Finally, the nature of the origins debate and the limits of science are considered. It is concluded that the origins debate does involve questions of philosophy and that empirical science alone cannot resolve the issue.

Introduction

In the problem of ultimate origins, the correct evaluation and interpretation of the empirical data have played a major role. Creationists have repeatedly taken the evolutionists to task in their interpretations of physics, biology and geology. However, it should be equally clear that in any discussion of ultimate origins there is more involved than the data of the natural sciences. Questions dealing with the nature or definition of science, for example, clearly are not matters of scientific data and cannot be answered "scientifically." They are, rather, philosophical questions. While creationists have dealt with some of the philosophical aspects involved in the debate on ultimate origins, there is still room for both a more rigorous and consistent approach. It is therefore the burden of this paper to show the relevance of considering some basic philosophical issues, especially in examining (1) the epistemological and ontological views which in some respects have adumbrated the rise of modern evolutionism, (2) the problem of language and universals in relation to science and (3) the relation of science to origins studies.

The Epistemological/Ontological Problem

One of the major issues underlying the question of origins is the problem of epistemology, the theory of knowing. This is important because the evolutionist

is capitalizing on a set of assumptions which gained ascendancy in the last century but had centuries earlier been articulated and promoted philosophically. Evolutionism is the terminal expression of a long, historical trend.

That trend begins philosophically with what Molnar calls the "God-problem." Historically there have been three positions possible regarding the existence of God and His relationship with man. The traditional Christian position holds that God is both personal and transcendent, an accessible, caring God. The two main opposing views include the position (A) that God exists but is distant or remote so as to be inaccessible. (This view can lead ultimately to agnosticism or atheism: God is so inaccessible as to be indistinguishable from non-existence.) A second opposing position (B) holds that God exists and is indistinguishable from man (and finally from nature). In position A the attempt is made to bridge the distance or remoteness between man and the "inaccessible" God by undergoing a process of growth whereby man becomes one with God. In position B it is already assumed that man partakes of the divine substance, at least he did originally, but that as a result of Creation, man has become alienated from God and from his own true self. Again a process is envisioned in which this alienation is overcome and man becomes reunited with God or the Godhead.¹

These two positions have profound implications for the problem of how man acquires knowledge (epistemology) which arises out of the conditions of man's

*Ralph E. Ancil, M.S., receives his mail at 1119 Kimberly Drive, #4, Lansing, MI 48912.

existence or being (ontology). Positions A and B hold that since man is a distinct, separate creature he is also a *limited* being and as such incapable of acquiring true knowledge. In other words man is assumed to be ontologically flawed and imperfect by virtue of being a finite creature (by definition). Molnar observes that this view "asserts that there is no valid way for the creature to apprehend the world, and that a growth in being, a rise from creatureliness, is necessary in order to have real knowledge."² In late medieval times this problem was believed to be resolvable by seeking a union of "all in all," especially of man in God. Meister Eckhart, for example, held that since God is all, man is nothing; he is an essenceless void, a non-entity.³ Man must therefore renounce his separateness, his creatureliness and he must become God. This growth in being or upward movement to a higher level of being in order to attain true knowledge Molnar calls the "ontological promotion."⁴ In this fashion epistemology became linked and dependent on ontology. Others who promoted similar views include Joachim de Fiore (12th century), William of Ockham (14th century), Giordano Bruno (17th century) and Caspar Schwenckfeld (17th century). Modern philosophers who have retained and secularized certain of these elements include Kant, Schelling and Hegel, the German philosophers of the *Naturphilosophie* (18th and 19th centuries).⁵

This attack on creatureliness, on limits and separateness logically leads to the fusion of the knowing subject with the known object in the attempt to total union. If man must surrender his distinctness, if he can no longer remain a separate being, then in the area of epistemology he cannot retain the distinction between himself (the subject) and the thing he studies (the object). The abolition of distinction implies the fusion of subject and object in the theory of knowing. Also the mental operations of such an epistemology take place in the mind of the subject in the sense that he believes his concepts are agents which shape the real world, and so the real world must be inside the subject. The extramental world is seen as "phantomatic," i.e., as not having full existence.⁶ He desires to absorb the extramental world, to reconcile things within and without.⁷ Indeed, he sees this fusion or coalescence of subject and object as the *source* of true knowledge.⁸ The goal of this subjectivist epistemology is to introduce the "extramental" or material world into the subject or to reduce its reality such that it can fuse with the subject and then the subject can finally study itself.⁹ The path toward total reunion is one which requires an ontological change:

His increased 'true knowledge' signifies a general increase of mankind's and the world's maturity; it also modifies radically the relationship between the object-world and the perceiving mind; it brings about an absolute change, a transmutation in man's morality, intellectual powers, and political insights; it brings about a change of being.¹⁰

However, this "maturity" is a carry-over from, or is at least analogous to, the alchemists' desire to overcome human limitations, e.g., by accelerating certain natural processes to transform common metal to gold and matter into spirit.¹¹ In terms of modern philosophy, however, the maturation process is thought to

occur over historical time in certain phases or stages with each phase of history measuring a phase in the growth of the mind. The historical phases are, in other words, assumed to correspond to higher forms of intelligence.¹² It is in this way that the maturation process is also conceived as a conquest of limits:

But modern philosophy is able to favor the notion that knowledge, and with it being, grows by the shedding of human limitations and the progressive emergence of a better intellect encased in better moral and historical forms.¹³

To this Molnar adds: "This notion is not only not hindered by modern science, it is promoted by evolutionary theories in the realm of biology and morals."¹⁴ That this view receives sustenance by a "scientific conception committed to the idea of historical evolution" and vice versa is evidenced by the popularity of such writings as those of Teilhard de Chardin.¹⁵ The maturation process is actually one in which man supposedly evolves (is alchemically transmuted) from creatureliness to divinity.¹⁶

If the world, then, continuously matures through history to new ontological heights, it must be in a continuous state of change; nothing ever *is*, everything merely *becomes* on the path to true being and knowledge. This subjectivist approach to knowledge is thus considered *dynamic*, and a rejection of the Aristotelian concept of knowledge *in aeternum* (in eternity) which is static.¹⁷ The focus, naturally, is on the process of becoming and of change.

This stress on flux can lead to a rejection of the notion of "concepts" because these represent a "stopping and a staying" in a world that is always changing.¹⁸ Concepts must distort reality because they are static, not evolving. Instead, it is preferable or necessary to grasp things directly without any form of mediation, intellectual or otherwise. Nicholas of Cusa, for example, advocated in his *Of Learned Ignorance* a way of "beholding without grasping," i.e., acquiring direct knowledge without intellectual apprehension, without "concepts."¹⁹ Meister Eckhart speaks of knowing God directly, without mediation.²⁰ This leads finally to the rejection of a *personal*, incarnate and anthropomorphic God.²¹ Such a concept of God implies a form of mediation between man and the eternal Father. Desiring to fuse with all reality, the adherents of subjectivism have sought to apprehend God directly, without mediation. Such a God is objectionable because He is the guarantor of the reality of the extramental world and so of the very distinction, creatureliness, and limitation, and hence the need for mediation, which the subjectivist is desirous of eliminating.

Because of this desire for total union or fusion the subjectivist must reject a concept of Biblical Creation because "creation implies a distinction between God and creature, consequently a relationship that is not a fusion."²² He requires the abolition of distinctions. This position leads the modern subjectivist/evolutionist thinker to abandon any sense of difference between what is artificial and what is natural; whatever occurs in his own mind is natural. In presenting methods of teaching about ultimate origins, Moore points out the problem this way:

In point of fact, a 'natural' thing or event is different than a concept that is plausible or thinkable. Evidently many students and others who have adopted the 'anything-is-possible attitude,' consider that if an idea is at all thinkable, then it is somehow natural. Yet the thinkable idea may well involve *no real*, naturally occurring object and/or event.²³

Historically, a shift in emphasis occurred from God manifesting himself in nature to a concept of God-Nature. "The Eckhartian mystics had prepared the way for man to identify himself with God; the Ockhamists were to have no difficulty to identify man with nature." From here on God was seen as a mechanism of nature, rather than as a personal, transcendent God.²⁴ The subjectivist, in other words, is a nominalist believing that the individual mind creates the world. As Molnar points out the function of reason was no longer to determine that thing and thought reliably fit together, but rather to "transform the world in the process of comprehending it."²⁵ The goal is to develop absolute intellect which will correspond to absolute being. The subjectivist is caught up in his own mental activity, in the process of knowing but not in the things that are known because, in the final analysis, the extramental world is for him not real. He thus abolishes the distinction between the artificial and the natural: whatever he thinks is natural.

An understanding of these philosophical views as sketched briefly above aids in understanding modern day evolutionism in so far as the latter incorporates certain key elements of the former. These elements then include (1) a rejection of *distinction* or *separateness* resulting in a desire for fusion; (2) a process of *maturation* to become a higher being, from creatureliness to divinity; (3) the view that the world is in constant *flux* and (4) a distrust of *mediating concepts* with its concomitant change in the function of reason.

Molnar correctly summarizes this epistemological/ontological dilemma by noting that "the whole debate turns on whether creatureliness is a fault, an imperfection, a nonbeing, or a limited, but in its limitedness a full, essence."²⁶ But the very notion of "essence" leads us to another main issue, a philosophical position relating to origins.

The Problem of Universals, Languages and Essences

The nominalist/subjectivist/evolutionist holds that universals (generalizations) are merely convenient mental constructs but which describe no reality. This view involves the belief that rather than an interlocking system, or inner structure to things (nature or essence), there are only particulars or individuals. Ramm, not unlike Molnar, notes that this change to a nominalist philosophy occurred during the Renaissance and Enlightenment and "did much to unravel the idea of a structural universe, including the Biblical doctrine of the one God who is Lord of creation, history, morality, and redemption."²⁷

Francis Schaeffer reaffirms the importance of universals because they give meaning to the particulars: "... in learning we are constantly moving from particulars to universals. . . . This is not only a linguistic thing, it is the *way we know*."²⁸ If nature (the material world) becomes autonomous it will eat up grace (the

spiritual world), he says, and then the universals will become lost and life in both morals and epistemology will become meaningless.²⁹ But Schaeffer also points out that the loss of universals, i.e., a denial of their objective existence, ultimately involves the loss of the ability to discriminate between "reality and fantasy"; without them man has no way "to distinguish what is in his head from that which is in the external world."³⁰

There is also a connection between the reality of universals and the meaningfulness of words. With the rise of nominalism, Weaver argues, words were thought no longer to correspond to objective reality and so it appeared no great loss to take liberty with them. After this faith in language as a means of arriving at truth is weakened.³¹ This weakening is especially promoted by semanticists who acknowledge a Darwinian link and attempt to explain language in behavioristic terms. Weaver, commenting on one such book by Charles Morris, notes that:

Language is spoken of as if it were some curious development of sense which enables an organism to take into account objects not perceptually present. The determination of the scientist to see all reality as process appears later in the same work when Morris collapses the notion of 'meaning' by making it purely a function of relationships. That is to say, nothing is, intrinsically, but each thing is, in terms of the process as a whole. The significant implication follows that concepts are not entities but are, rather, highly selective processes 'in which the organism gets indications as to how to act with reference to the world in order to satisfy its needs or interests.'³²

Behaviorism, functionalism or relationism is stressed in this evolutionary view to the exclusion of any inherent nature, substance or essence. To collapse the notion of the meanings of words so that they are considered to be solely a function of context is not unlike the view that organisms have developed solely according to their environment. It is a thoroughly Darwinian view. (Interestingly, Schaeffer cites a book by Korzybski and Bourland on general semantics in which the verb "to be" was never allowed to be used.³³)

Certainly evolutionists have not been rigorous or careful with the meanings of words and definitions. Words cannot capture the flux which is the reality conceived by subjectivist/nominalist/evolutionists. Garrett Hardin, for example, succinctly summarizes this view:

It is language that deceives us. Our language breeds gods: it is admirably suited to dealing with substances and persons, but poorly adapted to dealing with processes, which it constantly tends to degrade to things or beings. Perhaps no single ability is so characteristic of the true scientist as the ability to think in terms of process in spite of language.³⁴

Moore has well documented the result of this attitude to language in relation to evolutionists' use of words and definitions in the origins debate. He points out the cavalier use of such words as "history," "science," "hypothesis," "cosmology," "measurement" and especially "evolution" to cover a wide variety of meanings.³⁵

How was this attitude manifested in the natural sciences? Certainly, if one cannot believe in the reality of universals or in the ability of language to convey knowledge accurately, then it follows that "genera" and "species" are merely convenient inventions but name no reality. This was not the view of Linnaeus, though, whose nomenclature Wightman says "demands the 'reality' of the genus as much as that of the species."³⁶ The failure to continue in this vain is a sign of backsliding to Wightman:

It is perhaps significant that with our growing scepticism towards the existence of rigid species, let alone genera, we are accepting more and more *trinomials*—perhaps the first retrograde step to the descriptive phrase from which Linnaeus rescued us. . . . However it was the definition of *genus* and *species* that was all important; and here he did posterity the signal service of framing every description on a definite plan in which all essential parts were passed in review and described in a terminology admirable for its terseness and clarity . . .³⁷

This recognition of the reality of universals in biology is further suggested when Wightman, in referring to certain "progressive" creationists such as Owen, Agassiz and others, remarks that their refusal to recognize *progressive change* (macroevolution) was due to their acceptance of "Platonic forms" where, as he earlier describes it, change is restricted "to a mere return to the *status quo*." Homologous organs, for example, were not interpreted as arising "by any historical succession, but only in the mind of God, out of which they have become actualised by separate acts of creation."³⁸ Greene makes a similar point when commenting that in the Linnaean view, which would include others such as Ray, Tournefort and Cuvier, the "natural historian" was "above all, to search for a natural method of classification," one which corresponded "to a pattern in the mind of the Creator."³⁹ For these taxonomists and biologists classifications and universals were "real," a reality directly related to their faith in the unchanging character of a personal Creator.

But it was Charles Darwin, according to Ernst Mayr, who signaled the break with this tradition. Among the four major shifts in Darwin's thinking that Mayr cites, are (1) the abandonment of belief in "essences," and (2) the gradual loss of his Christian faith. The opposite of belief in "essences" is population thinking according to Mayr and this is what Darwin came to accept. Furthermore Mayr emphasizes the importance of these two views coming together:

That Darwin lost his faith in the same crucial years in which he began to adopt population thinking (and 'hard' inheritance) is a synergistic constellation, the importance of which should not be underestimated.⁴⁰

The loss in Christian faith and in essences was no mere coincidence. Darwin eventually came to believe, then, that only individual differences were real, not species or genera. The organism began to be seen in terms of its "relation" to its environment alone; it was no longer thought to have an inner structure, nature, or essence which identified it with its "universal" or "type."

A similar story holds for modern physics. The movement from classical to present-day concepts involves an emphasis on "relations" and the "state of the observer" as in relativity theory, and no longer places much importance on "essences" as Dampier writes: "The old physics assumed that we observed directly real things. Relativity theory says we observe 'relations,' and these must be relations between physical concepts, which are subjective."⁴¹ The nominalism and subjectivism are made further evident when Dampier suggests in the same context: "The regularities of science may be put into it by our procedure of observation or experiment." New ideas become "laws of nature" by being assimilated to our accustomed picture of nature and are therefore really "subjective laws which have grown out of the subjective aspect of physical knowledge. Thus the epistemological method leads us to study the nature of the accepted frame of thought."⁴² And finally the author concludes that:

In these pages we have often found reason to suggest that the concepts of science are but models and not reality. . . . Our scientific model of nature is so successful that we gain increasing confidence in believing that reality is something like it. But it remains a model, and a model which can only be examined in sections, *cut to suit our own minds* (emphasis added).⁴³

The truth of the regularities of science varies with the accepted frame of thought (or accustomed picture of nature) and our concepts of the world are merely mental constructs convenient or successful in manipulating things but they are not real, i.e., they do not accurately convey the truth or *re-present* reality. Because we do not have exhaustive knowledge these constructs can be examined only piecemeal, fashioned to suit our own minds. The entire implication here is that we distort reality or at least what we think we know is not extramental reality but only our own "models" of it and hence the preoccupation with studying the "accepted frame of thought." This suggests that the laws of nature are not descriptions of objective reality but subjective statements prescribed for or imposed onto the world.

Sir Karl Popper apparently praises Heraclitus' "discovery" that the world is not the sum of things but the sum of all events, changes, or facts. To this denial of substance, Jaki responds by noting that when the existence of *things* is denied, in favor of "facts" or "relations," the universe becomes unintelligible, an intellectual rubbish heap. And this ruins also the

strict consistency of any discourse about the cosmos, including cosmology, philosophical or scientific. Any admirer of the alleged exclusivity of facts still has to find a logical way of defining a process which is not undergone by *something* (emphasis added).⁴⁴

Isaac Newton, on the other hand, clearly relied on the concept of essences in his work. John Greene states that:

Newton's impenetrable atom was an example par excellence of a permanent structure [essence] that participated in the world of change without being altered thereby. The atom simply was what it was because God had designed it a certain way and intended it to stay that way.⁴⁵

Newton's hard, impenetrable particles gave a sense of coherence and permanence to the physical world. As Jaki describes it:

When relativity made meaningless the notion of the ether as an absolute, all-pervading essence, it did not disprove the doctrine of essences. . . . More importantly, while it may be claimed that the superstructure of Newtonian science could function without essences, Newton the creative scientist found them indispensable. For it is essences that secure to a world of change the coherence and permanence needed for its scientific investigation and philosophical interpretation.

In view of this it will not appear as a rank obscurantism to state that the traditional ways to God rest on the recognition of the existence of contingent essences. Their contingency points to a noncontingent existence, whereas their being essences indicates unlimited coherence and consistency in the Being whose essence is existence itself.⁴⁶

Essences or substances, then, are epistemologically necessary because their properties of permanence and coherence give the world intelligibility. Without them how is learning possible? We may ask with Plato's Cratylus that if all things are mutable how is anything knowable? The position of the subjectivist/nominalist/evolutionist, then, is one which undermines our ability to know; it is a position of anti-knowledge in that it focuses solely on flux as the only "reality" and in its quest for the abolition of distinctions which are necessary for knowledge.

Each entity, though finite, has its own substance, essence or nature, an inner structure which contributes to its intelligibility and that of the world. And furthermore, "the property of intelligence is precisely, to bring out this intelligibility, which is inherent in finite things and which is not the task of reason to imprint on them."⁴⁷ The determination of *what* a thing *is*, is one of the most important aspects of intelligent activity:

This is the function of intelligence, which, like a Don Quijote, would indeed aimlessly agitate its arms facing nonexistent targets if it did not have before it an intelligible object, a real being, the whatness of which is reliably cognized.⁴⁸

Though the orderliness of the extramental world is real, the mind "must conform to what is in order to report order, and the object, existing in its own right, must be the orderly substratum about which our intelligence informs us."⁴⁹ How is this possible without some concept of essences or substances?

This same attitude, which undermines belief in the validity of languages, universals and essences to convey or consist of truth, because of its mistrust of intermediaries such as "concepts," its nominalism and subjectivism, requires the abolition of philosophy and metaphysics traditionally conceived. The obvious example of this is the historicist school, a form of positivism, which stresses historical phases or stages, each stage leading to a higher ontological and/or epistemological level, i.e., man "evolves" in some way from a lower to a higher state of being. The final stage is the end of the "maturation" process (often conceived as a utopia). In this last stage man no longer needs philosophy or metaphysics for he will have absolute

knowledge in absolute being. Comte, for example, envisioned three stages of man's intellectual development: the theological, the metaphysical and finally that of positive science. In this stage even society would be studied in the manner of physics and hence he called for a "social physics" or sociology. The rise of Darwinian evolutionism contributed to the rise of positivism in that modern science could seemingly explain everything: society, human nature, history and even the ultimate origin of the universe and life. As a result philosophy and metaphysics hardly appeared necessary. With the rise of modern evolutionism "the hope of discovering or knowing a reality behind the veil of sense experience diminished as the prestige of [a Darwinian controlled and positivistically oriented] science grew."⁵⁰ And similarly, speaking of the consequences of Darwinism, Russett notes:

Science has for the most part ceased to serve as a platform for polemics, or at least for polemics of a metaphysical nature. . . . The abstention of scientists (as scientists) from metaphysical speculation results partly from a feeling shared by many scientists that metaphysics is non-existent or meaningless.⁵¹

In this view natural science is believed to be the only source of valid knowledge and all human thought is analyzed or critiqued in the terms of a positive science. But as Molnar points out speaking in the context of Kant's contribution to the rise of positivism, this involves a logical caveat:

...this critique [of human thought] is inevitably absorbed into the science closest to the linguistic or positivist thinker's heart, a kind of privileged science chosen for nonscientific reasons. . . . Then this particular science assumes the function of a metaphysics, and so on indefinitely, because to judge its own assumptions, a third science must be formulated, and so on.⁵²

Evolutionists desire an end to philosophy (traditionally conceived) but allow their evolutionism (as a world view) to function covertly as a metaphysic while parading it in the garb of "natural science." This allows them to proselytize their lingering positivism and materialism while enjoying all the respect, authority and prestige rightfully attaching to genuine science.

That "prestige of science" is of course a major point. Science came to be explicitly viewed as the only source of genuine knowledge, or at least the only way to get things done. Hence if anything was to become "respectable" it had to be "scientific." This attitude combined with the desire to abolish distinctions made it increasingly difficult to identify, at least in the popular mind, the limits of science; to distinguish between what is "science" and what is not and between evolutionists functioning as scientists and as metaphysicians. This leads to the question at hand here: What limits are there to science and does a consideration of ultimate origins fall within those limits?

Is the Study of Ultimate Origins Scientific?

Many evolutionists claim that their concept of ultimate origins is "scientific" and creationism is purely religious. Some creationists, on the other hand, argue that creationism is "scientific." The Creation Research Society, furthermore, proposes "to re-evaluate science"

from a Biblical creationist viewpoint. Any evaluation of science has to be non-scientific, extra-scientific or meta-scientific, i.e., metaphysical or philosophical. In the following section, some of these issues will be raised and tentative answers given. The purpose is not to rigorously or exhaustively pursue these points in all their subtlety but primarily to illustrate the importance and relevance of philosophy in the origins debate. These issues will revolve around the central question whether the consideration of origins problems is "scientific" and if so, in what sense.

Thaxton and Buell have recently attempted to deal with this question and conclude that origins studies are scientific but in a special sense. They distinguish between "operation science" and "origin science." The former is said to involve the gathering of data through experimentation and observation leading to the formulation of theories. These theories are valid if they (a) explain what was observed by some unifying principle, (b) predict phenomena which have not yet been observed and (c) are tested by repeated observation or experiment.⁵³

With these criteria it is clear that the study of origins is not scientific operationally. But Thaxton and Buell argue it is scientific in another sense. "Origin science" involves the assumptions (a) that every event, including past ones, has an adequate cause and (b) that like events have like causes. This is the principle of uniformity [really, uniformitarianism]: the present is the key to the past.⁵⁴

First, it should be noted that the postulate of adequate cause is assumed also in operation "science" and thus Thaxton and Buell's criteria do not sharply separate the two sciences. The second point is how does one scientifically study or determine past causes? The second criterion is based on analogy. But in studying ultimate origins are there really any events or processes occurring in the present which are "like" those believed to have occurred in the distant past? What is presently analogous to the "processes" used by the Creator to make the world? Or what is analogous in the present to an explosion of primordial ylem leading to the complex ordering of the entire universe? Actually, the cogency of any possible analogy is often governed by one's prior commitment to a worldview, religion or philosophy. In order to make an analogy one must in fact have a prior conception of ultimate origins for which analogies serve as illustrations for comprehension and communication.

Thaxton and Buell use the analogy of forensic medicine as a model of the nature of origins questions. Here unrepeatable crimes are solved by reconstructing a history of events. This is a legal approach, though one which uses some results of medicine and the natural sciences. This analogy suggests all those disciplines which are primarily concerned with historical reconstruction: archaeology might be another example. This does seem to come closer to capturing the heart of the matter. Even here, though, it should be noted that the practitioners of forensic medicine, like those of archaeology, are able to make their reconstructions based on analogies and comparisons of present, ongoing events or processes. Their *particular* events are nonrepeatable or unique but the type of event is not only repeatable but is usually continuing in the pres-

ent and thereby allowing for extrapolation. The reconstruction of buildings and roads of an ancient culture would fit this pattern as would the fact that chemical and anatomical analysis relating to the human body (physiology) are ongoing types of research which are used in forensic medicine. Some of the questions relating to origins, however, deal with *necessarily unique* events that are without type or pattern in the past or the present. Thus no comparable analogy is rigorously possible for the big bang or Creation *ex nihilo*. Such events are atypical.

In his discussion of scientific theories, Moore argues that these involve "immediate activities of human beings," and function to explain "present phenomena involving events occurring in the lifetime of human beings."⁵⁵ This includes both prior observations and predictions that can be developed from such theories before the fact and are testable by repeated experience (directly or indirectly).⁵⁶ As for the discussion of ultimate origins questions, Moore holds that these "involve basically imaginative speculations because they are formulated with the primary function of explaining *unobservable origins* . . ."⁵⁷ Because these are unrepeatable events, he concludes, "careful, orderly science properly understood as limited to the present cannot be applied." Any predictions here are mainly after the fact and are testable only by logical reasonableness or internal consistency about past events.⁵⁸

Moore's assessment might be characterized as stressing a certain kind of "closure" necessary for proper, scientific work. Not, of course, closure in the sense of delivering the final word on a subject but rather a level of temporal and spatial closure that is encompassable by a human scientist. Thus a proper scientific experiment or observation has a specific beginning and end and occurs within a specific place. This is indispensable if the scientist is to be a witness to the process or event under consideration; it gives a minimal amount of control which actually contributes to the definition of "observation." But infinite processes, or those which are thought to be of ages far longer than humans have been in existence, let alone of one scientist, are not encompassable or comprehensible to the scientist; they lack the necessary property of closure which makes the experiment or observation tractable or manageable. Macroevolution is one such postulated process. More generally in this view, ultimate causes such as the big bang and Creation *ex nihilo* are in principle outside the domain of natural science.

One example that some creationists use to show that creationism is scientific, i.e., that it yields testable hypotheses, is the prediction of coal formations from the Flood model.⁵⁹ Is this then not an example of "science"? There are several observations that can be made here. First, science proceeds on the basis of certain uniformities (not to be confused with uniformitarianism) in nature. A massive, global Flood would not be a uniform, ongoing, natural phenomenon; rather, it would be a unique, historical event and therefore, not susceptible of scientific treatment. Of course, the *presently* existing geological formations and deposits are capable of being so studied, but not their origin. The processes and events which generated or originated such features are unique to the Noachian Flood. The products of the Flood, like those of Creation gen-

erally, can be scientifically studied in the present. Secondly, a scientist can study these features and observe correlations or relationships which allow him to make predictions. But how necessary is a concept of origins for this? Is it possible that making observations of presently existing patterns is sufficient to predict the location of coal formations without elaborating in any significant detail a concept of origins? Thirdly, there are many aspects of a scientist's life which may give insight or inspiration to his science but which are not therefore "scientific." These would include his religion, his family, or even some accidental event. All that may be legitimately argued here is that creationism is not a hindrance to science, indeed, it is conducive to it. But this alone does not make it "scientific."

Furthermore, if we conceive of science as somehow involving a search for laws of nature, say, like the law of gravity, or the laws of planetary motion, then what are the laws of ultimate origins? The singular, historical event of the generation of the cosmos is more of a metaphysical concern than a scientific one. This should be especially clear when it is recalled that science, among other things, relies on the method of induction to derive laws of nature which were not formerly known. How could this method apply in the study of ultimate origins?

One other argument which some evolutionists have made in contending that the study of ultimate origins is "scientific" involves the concept of "indirectness." A physicist, so the argument goes, cannot study atoms, electrons, etc. directly but he can do so indirectly, making inferences about them. So, too, the paleontologist can study the past indirectly via the fossils and thus it is reasonable to conclude that ultimate origins can be scientifically studied in a similar way.

There are two observations to make here. First, assuming this does constitute a legitimate, scientific study of the past, it is not the study of *origins* but only of the life forms of the past, not the manner in which they originated. Second, the paleontologist is actually studying *presently* existing fossil materials which can be repeatedly observed, analysed and compared with presently existing life forms, as well as with other presently existing fossils. But how can his inferences about the past, and especially ultimate origins, be scientifically tested? Unlike the physicist's atoms, the process of fossilization is presently not ongoing. However reasonable the inferences about the origin of life, the universe, etc. may be, the event or process is no longer a part of nature and thus out of the purview of the natural scientist, strictly speaking. To be rigorously analogous the student of origins would have to *indirectly* observe the first appearance of life, or the big bang, etc.

There is also the problem of circumstantial evidence. All inductive evidence is usually considered to be circumstantial. But the circumstantial evidence for a repeating, ongoing process in nature is different from that of a nonrepeating or unique process or event which is imagined to have left a presently observable product. Evidence of the latter kind forces one to make an argument from the consequent, postulating a scenario to explain the event. But there may be all sorts of plausible stories to explain the event which cannot be rigorously examined or tested because by

definition the event or process is not occurring in the present.⁶⁰

Jaki describes the scientific method as involving a sorting out process, the isolation of special factors "operative in nature," and the integration of these factors into "fact laws" resulting from a complete generalization in the act of induction. He then comments:

In all these steps it is the facts of nature that dominate the mind, in the sense of holding it to a steady diet of facts, data, and observations which the mind must digest into an increasingly more abstractive nourishment.⁶¹

Can we really say that ultimate origins can be studied in this way? If not, then this topic falls outside the limits and thus outside the domain of natural science.

This leads to the threshold of another point, that science is not limited only by its methods but also by its object: "... science is divested of its nature when it ceases to be about nature . . ."⁶² Is the study of the *origin* of nature a study of *nature*? Or is the ultimate origin of the universe (nature) a natural event or process? These are philosophical rather than scientific questions yet are of importance to the origins debate. The metaphysical question of what is nature or what must nature and man be like in order to have modern science is something that must be answered before one can have a legitimate science. The evolutionist holds that nature "makes itself"; there is a process of "self-generation" and this supposed process takes place according to known natural laws.

If we define nature to be the "totality of consistently interacting things,"⁶³ then it is difficult to see how ultimate origins are a part of nature and so within the purview of the natural scientist. The processes producing nature are not a part of the "consistently interacting things." Again the problem of postulated but unobserved processes or events which are unique or singular but which are believed to have generated the universe cannot be a part of that universe. The *operation* of the present universe or nature can be explained in terms of presently known processes and events but not its *origin*. The origin of a typewriter, for example, cannot be explained exclusively in its own terms but only in reference to a set of different and more complex machines whose operational principles are also different.⁶⁴ Evolutionists are thus led into the logical caveat of inconsistency or infinite regress in trying to make nature "self-generating" or "self-explanatory." Neither the big bang nor Creation *ex nihilo* can be explained according to natural laws. Since they do not occur in nature now, they are actually "unnatural." In fact it would not be going too far to say that much of what the macroevolutionist proposes is really *contranatural*.

One final but major point in considering the problem of origins is the historical meaning and definition of science. For Robert Boyle, who distinguished between science (experimental chemistry) and a philosophy of science, the purpose of the scientist was to discover and formulate the laws of nature based on observation. In articulating this position Boyle *presupposed* a creationist view of origins.⁶⁵ Similarly for Ray and Linnaeus, Greene observes that "they did not consider it their business as natural historians to explain the origin of species, but neither did Newton consider it his

business as a natural philosopher [i.e., a physicist] to explain the origin of the solar system."⁶⁶ Rather they assumed the basic structures and specific forms of nature were permanent and part of a wise design. For Ray and Linnaeus the purpose of their science was to "name, classify, and describe"; it involved "blending Aristotelian logic and teleology with a static form of the Christian doctrine of Creation, [and] identified natural history with taxonomy."⁶⁷ Furthermore, this view was the dominant one in the field of natural history for almost two hundred years, that is, until Darwin changed the view from a static, taxonomy-oriented one to a dynamic, causal and evolutionary biology. This shift, says Greene, inaugurated a *new era in the study of nature*.⁶⁸ Darwin's methods were as revolutionary as his "theory."⁶⁹ But the basis for its adoption "sprang more from the *appeal* of this [evolutionary] *vision* of nature and natural science to imaginative minds than it did from factual discoveries . . ." (emphasis added).⁷⁰

Such a revolutionary vision of nature was possible once history and nature were both placed under a prescriptive definition of law. History became seen as having forces which moved in a certain direction affecting both nature and society. It became necessary then to formulate the "laws of historical development." Buffon, for example, "strove to portray the history of man as a part of the wider history of nature" and was preoccupied with devising a "theory of generation" that would explain the presently observed uniformities as "necessary products" of matter in motion.⁷¹ This historicist form of positivism became dominant in the last century and later emerged as evolutionism. More generally Greene concludes that:

It was not until the idea of social evolution was linked to the idea of organic evolution in the middle of the [19th] century that the concept of nature-history as a single continuum undergoing progressive development emerged as the central theme of evolutionary naturalism.⁷²

This revolutionary view affected modern man's vision of reality and the positivistic element in it inclined to the opinion that all reality was susceptible of scientific treatment. But as Greene observes:

Every great scientific synthesis stimulates efforts to view the whole of reality in its terms, and Darwin's theory [sic] of natural selection was no exception. But the views of reality that originate in this way are not themselves scientific, nor are they subject to scientific verification.⁷³

Why then call the study of ultimate origins "science"? It would seem that the main reason is to capture the aura of irrefragability that attaches to anything purporting to be "scientific." This comes from an inflated view of the role and method of the natural scientist.

Summary and Conclusion

Some of the key elements found in the world view of "evolutionism" were adumbrated centuries earlier in certain philosophical and religious positions of the late medieval period and were subsequently secularized in modern subjectivist philosophy. The problem originates in assuming that the limitation which inheres in the status of "creature" is an unacceptable flaw or imperfection in being which must be overcome. The path to true knowledge is inseparably linked to the growth

in being, the "ontological promotion." This promotion requires, among other things, the abolition of distinctions between subject and object, between God and man, and between these two and nature. It is a commitment to complete fusion in the effort to achieve total knowledge and total being. Man is thought to outgrow his creatureliness and become divinity in a "maturation" process occurring over historical time. This epistemological and ontological "evolution" in stressing flux, changeableness, and "becoming" rather than being, leads also to a rejection of anything requiring stasis and limits, including the rejection of mediating concepts, which cannot capture the world of flux, in favor of direct apprehension of God and nature.

Among other relevant philosophical positions of importance in the origins debate are the rejection of the doctrine of essences, denial of the reality of universals, and abandonment of belief in the validity of language to convey accurately truth. These are, of course, derivative of the position mentioned above. In the sciences these philosophical positions are reflected in both biology and physics in the denial of separate types of organisms and in the rejection of substance. Instead of things whose whatness is reliably cognized the modern mind is usually preoccupied with behaviorism, functionalism and relationism, again stressing change, becoming, and process. The emphasis is more on the *process* of knowing than on the *things* known since the reality of the extramental world is denied. This is a position which tends toward atheism.

All of this contributes to the positivism and materialism of the modern view in which the natural sciences are seen as the only valid source of knowledge with the result that philosophy and metaphysics are considered meaningless or non-existent, suited to an earlier, more primitive stage of man's intellectual evolution. The sciences are believed to explain everything: history, society, and ultimate origins. Hence in the discussion of ultimate origins almost anything the materialist or positivist scientist can imagine is considered "scientific." Little recognition is given to the limits of science here, to the making of distinctions. In this paper some of these limits and distinctions have been suggested with a view to recognizing some serious handicaps in claiming that origins questions can be studied "scientifically."

The alternative is to accept the reality of the extramental world, of things, essences and natures and reject subjectivism/nominalism in favor of a moderate realism. This means accepting our status as creatures, finite and limited and recognizing that though we cannot know exhaustively, we can know truly. That inevitably leads to the recognition of God the Creator. As Jacques Maritain observed: ". . . if things really exist, it is inevitable to postulate God's existence also."⁷⁴ And Molnar repeatedly supports that point:

. . . the Judeo-Christian-Aristotelian conceptual framework of our thought sees the existence of things in their createdness, so that the reality of objects presupposes also the reality of a supreme transcendental creator. . . . to postulate a God independent of man (transcendent), yet concerned enough (personal) to furnish the universe with other things and beings also . . . such a God stands guarantor to the reality of what he creates. . . .

God reminds us that man is not the creator of nature, nor is nature the creator of man; both were created distinct and limited . . . and he created the extramental world as an entity distinct from the human being. Hence cognition is enclosed within wide but firm limits.⁷⁵

In the creation/evolution debate, the gathering of more empirical data is simply not enough. Creationists must understand the long, philosophical background which lies not only behind belief in evolutionism but also behind evolutionists' concept of science. Greene urges that:

To ignore the differences between science, philosophy, and religion and roll them all into one evolutionary gospel claiming to disclose the meaning of existence is as dangerous to science as it is to philosophy and religion.⁷⁶

To ignore these differences is in fact to take a secular and essentially evolutionary position. Only when these distinctions are kept clear and when the philosophical understanding is added onto the critical evaluation of empirical data can creationists hope to unroll this "evolutionary gospel" completely and thus clear the path for hearing the only genuine gospel: Christ, the Redeemer of Creation.

References

1. Molnar, Thomas. 1973. God and the knowledge of reality. Basic Books, New York, see especially pp. 3-69.
2. *Ibid.*, p. 110.
3. *Ibid.*, p. 40.
4. *Ibid.*, p. xiii.
5. *Ibid.*, pp. 44-45, 46-47, 92, 109, 110, 112, 114-116, 117, 129-130, 210-211, and elsewhere respectively as indexed. The tracing of the continuity of thought between these men is a fascinating and complex study but well beyond the scope and purpose of the present paper. One example of the interesting connections of thought is that of Schelling. As Jaki indicates in his *The road of science and the ways to God*. 1978. University of Chicago Press, Chicago, p. 136, Schelling started his work by considering the Biblical doctrine of Genesis and Fall as a kind of myth which he supplanted with his own version of the genesis of the world which Jaki describes as truly mythical, i.e., illusory. Much of Schelling's philosophy was a recapitulation of Giordano Bruno's views as Jaki shows (pp. 134-135). Interestingly, Wightman identifies Bruno as being perhaps the first modern pioneer of evolutionary thought. See his *The growth of scientific ideas*. 1953. Yale University Press, New Haven, p. 396.
6. *Ibid.*, p. 113.
7. *Ibid.*, p. 115.
8. *Ibid.*, p. 106.
9. *Ibid.*, p. 114.
10. *Ibid.*, p. 99.
11. *Ibid.*, pp. 98, 101; but see the entire chapter, pp. 97-124.
12. *Ibid.*, pp. 101-102.
13. *Ibid.*, p. 108.
14. *Ibid.*
15. *Ibid.*
16. *Ibid.*, p. 107.
17. *Ibid.*, p. 116.
18. *Ibid.*, p. 121; see also pp. 111-112, 116.
19. *Ibid.*, p. 41.
20. *Ibid.*, pp. 34-35.
21. *Ibid.*, pp. 60, 61.
22. *Ibid.*, p. 113.
23. Moore, John N. 1983. How to teach origins. Mott Media, Inc., Milford, Michigan, pp. 84, 86.
24. Molnar. *Op. cit.*, p. 45.
25. *Ibid.*, p. 107.
26. *Ibid.*, p. 206.
27. Ramm, Bernard. 1983. Does anybody have the right to tell me what to do? *Christianity Today*, 27(17):46-49; see especially page 47.
28. Schaeffer, Francis A. 1972. He is there and He is not silent. Tyndale House, Wheaton, Illinois, p. 38.
29. *Ibid.*, pp. 41-42.
30. *Ibid.*, p. 56.
31. Weaver, Richard M. 1948. Ideas have consequences. University of Chicago Press, Chicago, pp. 3, 7-8.
32. *Ibid.*, p. 158 (footnote).
33. Schaeffer. *Op. cit.*, p. 51.
34. Hardin, Garrett. 1959. Nature and Man's fate. Mentor Books, New York, p. 60.
35. Moore. *Op. cit.*, pp. 56, 58, 64, 103, 105 and 128 respectively. But see also his "An Estimate of the Current Status of Evolutionary Thinking" in *Creation Research Society Quarterly*, 18:189-97; see especially pp.192-93, 195-96.
36. Wightman, William P. D. 1953. The growth of scientific ideas. Yale University Press, New Haven, p. 375.
37. *Ibid.*, pp. 375, 376.
38. *Ibid.*, pp. 416, 269.
39. Greene, John C. 1981. Science, ideology and the world view. University of California Press, Berkeley, p. 34; see also pp. 16, 35, 36, 50. Greene adds that for Buffon, though, "classifications were arbitrary human devices that played a useful but subordinate role . . ." (p. 34). This suggests something of both pragmatism and nominalism. Also Wightman (p. 377, reference 36) states that it was by constant reliance on extinct forms coupled with the application of the principle of correlation of parts which allowed Cuvier "to transform animal taxonomy at one stroke into a natural system, despite his uncompromising acceptance of Linnaeus's dogma of the fixity of species" (original emphasis). Wightman fails to consider the possibility that Cuvier's belief in some form of fixity, in the reality of distinct, basic types derived from the mind of God, may have contributed to this transformation of taxonomy into a "natural system."
40. Mayr, Ernst. 1977. Darwin and natural selection. *American Scientist*, 65:321-27; see especially p. 327.
41. Dampier, Sir William Cecil. 1948. A history of science. Cambridge, at the University Press, p. 491.
42. *Ibid.*, pp. 491, 492.
43. *Ibid.*, p. 497. Wightman claims it is Maxwell who made the "critical transition" from Newton's method of explaining phenomena based on known things (hard, massy particles) "to one in which the form of the relationship only is sought in analogy, the 'model' being discarded as soon as its usefulness had been exhausted" (p. 305, emphasis added). This involves a rejection of the doctrine of essences in favor of pragmatism and functionalism based on the modern mind's epistemological dilemma: one can never really know things; one can at best only know what works.
44. Jaki, Stanley. 1978. The road of science and the ways to God. University of Chicago Press, Chicago, p. 433.
45. Greene. *Op. cit.*, p. 14. The statement of Newton which Greene gives in this regard is: "God, in the Beginning form'd Matter in solid, massy, hard, impenetrable, moveable Particles, of such Sizes and Figures, and with such other Properties, and such Proportion to Space, as most conduced to the end for which he form'd them." See p. 13.
46. Jaki. *Op. cit.*, pp. 88-89.
47. Molnar. *Op. cit.*, p. 214.
48. *Ibid.*, p. 217.
49. *Ibid.*, p. 225.
50. Greene. *Op. cit.*, p. 133.
51. Russett, Cynthia E. 1976. Darwin in America. W. H. Freeman Co., San Francisco, p. 218.
52. Molnar. *Op. cit.*, pp. 212-213.
53. Thaxton, Charles, and Jon Buell. 1984. *The Foundation Rationale* 1(2):1.

54. *Ibid.*, p. 2.
55. Moore. *Op. cit.*, p. 86.
56. *Ibid.*
57. *Ibid.*
58. *Ibid.*, pp. 86, 87.
59. Morris, Henry M., and Gary E. Parker. 1982. What is Creation science. Creation-Life Publishers, Inc., San Diego, pp. 134-36. Parker also believes that "creation is a scientific concept" and that it is "based on testable hypotheses and stimulates research" (p. 141). Yet in dealing with the question "Can Creation be Science?" (pp. 146-50), he seems to recognize, perhaps inadvertently, that the origins debate does involve philosophical issues (though one might infer that philosophy is to be relied on here only as an unfortunate last resort). One problem with his approach is that because he believes origins is a scientific subject, it "can never be completely settled by scientific study alone" (p. 143). The evidence will tend to "see-saw" back and forth (p. 145) due to our finite minds and "incomplete knowledge of the facts" (p. 145). This suggests that we cannot know truly unless we know exhaustively, a problem arising in nominalism but not in philosophical realism. Also, the open-mindedness suggested by the opened-endedness seems contrary to human nature: Who can fail to have a commitment on such a vital topic as ultimate origins that will not "see-saw" with the "scientific" evidence?
60. Schoeffler, Sidney. 1955. The failures of economics. Harvard University Press, Cambridge, p. 38.
61. Jaki. *Op. cit.*, pp. 252, 253.
62. *Ibid.*, p. 252.
63. *Ibid.*, p. 262, 263.
64. The example of the typewriter is taken from Harold Armstrong's "Thermodynamics, energy, matter, and form" in the 1978 *Creation Research Society Quarterly*, 15:119-21; see especially p. 120. For a further development of this type of argument see my article "The limits of human thought" in the 1983 *Creation Research Society Quarterly*, 20:30-39. See also Michael Polanyi. 1967. Life transcending physics and chemistry in *Chemical and Engineering News*, 45(35):55-66.
65. Klaaren, Eugene M. 1977. Religious origins of modern science. William B. Eerdmans Publishing Co., Grand Rapids, Michigan, pp. 116, 119; 170-71. Throughout his book, Klaaren stresses the importance of the creationist view in the development of early modern science not only for Boyle but for Bacon and Newton as well.
66. Greene. *Op. cit.*, p. 33.
67. *Ibid.*, pp. 33, 36.
68. *Ibid.*, pp. 33-34.
69. *Ibid.*, p. 51.
70. *Ibid.*, pp. 51-52.
71. *Ibid.*, pp. 35, 37.
72. *Ibid.*, p. 132.
73. *Ibid.*, pp. 196-97.
74. Molnar. *Op. cit.*, p. 137.
75. *Ibid.*, pp. 114, 137, 227 respectively.
76. Greene. *Op. cit.*, p. 197.

PANORAMA OF SCIENCE

Questions Remain About the Sun's Operation

It seems to be generally conceded now that there is a problem about the Sun. The failure to find the flux of neutrinos which would be predicted by the common theory of the way in which the Sun's energy is produced suggests that there may be something wrong with the theory.¹

A recent article has taken up this matter.² The author agrees that the predictions do not match what is actually found. Not only is there the matter of the neutrinos, but there are other things, such as the five-minute oscillations, and other observations which are definitely at variance with the theory.

This matter is of interest to a creationist because, if the theory that the Sun's energy is produced by nuclear fusion must be discarded, some other source must be found. In fact, another source had been suggested before nuclear fusion was known: the Sun's contraction under its own gravity. Such contraction could supply energy at the rate at which the Sun is radiating; but it could do so for only, at most, a few tens of millions of years. Hence if the shrinking theory is accepted, and it seems to be the best alternative if the fusion is discarded, there will be another line of evidence for a recent Creation.

References

1. Hinderliter, Hilton. 1980. The shrinking Sun: a creationist's prediction, its verification, and the resulting implications for theories of origins. *Creation Research Society Quarterly* 17:57-9.
2. Joseph, C. L. 1984. Solar neutrinos and other problems and their relation to energy production in the Sun. *Nature* 312 (5991):254-55.

Contributed by Harold L. Armstrong

Olbers' Paradox Again

Olbers' paradox is the observation that, if the universe is infinite, and if there are stars, nebulae, etc., distributed more or less uniformly throughout it, in whatever direction one looks at the night sky, one ought to see a star. So the night sky would not be dark, but would be ablaze with light.

This matter has been discussed many times in the past. Now a recent article has returned to it.¹ While the author does not much like the word "paradox," he concedes that there is no suggested solution to the paradox which is definitely known to be true. Suggestions have included such things as curved space, tired light, and even stranger notions. But these suggestions are not susceptible to direct independent experimental demonstration; so the field remains one in which anyone may speculate.

Creationists may use the paradox in urging caution in the fields of cosmology and cosmogony, and in pointing out that such speculations as the big bang are just that: speculations. For their own part, they will find no difficulty in believing in a finite universe, created, according to Scripture, as an adjunct to the Earth. Indeed, the situation which we actually see agrees with what might be expected from Scripture. God created day and night, and He created many stars to be seen at night; but not so many, nor in such an arrangement, as to obscure the darkness of night, which, along with other parts of His creation, He saw to be good.

Reference

1. Harrison, E. R. 1984. The dark night-sky riddle: a "paradox" that resisted solution. *Science* 226(4677):941-45.

Contributed by Harold L. Armstrong

Hidden Development No Solution

It is quite widely conceded now that the fossils give little support to the gradual, continuous development of living things, from one kind to another. For there are fossils of many kinds of living beings, but none of transitional stages from one kind to another.

One notion which has been put forward to save gradual, continuous evolution, is allopatry. It is suggested that new kinds may have arisen in isolation, say on an island or in some remote valley. Then, when the new kind was ready, it burst forth upon the world.

This notion has been criticized already.¹ But there is another objection which might be raised. What happens when a kind of creature, which has been living in isolation, meets with the population of the outside world? The kind which was living in the remote place suffers. It is easy to point to examples. The dodo is extinct; the kiwi is nearly so. There is concern lest the peculiar creatures of the Galapagos become extinct. Other instances could be mentioned.

It would appear, then, that development in some remote corner is not the way to get a new kind started. It may be able to start there; but its chance of taking over the Earth is very poor.

Reference

1. Mehlert, A. W. 1982. Flaws in allopatric theory. *Creation Research Society Quarterly* 18:233-4.

Contributed by Harold L. Armstrong

Healing Properties of Garlic and Onion

Garlic (*Allium sativum*) and onions (*A. cepa*) are among the oldest cultivated plants. Egyptian pharaohs were entombed with carvings of garlic and onions to ensure flavored meals in the next life. One of the many complaints of the Children of Israel during their 40 year trek in the wilderness was their fond memory of "leeks, onions and garlic" in Egypt (Numbers 11:5). Garlic has been used for its healing powers since at least 1550 B.C. The Codex Embers, an Egyptian medical papyrus, gives 22 medical uses for garlic including remedies for heart problems, headaches, worms and tumors. Aristotle, Hippocrates and Pliny the Elder cited numerous therapeutic uses for garlic and onions. Garlic was used by athletes in the first Olympic games as a stimulant. In India, garlic was used as an antiseptic and the Chinese still give onion tea for fever. Louis Pasteur described garlic as antibacterial and Albert Schweitzer used garlic to treat amoebic dysentery in Africa. Garlic was used as an antiseptic for the prevention of gangrene in both World Wars. The chemistry of garlic and onions has been studied for over 100 years. Recent research has indicated the bulbs can release a variety of low molecular weight organic molecules that incorporate sulfur atoms in unusual configurations.¹ The molecules are highly reactive and spontaneously change to other compounds.

A wide variety of biological effects have been demonstrated. Onion contains a familiar and highly effective lacrimatory (tear producing) factor. Garlic juice diluted to one part in 125,000 inhibits the growth of disease causing bacteria such as *Staphylococcus*, *Streptococcus*, *Vibrio* (causes cholera) and *Bacillus* (including the kinds that cause typhoid fever and dysentery). Garlic juice also exhibits a broad spectrum of activity

against pathogenetic fungi and yeasts. Garlic has demonstrated antithrombotic activity, that is, it inhibits the formation of blood clots. Apparently, the antithrombotic activities occur because of a "hand and glove" perfect fit between a molecule from garlic and specific receptor sites on blood platelets that normally bind to fibrinogen resulting in blood clot formation. It is of interest that onion and garlic derivatives from drug or health food stores contain no biologically active substances. Preparation by steam distillation or drying destroys these highly unstable molecules. Only fresh material, as has been used for centuries, contains the biological properties of medicinal value.

At least some of the biological activity of substances produced by garlic and onion present problems for the evolutionist. It has been argued the antifungal and antibiotic activity might protect the bulb from decay induced by bacteria or fungi. Such a statement must be verified. It is certain the long list of human disease organisms that are rendered ineffective by garlic and onion extracts pose no threat to the bulbs. Could it be that a wise Creator designed these hardy plants to be used in the treatment of a wide variety of diseases? We are admonished to "consider the lilies of the field" (Matthew 6:28). Both garlic and onions are classified as lilies by modern science. The claim by the evolutionist that these substances evolved merely to protect the bulbs is totally unsubstantiated. Effectiveness of these interesting molecules against diseases known to attack the bulbs has not been demonstrated. Besides, other plants appear to do well without such chemical weapons. Similarly, the effective lacrimatory factor is thought to be repugnant to mice and insects that might eat the bulbs. Again, experimental evidence is lacking.

Even if those substances are demonstrated effective in the above roles, the evolutionist has absolutely no rational argument for a garlic bulb, living underground, evolving a complex, unstable molecule with a reactive site that corresponds precisely to a reactive site located in blood platelets of man. Consideration of this lily of the field points directly to an all wise, loving Creator.

Reference

1. Block, E. 1985. The Chemistry of Garlic and Onions. *Scientific American* 252(3):114-19.

Contributed by E. Norbert Smith

Theories of Origins¹

The author of this thesis claims that "the scientific method is often ignored and/or abused when attempting to substantiate theories for the origin of life." (abstract). Three general theories; spontaneous generation, evolution, and creation are considered. Often successful experiments conducted to disprove an origins theory are either disbelieved, ignored, or cited as faulty. The falsifiability premise supposedly inherent in the scientific method is difficult to apply in the emotionally-charged origins debate.

Various "offshoots" of creation such as the gap theory, day-age theory, progressive creation, framework hypothesis and theistic evolution are reviewed as well as several evolutionary theory hybrids. Many objections to the creation model of science cited by evolutionists are presented and refuted. The defense of the creationists use of the second law is as follows:

The second law of thermodynamics is consistent with the creation theory; entropy or disorder is increasing in the universe and the amount of usable energy is decreasing though the total energy remains constant. Creationists are criticized for misusing the second law when applying it to the thought that order cannot arise out of disorder.

...both the organic and inorganic world is rife with chemical mechanisms like crystals that produce order from disorder;...

...But order arises from disorder all around us. A human body arises from the relative formlessness of a fertilized egg; disordered water molecules form ordered ice crystals in our refrigerators. The reason, of course, is that neither an organism nor anything else except the universe as a whole is a closed system: the earth and its organisms are open systems that acquire energy from the sun to build complexity from simple precursors.²

Evolutionary theory would contradict the second law if (and only if) the construction of Darwinian histories required us to suppose the existence of thermodynamically closed systems in which entropy does not increase... But the systems in question are all open. Energy from the sun is constantly entering the system comprising the earth and its inhabitants. That energy flows into lesser organic systems as they feed and warm themselves.³

The creation theory does not question the validity of organisms utilizing the energy of the sun to produce food for itself. The creation theory is also in agreement with the concept that a human body arises from a fertilized egg. However, the raw energy from the sun is of no use to anything unless the object or organism possesses the machinery necessary to convert the raw energy into usable chemical energy. Living organisms possess such systems; photosynthesis in plants is but one example.

Chemicals in a disordered state, such as an organic soup, lack a mechanical system to utilize the raw

energy. The "relative formlessness of a fertilized egg", though appearing disordered, contains the necessary information and mechanical systems to utilize the energy it receives to organize itself into a human body. Without a mechanical system and information to utilize energy, the influx of energy is not only nonproductive but increases disorder.

In the case of water molecules or other chemicals organizing themselves into crystals, it is inappropriate to classify this process as increasing in order and thus being contrary to the second law. Water molecules will spontaneously seek a molecular arrangement that is the lowest energy state possible. The particular structure depends upon the surrounding environment. Below zero degrees celsius, that lowest energy state is a molecular arrangement in a crystalline solid. Above one hundred degrees celsius, water molecules again arrange themselves in the lowest energy state possible which in this case is as a gas. The liquid state is of lowest energy when water is in the median temperature range. This is a basic concept of chemistry. (pp.105-7)

Although there is not a very thorough review of modern creationist literature, this 133-page thesis offers a good starting place for a review of the subject of origins. For interested researchers much information on origin theories has been collected. True science continually supports the creation model of science, but most men prefer a naturalistic framework and seek other ideas of beginnings rather than God created the heavens and earth.

References

1. Brazo, Mark W. 1983. Theories of origins: do they persist despite contrary evidence? MS Thesis. ICR Graduate School, El Cajon, CA.
2. Futuyma, D. J. 1983. Science on trial. Pantheon Books, New York pp. 177, 183.
3. Kitcher, Philip, 1982. Abusing science. The MIT Press, Cambridge, MA p. 92.

Contributed by Emmett L. Williams

QUOTES

There are also some cases, not too many though increasing in number, which show scientists cheating with their data. The pressure to come up with novel results, the pressure of having another paper published, is too great; to yield to that pressure, the pressure of opportunity, is all too human. Some prominent medical schools and research institutes indeed suffered very bad publicity in recent years because they failed to prevent such misdeeds, or to detect them soon enough. Science can indeed become very much man's science in a very bad sense.

Jaki, Stanley L. 1984. God and man's science: a view of Creation in Morris, Lynne, editor. *The Christian vision: man in society*. The Hillsdale College Press. Hillsdale, MI, pp. 36-7.

In the physical and biological sciences, teaching, learning, and research presuppose without exception the self-sufficiency of nature and reason. The rational powers of the scientist and scholar fully exhaust the given material, and what is not known will be fully known by further inquiry. There is no room for something wholly baffling to the mind. The capacity for radical surprise and wonder is dead. And such capacity is excluded in principle.

One does not stand in awe before the radically novel, the radically other, the radically incomprehensible. In fact such a phenomenon, if it should ever turn up, is either immediately "explained" by the reigning categories of thought, or else new categories, materially continuous with the old, are devised to absorb it. Whatever continues to resist the ingenuity of the mind is automatically pronounced to be superstitious or irrational. The absolute self-sufficiency of nature and reason is to be vouchsafed at all costs, with the result that some form of naturalism, materialism, rationalism, humanism, immanentism, and monism always lurks in the background.

Malik, Charles H. 1984 Faith and reason in the university. *Modern Age* 28:316-17.

The Origin of the Life Cycle of Land Plants

According to evolutionary thinking, land plants evolved from aquatic plants about 400 million years ago. However, one of the most difficult problems with this theory is that the presumed algal-like ancestral plants were all gametophytes. They were haploid and therefore had only a single set of chromosomes in each cell. Reproduction was accomplished by the formation of egg-bearing structures on the stem of one plant and sperm-bearing structures on the other. When these mature, the sperm are released into the water and they swim to the egg-bearing structures called archegonia and then down the long necks and fertilize the eggs. The resulting zygotes each have a double set of chromosomes and so are diploid in chromosome number. These develop into sporangia or spore-bearing structures, mature and form spores each with the reduced or haploid number of chromosomes. These spores then form the leafy plants which again have the reduced number of chromosomes and are the next generation of gametophytes. Obviously in most algae the spore-bearing structures or sporophytes are very small in relation to the rest of the plant as in mosses and so the algal plants that we see are called gametophytes.

By contrast land-inhabiting plants which vary in size from the tiny buttercups to large oak trees and the giant Sequoia or redwood tree are sporophytes with the gametophytic generation reduced to the pollen grains and tiny embryo sacs at the base of the pistils. Now the question is just how did this dramatic shift from dominant gametophytes in algae to dominant sporophytes in seed plants take place?

Basically there have been two theories, one by L. Celokovsky and the other by F. O. Bower. Celokovsky proposed that land plants arose from green algae that already had alternation of two independent generations on separate plants. But the main question is how could a free-living gametophyte become attached to and so dependent and parasitic on the sporophytic generation as it is in many land plants?

Graham¹ favors Bower's hypothesis in which a delay of zygotic meiosis (the chromosome reduction division) could have produced the first multicellular diploid sporophytes that would be like the embryos of land plants associated with the parental haploid gametophyte. Thus according to Bower and Graham, an ancestral algae with a gametophyte generation only, had its fertilized egg delay meiosis but start dividing mitotically to produce a diploid cell mass that would evolve to form a sporophyte or diploid generation.

The Charales or stoneworts have a multilayered structure similar to those of all the land plants that produce motile reproductive cells such as the moss plants, ferns and certain members of the Pine tree group of plants,

called gymnosperms. From this multilayered structure the sperm and egg cells are formed.

In the genus *Coleochaete*, a green algae, the zygote called an oospore upon germination does not immediately undergo a reduction division and form gametophytes, but instead produces a diploid structure consisting of a number of cells which then form the swimming cells or zoospores by meiotic division. These haploid zoospores finally produce the gametophytic plants. This structure is considered to be similar to that of the higher plants and so has led to the theory that the latter arose from algae of the type in the present-day genus *Coleochaete*.

All that Graham has to suggest as to how these relatively small structures in both the stoneworts and *Coleochaete* could have become the dominant part of the life cycle of flowering plants is that the diploid tissue in land plants serves to protect the genome (ensemble of genes on the chromosomes) from the effects of deleterious mutations. Also, the sporophyte increases the number and diversity of recombinant progeny. She speculates that natural selection eventually would tend to increase the amount of this diploid or sporophyte tissue, giving rise to all the multiplicity of flowers, shrubs and trees we now enjoy.

There are several inconsistencies in this proposed explanation. One is that as far as we know, mutations are the only source of change to which evolutionists can appeal, and yet Graham acknowledges that they are deleterious! Finally it would seem strange indeed if the diversity and complexity which we see in land plants could ever have been built up by the selection of what few possible advantageous mutations might have occurred. It always seems strange to me that these theorists never can show even a few recorded steps in which mutations have led to the formation of a useful new plant feature such as a sporophyte generation. They simply refer to mutation and natural selection without showing that any of the required mutations exist and without demonstrating that natural selection would be able to intervene and produce the end result—in this case the balanced life cycle of a typical land plant with its large and dominant sporophyte housing a small but very essential gametophyte. Creationists believe that the Designer used haploid (gametophyte) and diploid (sporophyte) stages in varying combinations for the best possible outcome in each particular algae or land plant. Creationists believe that such a design hypothesis has a far better fit with botanical facts than do any of the evolutionary speculations about life cycle origins.

1. Graham, Linda E. 1985. The origin of the life cycle of land plants *American Scientist* 73:178-86

contributed by Walter E. Lammerts

QUOTE

Another aspect of the humanness of science is more tragic. Three hundred years ago, at the time of Newton, when science appeared robustly on the scene, it was greeted by many as the means whereby paradise may be created on earth. In 1664 Henry Power, a junior member of the Royal Society, greeted science as the tool for which "there is no Truth so abstruse, nor so far elevated out of our reach, but man's wit may raise Engines to Scale and Conquer it." A hundred years later Joseph Priestly, an English scientist, fled to the United States in a similar state of mind. He felt that in the virgin fields of this newly born country there would be a better chance of implementing the new and final age of mankind, an age "glorious and paradisiacal beyond what our imagination can now conceive."

Jaki, Stanley L. 1984. God and man's science: a view of Creation in Morris, Lynne, editor. *The Christian vision: man in society*. The Hillsdale College Press. Hillsdale, MI, p. 37.

SPECIAL FEATURE

RECORDED INSTANCES OF WRONG-ORDER FORMATIONS OR PRESUMED OVERTHRUSTS IN THE UNITED STATES: A BIBLIOGRAPHY — PART IV

WALTER E. LAMMERTS*

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References

1. Cooper, J. R. 1937. Geology and mineral deposits of the Hare Bay area, Newfoundland. Geological Sciences Bulletin No. 9, Newfoundland Department of Natural Resources.
2. Kay, G. M. 1938. Overthrust structures northeast of Lake Ontario. *Bulletin of the Geological Society of America* 49:1935.
3. Bascom, F. and G. W. Stase. 1938. Geology and mineral resources of the Honeybrook and Phoenixville Quadrangles, Pennsylvania. U. S. Geological Survey Bulletin No. 891. United States Government Printing Office. Washington, D.C.
4. Fraser, D. M. 1938. Contributions to the geology of the Reading Hills, Pennsylvania. *Bulletin of the Geological Society of America* 49:1199-1212.
5. Stase, G. W. and A. I. Jonas. 1939. Geology and mineral resources of York County, PA. Pennsylvania Geological Survey Bulletin C-67 (Fourth Series).
6. Stase, G. W. and A. I. Jonas. 1939. Discussion of the geology of the Reading Hills, Pennsylvania. *American Journal of Science* 237:281-6.
7. Willard, B. 1939. Highway overthrusts, Philadelphia to Pittsburgh, PA. Pennsylvania Geological Survey Bulletin G-12 (Fourth Series).
8. Willard, B., F. Swartz and A. B. Cleaves. 1939. Overthrusts of the Devonian of PA. Pennsylvania Topographical and Geological Survey Bulletin 19-G (Fourth Series).
9. Laurence, R. A. 1939. A small fenstern in Johnson County, Tennessee. *Journal of the Tennessee Academy of Science* 14:200-2.
10. King, P. B. 1938. Geology of the Marathon Region, Texas. U. S. Geological Survey Professional Paper 187. United States Government Printing Office. Washington, D.C.
11. Eardley, A. J. 1939. Structure of the Wasatch-Great Basin Region, Utah. *Bulletin of the Geological Society of America* 50:1277-1310.
12. Jackobs, E. C. 1938. Geology of the Green Mountains of Northern Vermont. Twenty-first Report of the State Geologists, Vermont.
13. Butts, C. and R. S. Edmund. 1939. Geology of Little Mountain in Northern VA. Virginia Geological Survey Bulletin 51-H pp. 161-79.
14. Cooper, B. N. 1936. Stratigraphy and structure of Marion area, VA. Virginia Geological Survey Bulletin 46-L pp. 125-66.
15. Cooper, B. N. 1939. Geology of the Draper Mountain area, VA. Virginia Geological Survey Bulletin 55.
16. Cooper, B. N. 1939. Origin of the narrow Cambrian belts north of Draper Mountain, VA. Virginia Geological Survey Bulletin 51-G pp. 147-59.
17. Currier, L. W. 1935. Zinc and lead region of Southwestern, VA. Virginia Geological Survey Bulletin 43.
18. Furcron, A. S. 1939. Geology and mineral resources of the Warrentown Quadrangle, VA. Virginia Geological Survey Bulletin 54.
19. Baker, C. L. 1938. Westward overthrusting in Wind River Mountains, Wyoming. *Bulletin of the Geological Society of America* 49:1865.
20. Beckwith, R. H. 1939. Asbestos and chromite deposits of Wyoming. *Economic Geology* 34:812-43.
21. Bucher, W. H. 1933. Volcanic explosions and overthrusts of Wyoming. *Transactions of the American Geophysical Union* (14th annual meeting) pp. 138-242.
22. Fanshawe, J. R. 1939. Structural geology of Wind River Canyon area, Wyoming. *Bulletin of the American Association of Petroleum Geologists* 23: 1439-92.
23. Harberg, L. 1938. The structural geology and physiography of the Teton Park area, Wyoming. Augustana Library Publication 16.
24. Jones, C. T. 1939. Geology of Wind River Canyon, Wyoming. *Bulletin of the American Association of Petroleum Geologists* 23:476-91.
25. Knight, S. H. 1936. Origin of the giant conglomerates of American Mountain and Crook's Mountain, Central Wyoming. *Proceedings of the Geological Society of America* p. 84.

*Walter E. Lammerts, Ph.D., Fellow of the Creation Research Society, receives his mail at P.O. Box 496, Freedom, CA 95019.

LANGUAGE AND SCIENCE

ROBERT A. HERRMANN*

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Abstract

This is the second article in the series entitled Nature: The Supreme Logician. This article discusses various notions associated with the languages of science. In particular, the concept of a rational description, hypotheses, indirect verification, theories, scientific speculation, discipline languages, Mill induction, improper theories, and the notion of a model are discussed. The concepts of falsifiability and hypothesis modification are delineated. One of the major features of our discussion is an introduction to what applied mathematical modelling truly signifies, and an investigation into the unscientific methods, such as absolute randomness, that are ad hocly utilized to reject totally acceptable alternative scientific theories.

1. Time

Prior to continuing our investigation of the deductive-world—the supermind model—for the development of a natural system, it becomes absolutely necessary to give a technical discussion of certain language concepts and their association with various verbal descriptions for natural system behavior. It is often necessary to incorporate within such descriptions a time notion. We only give a cursory introduction to two possibilities. However, if you have a strong intuitive understanding of the time concept, then this section can be omitted without loss of comprehension.

Since our discussion revolves around the concept of a developing natural system, the term *cosmic time* is useful. A partial description for this concept, as first suggested by H. Weyl in 1923, can be found in many elementary texts in modern cosmology. For example, Bondi defines this notion in the following manner.

For it is asserted that every fundamental observer sees a changing universe, but that it presents the same aspect to them all, then it must be possible for observer A to find a time t_a according to his clock at which he sees the universe in the same state as observer B sees it at a time t_b by his clock. The universe itself therefore acts as a synchronizing instrument which enables A and B (and hence all observers) to synchronize their clocks.¹

To apply this to any natural system, we simply replace the word “universe” in this definition with the phrase “natural system.”

Cosmic time requires one to believe in certain additional properties associated with developing natural systems, such as the fundamental observer, a uniform substratum and the like. If you are not willing to accept these restrictions, then intuitively we can consider a natural system as a finite entity and that its development “begins” at the moment when it appears in some fixed configuration. In this case, cosmic time can be completely replaced by a universal Feynman diagram² concept. We would use the concept of a universal event number (u-number) and u-event intervals in order to analyze system development.³ Distinct u-event numbers are assigned to distinct events and, hence, become sequentially ordered as are the universal events. The ordering of the u-event numbers need not be considered temporal in character. However, this numbering system does impart the necessary ordering by which we can discuss the development of a natural system in the exact same manner as our forthcoming cosmic time discussion. All one needs to do

is to change such expressions as “time t_i ” to “u-event number i .”

U-event numbers do not require fundamental observers and the like. Further, the u-event number scheme allows for time and space differences to be analyzed rather than restricting such analysis only to cosmic time differences within the development. Since cosmic time is a much less abstruse concept and is well known we retain this terminology throughout the remainder of this investigation. When the term “time” appears it will from this sentence on refer to cosmic time.

2. Theories

A natural science is concerned with communicating descriptions for the apparent behavior of a named natural system and named system constituents. Suppose that one or more individuals verbally communicate what is claimed to be a consistent and faithful description for the behavior and characteristics of a natural system and the system constituents as such behavior would be observed by assumed human or machine sensors at a moment of time. By introduction of the idea of the color dot matrix, various diagrams, photographs and other visual displays can be faithfully described and, indeed, computer techniques also allow for the systematic mathematical encoding of visual and audio information.⁴ Such computer encoded sensorially received “real” information can also be included in the narrative description and retrieved through applicable visual or audio display mechanisms. As is well known the only acceptable description would be one that follows the same logical patterns as can be associated with human thought processes. All other verbal descriptions would be, in general, without comprehensible content. Louis deBroglie states, “... the structure of the material Universe has something in common with the laws that govern the working of the human mind.”⁵ As Torrance writes, “If the nature of things were not somehow inherently rational they would remain incomprehensible and opaque and indeed we would not be able to emerge into the light of rationality.”⁶

Once we have defined a “rational description as a logically consistent communicable collection of words, sentences, diagrams, pictures and the like that have been obtained through application of acceptable dialectical, propositional, predicate or other consistent (human) deductive processes,”⁷ then we can define a rational description for the regularities presented by a real world phenomenon (i.e. the behavior of what is accepted as a real physical system). The Axiom of Natural Consistency states that “a description for a portion of reality is acceptable if and only if it is a rational description.”⁸

*Robert A. Herrmann, Ph.D., Mathematics Department, U.S. Naval Academy, Annapolis MD 21402

Even though we will discuss other languages, we utilize, for the present, certain nonambiguous procedures and investigate the simplest possible cases in order to give a brief discussion of some of the most salient aspects of *theory building*. Let D be a *discipline dictionary* say for some natural science. This means that D contains all of the meaningful words used throughout this particular scholarly discipline. We further assume that D contains all of the necessary language that is needed to construct an *intuitive first-order language*. Consequently D contains the words, *if, then, and, or, not, only, there, exists, for, all, each*, among others. The construction of the full discipline language $L(D)$ will be based upon a strict grammar that includes all of the usual first-order construction.⁹ I point out that many “scientific” statements are written in an intuitive first-order language and, indeed, all specific deductive-world statements are first-order.

The discipline language $L(D)$ includes *propositions, predicates, names for objects* (i.e. constants) so as to allow for the required first-order constructions. For example, if P and Q represent propositions in $L(D)$, then “ P and Q ” is a member of $L(D)$. If $R(x)$ represents a one-place predicate, then the sentence “For each x , if $R(x)$, then P ” is a sentence in $L(D)$. If c denotes the phrase “a photon” and $R(-)$ the one placed predicate “- is an elementary particle,” then $R(-) =$ “a photon is an elementary particle” and $R(c)$ is a member of $L(D)$. Of course, $R(c)$ need not be a sentence that is “true in reality.” In what follows L_1 denotes the set of all intuitive first-order sentences contained in $L(D)$. A *general hypothesis* Γ for the generation of a *rational physical theory* (or paradigm) is a consistent subset of L_1 . Notationally this is written as $\Gamma \subset L_1$. A *logical consequence deducible from* Γ is a sentence S that is a member of L_1 (notationally $S \in L_1$) such that S is obtained from Γ by means of the informal rules for predicate deduction (metalogue).¹⁰ For simplicity we often call S a *consequence of* Γ or a *logical implication*. Notationally we let symbols such as Cn represent the usual rules for logical deduction. Cn is often called a *consequence operator* and for this immediate discussion it represents standard predicate deduction. Generally, predicate deduction yields objects that are not the usual “sentences” that appear within scientific descriptions. However, within this entire investigation, the symbol $Cn(\Gamma)$ will denote the set of all ordinary first-order sentences as they are defined within our language $L(D)$.

Technically the set of sentences $Cn(\Gamma)$ is called a *theory*. There are many different types of “theories.” A *descriptive physical theory* is one in which all of the nonlogical and nonuniversal terms utilized within the sentences are assumed to have some physical meaning, if you are a realist.¹¹ In an informal *mathematical theory* the nonlogical and nonuniversal terms are called *primitive* or *undefined technical* terms and are assumed to have no meaning.¹² In a *formal mathematical theory*, sentences are constructed from strings of “meaningless” symbols. However, in practice $Cn(\Gamma)$ is not the theory meant when a scientist speaks about a “scientific theory.” First, most scientific theories are not based upon one set of hypotheses, but are usually based upon a collection $(\Gamma_1, \Gamma_2, \dots, \Gamma_n, \dots)$ of distinct hypotheses where the theory contains the *subtheories* $Cn(\Gamma_1), Cn(\Gamma_2), \dots, Cn(\Gamma_n), \dots$. Also it is not necessarily true that a set of hypotheses is a finite set. Some logicians claim that the Theory of General Relativity

requires an infinite set of hypotheses. Moreover, scientific theories also contain the rules for experimental and observational inquiry, the rules for the scientific methods to be employed, fragments of mathematical structures, the interpretations of these fragments and even modifications to the logic Cn or the languages. Many so-called scientific theories also contain statements that are entirely outside of $L(D)$ —statements that usually lead to philosophical concepts.

Since we are considering two-valued processes only, then a *verification process for a sentence* $S \in Cn(\Gamma)$, is a set of rules, canons, procedures (i.e. empirical, inductive) and the like that yields for S the symbol T or F not both. The symbol T could intuitively mean (2.1) “ S is accepted as true in reality with respect to the time interval over which the verification process is conducted” and F would mean the expression “not true” is substituted for “true” in statement (2.1).

The actual hypotheses that are verified are usually not the entire set Γ , but rather a nonempty subset δ of Γ . Indeed, Γ is often highly variable in character. A verification process V_i is distinct from a valuation process for a first-order language since V_i does not apply, in general, to the entire set Γ . As Cohn and Nagel state it, “It is often the case—indeed the most valuable hypotheses of science are of this nature—that a hypothesis $[\delta]$ cannot be directly verified.”¹³ Some of the logically deduced implications of δ that are not contained in δ may be the only sentences that are capable of verification. The process of verifying such hypotheses is termed *indirect verification*.

A basic prototype for indirect verification comes from particle physics. “The existence and properties of the ultimate elements are only to be inferred indirectly from observations of gross matter.”¹⁴ Let δ be the hypothesis stated in 1931 by W. Pauli relative to the existence of the neutrino and let $G_1 \subset L_1$ be the necessary hypothesis for Fermi’s theory of β decay. Evans writes, “Fermi’s theory of β decay, in 1934, developed for the first time a set of measurable consequences of the existence of a neutrino and these have been completely verified experimentally.”¹⁵ This process may be symbolized in the following manner. Let Cn denote the logic employed, say first-ordered predicate logic, and $Cn(\Gamma_1)$ the set of consequences. In general $Cn(\Gamma_1)$ is an infinite set and a finite set $F(\Gamma_1) \subset Cn(\Gamma_1)$ disjoint from δ is what is actually tested. Thus for each $S_i \in F(\Gamma_1)$ there is a verification process V_i such that $V_i(S_i) \in \{T, F\}$. It is a very significant fact that no matter how many implications are verified as T , it is not possible to absolutely prove that neutrinos exist in reality. One of the absolute requirements of the scientific method and the logic employed is that a physical hypothesis that can be indirectly verified only cannot be absolutely demonstrated as “true in reality.” It should be known by every individual, scientist or not, that such absolute acceptance or rejection of statements such as δ is a philosophical stance. Paraphrasing Cohn and Nagel,¹⁶ all scientific inquiry that deals with matters of fact and that is based upon indirect evidence is probable in character. The acceptance or rejection of such hypotheses is never beyond every significant doubt. Further, “No hypothesis which states a general proposition can be demonstrated as absolutely true.”¹⁷ It is a fact of basic logic that a logical implication of δ can be verified as “true in reality,” while each member of δ is “false.”¹⁸

3. Falsifiability

Two other major aspects of theory building—falsification and hypothesis modification—need to be clarified. Falsification is a widely misunderstood concept. Actually the falsifiability associated with any statement in $Cn(\Gamma)$ is totally unrelated to the Cn logical process, but it is related to the verification processes and induction. The scientific method places an additional prerequisite upon the verification process V_i for any $S_i \in Cn(\Gamma)$ that is capable of verification. The process V_i must be applicable to repeated experiments prior to the induction hypothesis. For any given moment of time t the process V_i must be capable of yielding not only a T but also an F when applied to some S_i . For the language L_1 this also means that V_i is capable of yielding a T for the statement “it is not the case that S_i .” Thus falsifiability applies to the verification of the implied consequences of a theory and it does not apply to the basic hypothesis δ assuming the theory is only indirectly verifiable. Hence the lack of a falsifiable verification process for some of the implications of an indirectly verifiable theory does not invalidate the hypothesis δ . What it does, obviously, is to lead to fewer verifiable consequences and nothing more serious. On the other hand strict application of the canons of the scientific method would require one to reject δ if no members of $Cn(\delta)$ are falsifiable.

As a classic example of falsification difficulties, assume that δ contains the statements (A) Let t denote the time that exists at the moment you read this sentence. (B) There exists a time x greater than t such that the temperature at all locations within the universe is at least 10^{32} °K. (C) Biological life does not exist when the temperature at any location at which it is placed is 10^{32} °K. Let $\delta = \{A, B, C\}$. Define the term “mortal” to mean “there is a moment of time when the biological life of a human being ceases to exist.” Adding a few obvious statements to δ we obtain Γ . Let (D) be the statement “Each human is mortal.” We assume that (B) and (C) are not directly verifiable even though they may be indirectly verified as consequences of another set of premises. Let h denote the name for some human being, and $M(-)$ the predicate “is mortal.” Now statement (D) is inductively accepted as true in reality if and only if there is a verification process V_h such that $V_h(M(h)) = T$ for each h that is an element of a large finite unbiased sample taken from the set of all human beings. Unfortunately no scientist has devised an experiment or any verification process that yields a T if an individual is immortal. Consequently, at the present time, since no such process is describable within our language, then we must assume that V_h is not falsifiable. However, depending upon what statements we add to Γ there may be numerous sentences in $Cn(\Gamma)$ that have falsifiable verification processes. The fact that (D) is not, at present, falsifiable is no reason to reject Γ . If $\delta = \{D\}$, then δ still need not be rejected unless we cannot find a falsifiable verification process for any of its consequences.

There are three basic reasons for rejecting, altering or adding to a set of premises Γ . (3.1) There is some $S_i \in Cn(\Gamma)$ such that $V_i(S_i) = F$. (3.2) There is some $S_j \in L_1$ and a verification process such that $V_j(S_j) = T$, but S_j is not a member of $Cn(\Gamma)$. (3.3) There are two statements S_i and S_j such that $S_i \in Cn(\Gamma_2)$ but the sentence “ S_i and S_j ” implies a contradiction. When (3.1) occurs the main set of premises Γ is almost never rejected in its entirety.

The Set Γ is often modified so that almost all of the finite set of previously verified consequences is retained, but S_i is not a consequence of the modified Γ . Please observe that since only a finite set of consequences is ever verifiable over any cosmic time interval, then it is almost always the case that the (3.1) situation can occur. We have simply not arrived at the particular S_i that forces this condition.

A vast amount of theoretical effort and huge monetary expenditures are incurred in attempts to correct the situation expressed by (3.2). Usually the premises Γ are consistently extended in some manner to a set Γ^1 (i.e. $\Gamma \subset \Gamma^1$) so that $S_j \in Cn(\Gamma)$. Scientists search for theories that are more general, that have “greater predictive power.” Let $F(\Gamma^1)$ be a finite set of consequences generated by a set of hypothesis Γ , such that each member of $F(\Gamma)$ has been verified and the set contains all statements that are of interest to the scientific community. There is a second method to correct the (3.2) situation. A set of premises Γ^1 is sought after such that $F(\Gamma) \subset Cn(\Gamma^1)$ and $S_j \in Cn(\Gamma^1)$. However, it need not be the case that $\Gamma \subset \Gamma^1$.

The final situation (3.3) is the most demanding of these various possibilities. When (3.3) occurs then since we always assume that the set of hypotheses is consistent and that we are following the Axiom of Natural Consistency, then it must follow that one or both of the statements S_i , S_j is not verifiable. However, the logical consistency of the two theories $Cn(\Gamma_1)$ and $Cn(\Gamma_2)$, the requirement for completeness and other considerations tend to demand that (3.3) be corrected. The simplest approach to this problem is to simply reject Γ_1 or Γ_2 . This is especially the case if the two finite sets $F(\Gamma_1)$ and $F(\Gamma_2)$ to be verified are equal. The more difficult approach is to modify Γ_1 and Γ_2 in order to obtain Γ_1^1 and Γ_2^1 , so that $F(\Gamma_1) \subset Cn(\Gamma_2^1)$, $F(\Gamma_2) \subset Cn(\Gamma_1^1)$ and either S_i or S_j is not a member of $Cn(\Gamma_1^1)$ nor of $Cn(\Gamma_2^1)$. Essentially this is what a “unified” set of premises Γ'' accomplishes. In general $\Gamma_1^1 \subset Cn(\Gamma'')$ and $\Gamma_2^1 \subset Cn(\Gamma'')$. More importantly since Γ'' is consistent then the implied contradiction cannot occur as a consequence of $Cn(\Gamma'')$.

These articles detail the construction and implied consequences of just such a unifying model. The *deductive-world model* appears to satisfy all of the qualities for a satisfactory unifying alternative that eliminates the various implied contradictions that have appeared recently throughout many other models for system development.

4. Scientific Speculation

The concept of verification is closely related to the expression *scientific speculation* or what was once called metaphysics. As long as we remain within the language $L(D)$ (or better L_1) scientific speculation can be specifically defined. Such speculation always occurs with respect to any Γ where only indirect verification is possible. For disciplines such as quantum theory and cosmology, Frank Wilczek gives us his description for such a mental process:

... the explanation of the cosmic asymmetry between matter and antimatter may seem more mythical than scientific. To an extent this is unavoidable, since the extreme conditions of the early universe cannot be reproduced in a laboratory. What distinguishes scientific speculation from myth is its logical consistency and the amenability of at least some of its elements to experimental test.¹⁹

Notice that Wilczek does not indicate how many verified implications would make the speculative theory accepted fact.

Assuming that we had actual knowledge of the conditions that existed within an "early" universe and that these conditions correspond to such things as a nearly infinite temperature or pressure, then an hypothesis composed of statements describing such conditions is not at present directly verifiable. Wilczek requires verification of *some* of the implications generated by such an hypothesis as it is coupled with descriptions for how natural systems such as electromagnetic radiation behave at the present epoch within our laboratories. Thus it must at least be technically feasible to verify some finite subset of the infinite set of implications produced by such an hypothesis. However, does a speculative theory become any less speculative even if some implications are indeed verified?

The only statements generated by the theory and that can be directly verified are statements that involve macroscopic objects. These include such statements as those that predict the behavior of pointers on gages, counters and differences that exist between those pictures or graphs generated by "received" electromagnetic radiation or assumed particles and those pictures or graphs generated within the laboratory. Indeed, only statements relative to devices that impinge directly upon human sensors are capable of verification.

Even though the deductive-world model is a first-order theory, from this sentence on, we no longer restrict our discussion to a first-order language. However, we do retain C_n as our notation for a logical operator and other concepts such as consistency and the like. Thus we discuss these concepts relative to the set-theoretic logic of Tarski.²⁰

For a given theory $C_n(\Gamma)$, let $VS(\Gamma)$ denote the set of all theory statements that have been directly verified as of the present time. Let $\Gamma_1, \Gamma_2, \dots, \Gamma_n$ denote discipline language hypotheses that generate the exact same directly verified statements as those generated by Γ . (Note: these hypotheses may come from different discipline languages.) Notationally this can be written as $VS(\Gamma) = VS(\Gamma_1) = VS(\Gamma_2) = \dots = VS(\Gamma_n)$. The theories $C_n(\Gamma_i)$, $i = 1, \dots, n$, are called *alternatives* to the theory $C_n(\Gamma)$. If such alternatives exist, then the answer to the above question on speculation is a resounding *no* since the tested set of statements $VS(\Gamma)$ cannot differentiate between these theories. Do such alternative theories exist? The literature is replete with numerous examples of such alternative theories. Let GT denote the General Theory of Relativity. In cosmology we have the steady-state theory which is now able to predict all of the $VS(GT)$.²¹ We also have the possibility that classical physics as discussed by Barnes can predict all of the $VS(GT)$ as well as consequences of quantum theory.²² It has been known for many years that a modified classical Newtonian theory is also capable of predicting all of the $VS(GT)$.²³ In quantum mechanics (QM) we have nonlocal hidden variable theory of Bohm that predicts all of the $VS(QM)$.²⁴ In quantum measure theory we have the Everett-Wheeler-Graham theory which predicts and improves upon all of the verified quantum measure theory statements. It will be shown in a future article in this series that the theory of subparticles not only generates any verifiable statement associated with the Special Theory of Relativity but generates the entire theory itself. Indeed, the deductive-world theory—the supermind—predicts *all* of the verified statements for *all*

scientific theories. (Note that $VS(\Gamma)$ is a subset of the "verifiable" statements.)

Since there are literally hundreds upon hundreds of alternative scientific theories that generate the same verified consequences as some of today's most popular theories, I believe that it is necessary to *technically* define scientific speculation in a narrow sense. For the remainder of this investigation, we use the Logic definition and technically define any statement $S \in \Gamma$ as speculation if it is not a member of $VS(\Gamma)$. Clearly this definition may make many modern scientific theories speculation. Notice that if $S \in VS(\Gamma)$ and we *assume* that the natural phenomenon being described by the theory $C_n(\Gamma)$ follows the logical patterns generated by C_n , then each member of $C_n(S)$ will be considered as "true in reality." Obviously it becomes more meaningful not to discuss speculative theories, in general, but rather to consider the speculative portion of such theories. Notationally we let $\Gamma - VS(\Gamma) = SP(\Gamma)$ denote the speculative portion of the hypothesis. We call the hypothesis Γ *speculation* or $C_n(\Gamma)$ a *speculative theory* etc., if $\Gamma - VS(\Gamma) = SP(\Gamma)$ is non-empty. Of course, if $S \in \Gamma$ appears to be only indirectly verifiable, then $C_n(\Gamma)$ is technically *speculation*, at least until this situation can be rectified—if ever.

What is it for indirectly verifiable theories that differentiates scientific speculation from *accepted fact*? With one notable exception the *personal* boundary between speculation and the *acceptance* of a theory as fact is often not an evidence-induction boundary, but rather it is a philosophical boundary dependent upon many personal traits and desires and even language tricks. Such acceptance has no relation to the scientific method. It is ultimately the responsibility of the reader of the various speculative statements generated by a theory to eliminate their speculative nature and to endow them with any degree of "truth" he chooses and for any personal reasons he desires. Notice that accepting an indirectly verified theory as fact is not the same thing as demonstrating by direct verification that each hypothesis is fact. Such theories are usually still (technically) speculation.

There is one unfortunate aspect of speculative theories (the notable exception) that does tend to force a scientist to accept a theory as "fact", at least for a while. If there does not exist an (philosophically?) acceptable alternative Γ^1 such that the set of tested statements is common to $C_n(\Gamma)$ and $C_n(\Gamma^1)$, then for motivational reasons, at least, some individuals insist that $C_n(\Gamma)$ is "absolute fact" even though no such statement as "absolute fact" can be established logically. History is replete with examples where prominent scientists have greatly embarrassed themselves by such an absolute acceptance of a theory as fact only to discover at a later date that certain verifiable implications were proved false or they have simply accepted a theory as fact since for political or philosophic reasons the majority of their colleagues have accepted a popular theory as fact. Even though there are specific rules within the canons of hypothesis and theory building that require a scientist to replace one theory with an alternative theory, there are often great political and economic forces that tend to prevent such a replacement. In today's political atmosphere the major method for alternative rejection is not based upon any scientific canons, but it is based upon philosophical or political ridicule. In these articles such methods will not be employed and only the basic canons of the scientific method relative to hypothesis and theory construction are used for acceptance (as a *working model*) or rejection of

any speculative theory. When these canons do not allow for such an acceptance or rejection, then the entire matter must be left to an individual's personal and reflective choice. Further, the elementary reasons for the acceptance of an alternative theory or hypothesis such as *simplicity* are relegated to the standard treatises.²⁵ Our concern in this present article is relative to other insidious and highly significant factors that have in recent times been arbitrarily introduced into theory building in an attempt to destroy the scientific validity of certain well-founded and highly meaningful yet, of course, speculative descriptions.

5. Proper Scientific Speculation

As pointed out in section two of this article ordinary scientific theories are not merely collections of statements written in a first-order language. Scientific theories generally contain an enormous collection of subsidiary descriptions that give the rules and methods that are to be allowed within a specific discipline. In recent times, some very clever and unfortunate "tricks" have been used to improperly limit scientific theory building. We delineate some examples.

With respect to the so-called theory of chemical evolution, we are told by John Farley that modern biologists and biochemists have generally accepted "the evolutionary viewpoint as expressed by Oparin."²⁶ He makes the following all conclusive statements part of his theory.

Engles shows that a consistent materialistic philosophy can follow a single path in the attempt to solve the problem of the origin of life. It must have, therefore, resulted from a long evolution of matter, its origin being merely one step on the course of its historical development.²⁷

Notice that such words as "only", and "must have" eliminate automatically all other possible theories from consideration. Thus Oparin has built into his "theory" a philosophical bias that is generally not allowed in scientific theory building. Simply recall that only a finite number of statements can be verified over a finite time span and that Oparin's theory of evolution is an inductively established theory. Moreover, as will be shown by means of the deductive-world model, there is an absolute alternative to the theory of the universal uniformity of nature (uniformitarianism) that immediately proves that those portions of uniformitarianism necessary for his theory are unverifiable (as should be obvious).

Harlow Shapley stated in 1961 that various theories for the sudden appearance of life forms are "irrational."²⁸ Once again an eminent scientist has interjected an unfounded word "irrational" into his theory of evolution. This clearly eliminates all such theories that imply such types of "sudden appearance."

We discussed in the first article in this series²⁹ how Bohr attempted to inject into the language of quantum theory an additional statement that automatically limited the languages that one can employ to investigate the microphysical world. It has been established that his attempt actually would yield an inconsistent quantum theory. However, it did have the effect, over a long period of time, of inhibiting scientific knowledge by preventing a deeper rational analysis of this invisible world.

In the very important article "The Evolution of the Universe", G. Gamow writes the following as his very first sentence.

The discovery of the red shift in the spectra of distant stellar galaxies revealed the important fact that our universe is in the state of uniform expansion, and raised an interesting question as to whether the present features of the universe could be understood as the result of its evolutionary development, which must have started a few thousand million years ago from a homogeneous state of extremely high density and temperature.³⁰

Notice that Gamow uses the word "fact" as well as "must" within his brief "scientific" description. Once again we have a "theory" that in its grammatical construction has introduced word-forms that automatically eliminate any alternative description. We further note that it is very common for Soviet-trained scientists to utilize these unfortunate language techniques.

All of the above examples illustrate how theories that claim to be "scientific" can be so constructed that they violate the rules for speculative theory writing. In order to avoid logical or linguistic errors, and to maintain the integrity of the scientific method it is strongly advised that individuals adhere to following two rules whenever they present their deduced conclusions. (4.1) No statement can be deduced from the hypothesis that specifically requires the rejection of any other rationally presented theory. (4.2) The rejection criteria for any scientific theory $C_n(I)$ must be based upon *general rules and procedures* that apply to *all* theories and these criteria must be stated in a metalanguage that is exterior to the language of the theory. (Note: these rules are obtained by intuitively applying the theory of logical types.) For above reasons the theories as presented by Bohr, Oparin, Shapley, Gamow and literally thousands of our modern day scientists such as Sagan are not scientific theories, but are scientific descriptions coupled with philosophic generalizations.

There are, of course, many terminological methods that yield proper word-forms while retaining a theory's speculative content. Changing such phrases as "important fact" to "important possibility" is but one example. However, the best approach seems to be the modern trend of utilizing the term "model" - a term that will be shortly but briefly discussed. Thus one could write that "within our model such and such occurs." Some individuals claim that "all scientists know that these are but speculative theories." Unfortunately they have not taught these facts to our children nor expressed them to the general public.

Two other greatly misunderstood terms have appeared throughout the scientific literature and especially in the popularizing books, movies and television. These terms are *chance* and *randomness*. For a relatively deep analysis I refer you to the Bohm's treatise,³¹ especially Chapter II, sections 11-14. In this article we touch upon the language aspects of these concepts. Even though these terms are concepts and as such would probably have more "meaning" than is finitely describable within any language,³² we examine a restricted, but practical view, the "operational" content of these two concepts.

First, it is proper to utilize these terms within a scientific theory, *if* the reader understands that their meaning is *relative*. This fact is amply demonstrated by Bohm when he introduces the notion of levels of "chance contingencies." These terms are related operationally to descriptions for "predictions" and for "causes." Within a theory language a *one-to-many causal statement* is a description

of how a *describable causal process*, as discussed in the first article in this series,³³ produces many (possibly infinitely many) describable events. Using a list of theory statements that has been accepted as general descriptions for systematic behavior (i.e. relations) between events, a set of such events is termed "statistically random" if it is accepted that they do not exhibit any of the listed systematic behaviors. Note that this does not mean that we cannot have statements that describe the behavior of aggregates. If using another list of theory statements describing causal processes, it is accepted that there is no causal statement within the list that has produced such a set of statistically random events, then the set of events is said to have been produced by a "random cause." There are many one-to-many causal statements that yield, in the above operational sense, sets of events that appear to be statistically random. For example, the phenomenon of Brownian motion has causal statements. One simply describes the entire experimental set up that yields this behavior and attributes the phenomenon to the effects of molecular motion and collisions.

Essentially, Bohm argues that random causes or statistical randomness is theory and, hence, language dependent and that in an extension of the theory a cause might be described, or predictive or systematic statements supplied. We will expand slightly upon Bohm's argument. Assume that an experiment leads to two mutually exclusive and describable events X and Y. Now there seems to be no acceptable statement within our theory that allows us to describe a systematic relation between these events. In order to "establish" that this might be the case we repeat the experiment a large number of times recording whether or not event X and Y occurs. Statistical tests lead us to accept that the events are binomial with probability of 0.5.

Mark Kac³⁴ has once again shown, what was once a well-known fact, that no matter what tests for statistical randomness are applied to the sequence of X and Y events that the exact same tests applied to a *determinate* sequence of X and Y events that is generated by taking the fractional part of the numbers expressed by the sequence $2^n x$, for an appropriate x, will "establish" that this systematically generated sequence of X and Y events is also binomial with probability of 0.5. What this signifies is that if a physical process is modelled by this determinate numerical process within an extended theory, then even though the events are predictable and thus highly systematic they will appear operationally within our original theory to be statistically random. In the next article in this series, where we discuss the concept of the "developmental paradigm", it will be proved that any description utilizing a "natural" scientific language for a sequence of observed events is not produced by a random cause and that the events are not statistically random when viewed from the extended theory we call the deductive-world model. Even though this last statement may appear difficult to comprehend, it displays properties of the mathematically generated supermind processes and certainly indicates how different these processes are from our own reflective methods.

In a large number of theories the philosophical concept of *absolute statistical randomness* or *absolute random causes* is incorrectly introduced. What this means is that there is no systematic behavior, describable or not, between the events or no causal process, describable or not, for their production, respectively. What the introduction of these two absolute concepts does is to once

again limit the languages that the scientist can use to discuss alternative theories. Consequently, properly stated scientific theories can employ these concepts of randomness within the theory language, but they cannot utilize the philosophically based concepts of absolute randomness.

6. Uniformity of Nature

As first pointed out in 1843 by the codifier of the scientific method—John Mill—there is an underlying assumption that permeates all of our scientific investigations. In order to apply the basic principle of induction some doctrine of the "uniformity of nature" must be *presupposed*. As Mill states this doctrine, "there are such things in nature as parallel cases, that what happens once, will, under a sufficient degree of similarity of circumstances, happen again."³⁵ Mill also stated, however, that the principle should not be applied except in a spacially local sense. Mill's induction only allows for full generalization in the time coordinate. Indeed, this requirement for Mill's induction is with respect to cosmic time. Mill's induction can be modelled as follows: let $S_i \in Cn(\Gamma)$ and V_i be a verification process for S_i . Over a space-time interval $S \times C$ where:

$$(6.1) S = \{(x, y, z) | a \leq x \leq b, c \leq y \leq d, f \leq z \leq h\} \text{ and } C = \{t | t_1 \leq t \leq t_2\}, a \neq b, c \neq d, f \neq h, t_1 \neq t_2 \text{ and } a, b, c, d, f, h, t_1, t_2 \text{ are real numbers,}$$

individuals replicate the verification process V_i for finitely many ordered triples in S and for a finite increasing sequence of cosmic time $t_1 < t_2 < \dots < t_n$. If for these n distinct space-time points $V_i(S_i) = T$, then Mill induction generalizes over $S \times C^1$, where C^1 is all of cosmic time. This type of generalization then assumes that due to the "uniformity of nature" $V_i(S_i) = T$ for each $(x, y, z, t) \in S \times C^1$. Consequently, we do have a restricted form for the doctrine of the uniformity of nature. Certain *apparently* time and space independent natural science statements or statements that include an explicit space-time alteration process are singled out by this induction process and are called "first principles" or "laws of nature." These so-called laws of nature are, of course, only humanly constructed descriptions for humanly comprehensible phenomena.

With regard to the uniformity of nature, modern science often takes yet another leap of faith and extends the induction-generalization process not just to all of cosmic time but to all of space as well. This is the pure assumption of the *universal uniformity of nature* (uniformitarianism)—an unstated assumption made by many of the individuals that deal with long term developing natural systems. Such systems occur in astronomy, cosmology, micro and macro evolution, anthropology, among many others. It is self-evident that to have a natural science one needs to assume a local doctrine of the uniformity of nature where we generalize over $S \times C$ only. Later in this series of articles, it will be shown analytically, that no doctrine on the uniformity of nature is directly or indirectly verifiable. The doctrine is not even speculation in our restricted sense. Such a doctrine must be accepted purely on "faith" as an *a priori* principle. In these articles, only local uniformity employing a natural science language, will be accepted; but, notice that this is a weaker (unverifiable) principle since both the universal and Mill uniformity of nature imply local uniformity but *not* conversely.

7. A Major Controversy

We are now able to analytically expose one of today's major controversies relative to scientific theories. Let $Cn(T)$ be a theistic theory based upon certain theistic hypotheses T . A proper speculative scientific theory $Cn(I)$ when combined with $Cn(T)$ (which we notationally write as $Cn(I) \cup Cn(T)$) can lead to an *inconsistent* collection of statements. Usually this occurs, when a statement $S \in Cn(I)$ is the negative of a statement $S_1 \in Cn(T)$. This yields the contradiction " S_1 and not S_1 ." There are certain theories that have been termed as "creation science" theories that when combined with certain theistic theories *do not* lead to a contradiction, while many of the improperly stated scientific theories not only eliminate alternative theories improperly but also yield contradictions when combined with specific or, indeed, any theistic theory. A properly constituted speculative "creation science" theory $Cn(I)$ may not only yield the exact same verified statements of some popular theory $Cn(P)$, that contradicts a theistic theory $Cn(T)$, but $Cn(I)$ may also yield all of the popular theories, verifiable statements. Moreover, it is certainly possible that the set $VS(I)$ contains more verified statements than the set $VS(P)$, in which case $Cn(I)$ would meet one of the important criteria for theory acceptance.

Thus even though $Cn(I)$ may be more technically acceptable as a working model than is $Cn(P)$ your actual acceptance or rejection is purely a personal and experimental or philosophical matter. Unless we exist in an absolute scientific dictatorship then there can be no rational scientific reason for not allowing individuals upon personal reflection to decide for themselves whether or not to accept $Cn(I)$, at least as a working model. The fact that it does not contradict some theistic hypothesis T , exterior to $Cn(I)$, is not relative to the theory's scientific merit. The only obvious reasons for refusing to present $Cn(I)$ as a viable theory is an attempt to restrict both financially and educationally all speculative theories to those that *do* contradict certain theistic concepts since these noncontradictory creation science theories would tend to yield indirect proof for the theistic theories. I shall leave it to the reader's imagination as to a possible source of this most irrational trend.

Further, there is one more interesting aspect of this controversy. Many theistic theories contain portions of the language used in the natural sciences. It may be the case that many statements within $Cn(I)$ correspond exactly to the natural science statements in $Cn(T)$ including all of the verifiable $Cn(T)$ statements. Since we are assuming that both $Cn(I)$ and $Cn(T)$ are speculative theories then this may appear to *force one* to accept $Cn(T)$ as well as $Cn(I)$. That this is not the case should be self-evident. In my personal opinion individuals should spend a great amount of effort in study and contemplation, and bring to bear their personal experiences and, indeed, actual physical manifestations before they reject or accept something that is so vastly important as a theistic theory. It is the responsibility of scientists not to influence an individual's efforts by interjecting false scientific claims, and not to utilize the erroneous methods that are outlined within this article.

8. Model

The term "model" is extensively used throughout the scientific literature in a variety of contexts. We have

such concepts as *the physical model, the analogue model, the conceptual model, concrete models, mathematical models, abstract models*, and many others. In a previous article, which the reader may wish to consult, I discuss the ideas of the analogue and conceptual models in some depth³⁶ and will not do so within this discussion. Further, the mathematical concepts of the concrete and abstract model have little relation to our present investigation.

A *physical model* was originally conceived of as any actual construction, picture, drawing, diagram or written description employing physically meaningful constructions, objects, terms, and the like that only *represented* or *mirrored the behavior* of another distinctly different and sometimes unknown natural system. It is significant to note that the physical model is a *concept* and as such includes within its "meaning" many unindicated deductions that depend strongly upon an individual's experience, knowledge and intuition. The concept that the model is attempting to convey is much deeper than the mere representation itself, if the viewer has an appropriate amount of experience.

Originally the most important aspect of model construction was the fact that it only represented the behavior of some other physical concept. It was not assumed to correlate in meaning directly to the objects being represented. As a prototype simply consider the Newtonian gas cloud that is often used as a model for the expanding universe.³⁷ Each element of the gas is representative of an entire galaxy of stars. However, for many physical models this is not how they are now perceived. They have lost their purely behavioral content and have taken on the more specific meaning of a speculative theory. That is to say that the constructions, pictures, diagrams and written terms are now assumed to correlate directly to "real" objects, events or phenomena, where these methods only mirrored behavior originally. As a prototype of this contextual change we consider the "quark model."

As of 1969, the quark model had progressed from a purely mathematical context within group theory to a very weak physical model. "In the quark model quarks are not viewed as mere mathematical objects but as capable of somehow being realized in nature. We do not know how."³⁸ As of 1980, through a vast amount of imaginary and expensive effort the model had changed its character into a full speculative theory.³⁹ Since that time the realists have taken over and we are now told that "... the reality of quarks as the *fundamental* constituents of hadronic matter has been established beyond doubt."⁴⁰

As we have previously pointed out since this is an indirectly verifiable theory only, then this last statement is untrue. Moreover, as will be established in the next article in this series, an alternative theory rationally displays a more fundamental character of hadronic matter and, indeed, all matter. There is a portion of the descriptive deductive-world model termed the "supermind" portion that can generate deterministically all of the macroscopic effects predicted by the quark model. A deeper analysis rationally shows that within this submodel there are objects called "superworlds" that are part of the D-world mechanism for such a generation. However, when the superworlds are analyzed it is discovered that they contain objects that can be *generally* modeled by various humanly comprehensible processes but that there can be *no* humanly comprehensible models of any type that could allow for any *specific* knowledge as to either

their content or the mechanisms by which these objects came into being. These facts can be extended to show that there also must be an absolute lack of some humanly comprehensible information as to how any fundamental material system is produced. On the other hand, such information is not lacking within the D-world.

From the above discussion, it should be self-evident that physical models often become *extended* physical theories. However, a certain portion of such theories is usually not specifically expressed in some written form but, as it is claimed, is within the imagination of the viewer, who through education and experience has developed a special intuition that allows for conclusions being deduced without the need for an *immediately clear* rational argument.

Finally, as with the quark model, it often occurs that individuals become so overwhelmed by the predictability of their speculative model that for some personal or philosophical reason they now claim that what was only designed to mirror behavior and have no other relation to reality is now a "true and faithful" representation for reality. I do not hold that such philosophical procedures are incorrect, only that they should be specifically identified as such.

It is unfortunate, but a verifiable fact, that many of today's most outspoken scientists do not have even the most rudimentary knowledge of how mathematics is applied to various scientific disciplines. This is especially the case when applied mathematical modeling is discussed. For this reason it is absolutely necessary that I give a brief yet accurate overview of these general procedures as illustrated by two significant prototypes.

First and foremost I cannot emphasize strongly enough that an (applied) *strong mathematical model* for the basic logical workings of a discipline theory is NOT an abstract mathematical object. Such strong models should always be based upon well established experimentally verified or self-evident statements dealing with real and actual events.

Quantum theory has such a strong mathematical model. The actual and real events are the methods and difficulties actually observed in measuring various properties of the macrophysical world. It is observed that the processes by which human beings are forced to measure particular macroscopic properties will alter some of these macroscopic properties and even alter the measuring apparatus itself. Under certain circumstances, no alteration appears to take place in the property being measured during the measuring process. These observations are then impressed upon the microphysical world and lead to the *law of simple observation*. Other observed requirements for human measurement lead to the *law of complex observation* and the concept of *compatible* and *incompatible* observations. These may not be general laws of nature, but they are laws of *human* nature and the processes by which human beings measure quantities. These "laws" are expressible in a discipline language L_1 first and not in a mathematical formalism.

Now it is discovered through a simple first-order discipline language argument (not a mathematical argument) that the law of simple observation behaves exactly like an "idempotent operator." If this law is abbreviated by a single symbol Y , then this observation can be expressed in the form $Y^2 = Y$. If this same abbreviation process is applied to the law of complex observation, compatible and incompatible observations, then it is discovered that

in abbreviated form these laws behave like mathematical operators.

The term "idempotent operator" is an abstract mathematical notation that utilizes a mathematical discipline language and is probably not, as yet, a member of L_1 . From this brief discussion it certainly appears possible to *correspond* these laws of observation to objects within an abstract mathematical structure. The structure selected is called a *separable Hilbert space* and has its own discipline language—its technical language. Other correspondences are made between terms in L_1 or more likely terms added to L_1 and this structure. The expression "state" corresponds to a vector or operator. By this approach a strong mathematical model is constructed in such a manner that numerous expressions in the discipline language correspond to what were abstract objects within the mathematical theory. Moreover, there are also techniques for incorporating the actual numerical measurements that one can probably expect from such observations within this strong mathematical model. It is especially important to realize that with respect to such strong mathematical models, many of the abstract terms within the mathematical theory are not utilized but are replaced by concrete and specific expressions within L_1 . On the other hand, some of the abstract terms may be included within L_1 especially if they are common to both L_1 and the mathematical language. For example, the abstract terms vector, line, path, point, surface and the like now become concrete expressions within L_1 . Sometimes you only know that you are working within the abstract structure or the strong model by the context.

It is not the purpose of this article to discuss the torturous, exhausting and, yet highly creative back-and-forth methods that produce this correspondence that logically links the discipline language physical description with such a mathematical structure.⁴¹

Simply notice that including the laws of measurement within a theory $Cn(I)$ we have now made a fragment of a mathematical theory $M_1 \subset Cn(I)$. It is a basic property of human deduction that $Cn(M_1) \subset Cn(I)$. Now the theory $Cn(M_1)$ may not generate any significant concepts.

For example, simply because we have sums of "state" vectors does not mean that we have introduced enough of the mathematical structure in order to discuss convergence. Thus the model constructor adds other simple mathematical concepts to M_1 in order to yield a meaningful theory. Unfortunately it is often the case that if M is an extension of M_1 (or even the same as M_1), then $Cn(M) \not\subset Cn(I)$. Two methods are utilized to "correct" this situation. The first method uses a restriction technique where only a certain $A \subset Cn(M)$ is used as a "mathematical basis" for $Cn(I)$ (i.e. $A \subset Cn(I)$). For example, rejecting "on physical grounds" certain negative measures that are generated by differential equation models. On the other hand, $Cn(M)$ is often made into a translated subset of the discipline theory in the obvious manner by assuming that all terms in $Cn(M)$ are related to discipline language expressions. Moreover it is always necessary to let some terms or expressions in $Cn(M)$ correlate to actual observable phenomena or empirical operations. For the purposes of this second method certain statements are often added to $Cn(I)$ in order to "interpret" many members of $Cn(M)$ that were not previously assigned a physical language term. Coupled with these two methods we have the fact that a vast amount of the actual logical arguments that yield members of $Cn(I)$ from finite subsets

of $Cn(\Gamma)$ do not use members of $Cn(M)$ at all. Thus even though it is claimed that such theories as $Cn(\Gamma)$ are "mathematical" in character and, hence, the logical conclusions follow the most rigorous procedure known to the human being, in actuality this is not the case. The arguments are based upon members of $Cn(\Gamma) - Cn(M)$. It is because of the actual methods used to argue for certain conclusions that many of these "mathematical based" physical theories or models generate controversy and paradoxes. Some of these controversies will be examined in later articles. Of course, we are always left with a basic question. Do these interpretations correspond to reality or are they simply imaginary concepts that aid human comprehension?

The process utilized to construct the deductive-world model (i.e. the D-world model or NSP-world model) is entirely similar to the methods used to construct all such mathematically based models as outlined above except that the model is based directly upon real and actual properties that have been observed trillions upon trillions of times for at least 2300 years and is more strongly related to a discipline language than other theories. The discipline theory is the theory of how human beings must communicate their ideas. The discipline theory is called Logic and portions of it were apparently first formulated by Aristotle who also apparently described the concept of the developing natural system.⁴² It is evident that all scientists must follow the specific rules required for such logical communication.

In 1847, G. Boole discovered that some of the rules for logical communication correspond to a mathematical structure that we now call a Boolean ring. With this discovery the formal discipline of *mathematical logic* was born.⁴³ The same type of terminology exchange is made between the objects in Logic and the abstract mathematical entities. For example, in one portion of the D-world construction a single English word corresponds to a "finite equivalence class of partial sequences of natural numbers" and other portions of a mathematical structure called a superstructure correspond to logical operators — the logical rules all human beings must apply to be classified as "rational." Other portions of the D-world model correspond to the 2200 year old mental process known as *infinitesimal reasoning*⁴⁴ and since the back-and-forth modelling process is still continuing at this writing other future correspondences should be expected. Consequently, the D-world model is a strong mathematical model and, as such, a portion predicts these real describable mental processes that have been continually observed and discussed at least since Aristotle. The interpretations are such that contradictions do not occur, assuming that the mathematics is consistent, since many of the defined concepts are defined by the mathematics itself. It uses a discipline theory language and is, thus, a concrete rational extension of our most common everyday experience. In the next article in this series we investigate the "logic behind" the development of a natural system and specifically show that this logic is operationally obtained from the supermind portion of the deductive-world model.

References

1. Bondi, H. 1952. *Cosmology*. Cambridge University Press, Cambridge, p.71.
2. Shale, D. 1979. On geometric ideas which lie at the foundation of quantum theory. *Advances in Mathematics* 32:175 - 203.
3. Herrmann, R. A. 1983. Universal event numbers. I.M.P. Press, P.O. Box 3410, Annapolis, MD 21403.
4. Herrmann, R. A. 1982. The miraculous model. Monograph 100. I.M.P. Press, Annapolis, MD.
5. March, A. and I. M. Freeman, 1963. The new world of physics. Vintage Books, New York, p. 143.
6. Torrance, T. F. 1969. Theological science. Oxford University Press, Oxford, pp. vi-vii.
7. Herrmann, R. A. 1983. Mathematical philosophy and developmental processes. *Nature and System* 5(1/2):17-36. See p. 20.
8. Herrmann, R. A. 1982. The reasonableness of metaphysical evidence. *Journal of the American Scientific Affiliation* 34(1):17-23.
9. See any elementary text in mathematical logic that includes the translations from ordinary languages such as Kleene, Stephen, 1967. *Mathematical logic*. John Wiley & Sons, New York, pp. 134-146.
10. The metalogic may be intuitively expressed in a metalanguage, but the rules applied are not usually stated explicitly.
11. d'Espagnet, B. 1979. The quantum theory and reality. *Scientific American* 241(5):158-181. "Realism can be stated formally as the belief that a mere description of data is not all that should be required of a theory... The mind demands something more... at least objective explanations of observed regularities or in words causes." See p. 177.
12. For an elementary discussion of such matters see Wilder, Raymond, 1967. *Introduction to the foundations of mathematics*. John Wiley & Sons, New York.
13. Cohen, M. R. and E. Nagel. 1934. *An introduction to logic and scientific method*. Harcourt, Brace and Co., New York, p. 207.
14. Temple, G. 1951. *The general principles of quantum theory*. Methuen's monographs on physical subjects. Methuen & Co., London, p. 23.
15. Evans, R. D. 1955. *The atomic nucleus*. McGraw-Hill, New York, p. 541.
16. Cohn & Nagel, Op. Cit. p. 393.
17. *Ibid*.
18. In general one of the most trivial examples of this is the following: let P and Q be any two false propositions. Then "If P, then Q" $Cn(Q)$. However, the statement "If P, then Q." is a true statement.
19. Wilczek, F. 1980. The cosmic asymmetry between matter and antimatter. *Scientific American* 243(6): 82 -90. See p. 89.
20. Tarski. A. 1956. *Logic, semantics, metamathematics* (papers from 1923-1938). Oxford University Press, Oxford.
21. Devendran, T. 1982. Gegen Fred Hoyle gibt es keine Siege. *Bild der Wissenschaft*, 1982(1):49 - 54.
22. Barnes, T.G. 1984. A unified theory of physics. *Creation Research Society Quarterly* 21:56-62.
23. Bonner, W. B. 1970. *Status of General Relativity*. Francis Hodson, London, p.3. Other possibilities have been advanced for the background radiation such as interstellar dust and they predict approximately the same results. (See *Nature* 218:1124, 1126.)
24. Bohm, D. 1952. A suggested interpretation of the quantum theory in terms of "hidden" variables. *Physical Review* 85:180-193.
25. Cohn & Nagel. Op. Cit.
26. Farley, J. 1977. The spontaneous generation controversy from Descartes to Oparin. The Johns Hopkins University Press, Baltimore, p. 187.
27. Oparin, A. I. 1953. *The origin of life*. Dover, New York, p. 33.
28. *Ibid*. See Forward.
29. Herrmann, R. A. 1985. Subparticles and realism in quantum theories. *Creation Research Society Quarterly* 22:84-89.
30. Gamow, G. 1948. The evolution of the universe. *Nature* 162:680-682. See p. 680.
31. Bohm, D. 1957. *Causality and chance in modern physics*. Harper Torchbooks/The Science Library, Harper & Brothers, New York.
32. Herrmann 1982 (Reference 4), where concepts are modelled by means of describing sets.

33. Herrmann 1985 *Op. Cit.*
34. Kac, M. 1983. Marginalia: What is random? *American Scientist* 71:405-406.
35. Mill, J. S. 1843. A system of logic. Book III. Collected works of John Stuart Mill, Vol. VII. University of Toronto Press, p. 306.
36. Reference 7.
37. Sciama, D. W. 1971. Modern cosmology, Cambridge University Press, Cambridge, p. 101.
38. Kokkedee, J.J.J. 1969. The quark model. W.A. Benjamin, New York, p. 12.
39. See many of the more recent articles in *Scientific American*. For example see, 1980. Particles and fields, W.H. Freeman, San Francisco and 't Hooft, G. 1980. Gauge theories of the forces between elementary particles. *Scientific American* 242(6):104-137.
40. Appelquist, J., M. K. Gaillard and J.D. Jackson, 1984. Physics at the superconducting supercollider. *American Scientist* 72(2):151-155. See p. 153.
41. Herrmann 1983 (Reference 7), p. 23.
42. See De Mundo in The basic works of Aristotle, 1931. Vol. III. Oxford University Press, Oxford.
43. Boole, G. 1847. The mathematical analysis of logic, being an essay toward a calculus of deductive reasoning. Reprinted 1948 by Basil Blackwell, Oxford and Philosophy Press, New York.
44. Herrmann 1983 (Reference 7), See the entire section 3.

MINUTES OF 1985 BOARD OF DIRECTORS MEETING

A meeting of the Executive Committee was held Thursday evening at Howard Johnson's Motor Lodge, Ann Arbor, Michigan. On Friday, 12 April, between the hours of 0800 and 1600, the Research, Quarterly, Publishing, Constitution and Financial Committees held meetings, each lasting about two hours. In each committee an appointed secretary recorded the discussions in preparation for the Saturday plenary session.

The official annual meeting of the board was opened at 1900 hours by President Rusch in Room 102 of the Science Building at Concordia College, Ann Arbor, Michigan. Present: D. Boylan, W. Frair, G. Howe, D. Kaufmann, R. Korthals, J. Meyer, G. Mulfinger, W. Rusch, N. Smith, E. Williams, G. Wolfrom. Absent: H. Armstrong (deceased), C. Burdick, D. Gish, J. Klotz, J. Moore, H. Slusher, P. Zimmerman. Also present were 18 visitors. The president welcomed everybody to this the beginning of the twenty-second year of the Creation Research Society; and he called for silent prayer, particularly requesting that the Armstrong family be remembered.

The president introduced Dr. David Schmiel, president of the host college. Dr. Schmiel expressed a welcome and then talked about the program of Concordia College, particularly their training of students.

Minutes of the 1984 Board of Directors meeting were read. The secretary reported that the following had been elected for a three-year term on the board: John W. Klotz, Richard G. Korthals, Wilbert H. Rusch, Harold S. Slusher, E. Norbert Smith, Glen W. Wolfrom. The election report was accepted.

The treasurer's report from Korthals indicated that the 1984-1985 total income was \$69,938.90 and total expenditures \$53,826.49. Total cash assets of the Society equal \$149,127.64. The laboratory fund has increased from \$116,568.09 to \$137,454.92. During the past year those who received life memberships paid \$3,250 into the special endowment fund. This was Korthal's last treasurer's report because he is retiring after 16 years of faithful service in this office.

President Rusch, who was treasurer from 1963-1969 and has been membership secretary from 1963 to the present, introduced Glen Wolfrom as the new membership secretary. Then Rusch indicated that the total memberships and subscriptions were down by about 130 from last year.

Vice-president Howe was introduced and he reported that the new Research Committee chairman is John Meyer. He and Meyer spent time during the summer of 1984 at the Grand Canyon Experiment Station (G.C.E.S.). They fenced the property and laid out 5-meter-square quadrats in preparation for a systematic study of the biota. He reported that the cost for drilling the 80-foot

well was \$1,200. There appears to be 40 feet of water, and plastic piping has been used. Then Meyer gave a slide-illustrated presentation regarding the desert pupfish (*Cyprinodon*) and the tassel-eared (Kaibab) squirrel, *Sciurus aberti*. Williams gave details regarding a Grand Canyon Hakatai shale sample which had been treated for examination with the electron microscope, particularly to check for the presence of pollen grains. Research with the shale is continuing. There were a number of questions from the audience.

The president expressed the gratitude of the C.R.S. to Mr. David Golisch and others who were visiting from the Southeastern Michigan Creation Science Association (formerly the Detroit Creation Science Association). Mr. Golisch then spoke briefly to the audience expressing his appreciation for the work of the C.R.S. The meeting was adjourned at 2030 hours for refreshments provided by the Creation Science Association.

The meeting was reconvened at 2045. Mulfinger gave a report about C.R.S. books indicating that the following sales were made during 1984-1985: *Why Not Creation?*, 73; *Variation and Fixity in Nature*, 106; *Thermodynamics and the Development of Order*, 134; *The Moon*, 11; *Decade of Creation Research*, 3; *Time Upside Down*, 24; *Design and Origins in Astronomy*, 290; *The Argument*, 95. In this year the money taken in from the sale of books doubled from last year; and it is hoped that at this rate book sales will produce an increased income which will be above costs. Publication of some other monographs is anticipated.

Then Williams gave a tribute to past Editor Armstrong for his service to the Society. Williams indicated that the past year's quarterly, volume 21, contained 216 pages, which is a slight reduction from last year. There have been a number of invited papers. Norbert Smith will be taking over the "Panorama"; and John Moore has been writing the Education Column, which is expected to appeal to teachers. These two features should be of particular general interest in addition to the more scholarly papers. The content of volume 21 was divided as follows:

	Pages	Percent (%)
Biological Science	34.5	16.0
Physical Science	36.5	16.9
Earth Science	62.0	28.7
Philosophy of Science	10.5	4.9
Biography	15.5	7.2
Book reviews	16.5	7.6
Cover, Ads, CRS business	32.0	14.8
Quotes	8.5	3.9

Further, Williams indicated that volume 21 contained 121 pages of literature review (library research), 9 pages of trip report, and 25 pages of field, laboratory, and theoretical research. It was pointed out that the quarterlies serve as a source of information for many people, including the approximately 50 other creationist organizations. Therefore, the Society probably should have much wider financial support than it does.

The president then discussed the C.R.S. high school textbook which he represented as something of a millstone around the neck of the Society at the present time, because at the end of 1984 George Mott indicated that his company was not publishing any more textbooks. So work on the manuscript has stopped. Much of it already has been put on computer disks. In the light of the current political situation, there is a question whether the Society should go ahead with the publication of this text for the public schools. It does seem clear to the Society that teachers in Christian and public schools are not being prepared adequately to cope with much of the evolutionary propaganda. Preparation of video tapes should be considered. After discussion of this issue, the meeting was adjourned at 2145 hours.

On 13 April the closed meeting was called to order by President Rusch at 0835. Present: D. Boylan, W. Frair, D. Gish, G. Howe, D. Kaufmann, R. Korthals, J. Meyer, G. Mulfinger, W. Rusch, N. Smith, E. Williams, G. Wolfrom, P. Zimmerman. Absent: H. Armstrong, C. Burdick, J. Klotz, J. Moore, H. Slusher. The minutes of 1984 were adopted and the secretary's report and membership report were received.

The Research Committee reported that the \$12,000 unencumbered interest came down to \$8,000 and the contributions to the laboratory fund were down from approximately \$26,000 to \$15,000 for this year. So concern should be given to the matter of increasing contributions to the Society.

Research is progressing on Grand Canyon pollen studies, the tassel-eared squirrel, pupfish and the flora at the G.C.E.S. Howe has been studying grasses on the plot and has hired a consultant for \$300. A motion was passed that Howe be granted leave from the Board for one year so he can be on contract from 29 April 1985 through 29 April 1986 for directing research at the G.C.E.S.

There was discussion on insurance for members and workers of the Society and Williams was assigned the responsibility for contacting Wendell Bird regarding protection for all workers at C.R.S. research facilities.

For the Quarterly Committee Williams distributed his editorial policy as shown below. A motion was passed that the eight criteria be accepted. A motion was passed that there be a revision of Article II, Section 3, of the bylaws indicating a five-year limit for the quarterly editor who may not succeed himself.

Norbert Smith has been appointed as editor-elect. Smith stated that he needs help in obtaining material for *Panorama of Science*, particularly that which deals with design in nature and obvious enigmas in evolution. Editor Williams indicated his need for more cover illustrations which should be sent to him.

Mulfinger reported for the Publishing Committee. For promoting *The Argument* Kaufmann agreed to work with Concordia Publishing House, investigating possibilities of their listing *The Argument* in their catalog and their taking on consignment some copies of this book for the

C.R.S. Recommendation was made that *The Argument* be mailed to science departments to promote its use as a text. Names of those who are likely to adopt the book should be given to Kaufmann if it is felt that they should receive a free copy. A motion was passed that the Society not continue working on the Bergman manuscript any further.

Future publications could include a work dealing with homology and design in nature. Also publication on Darwin's last hours, which would be a booklet reprinting the three quarterly articles, was discussed. A motion was passed that Howe and Rusch in cooperation with Klotz will put together the trilogy.

After discussion of a new C.R.S. promotional flyer, a motion was passed that the Society's brochure be updated. Mulfinger suggested distribution of this pamphlet in our classes. Further, it was suggested by Smith that color and slick paper be utilized. Meyer volunteered to update the folder and the board accepted his offer.

The new Article II of the constitution (copy attached) was adopted.

There was discussion regarding a reduction of the size of the Board of Directors in order to decrease expenses and allow more flexibility. It was felt that a board with 12-18 members would be ideal. A reduction from the present 18 would be permitted only when there are vacancies. This was passed by vote. The necessary revision of Article II, Section 1 of the bylaws will be published in the quarterly for a final vote of the board next year. There is no change in the requirements for board membership as indicated in the minutes of 1978, page 6.

The meeting was adjourned at 1130 hours.

The meeting was called to order at 1235 hours, and it was decided that the current constitution and bylaws should have wording changed to remove the sexual connotations, for instance, "men" changed to "men and women".

A motion was passed to renominate board members whose terms would expire this year, namely: David R. Boylan, Duane T. Gish, David A. Kaufmann, Emmett L. Williams, Paul A. Zimmerman. Also it was passed that the vacancy left by Harold Armstrong should be filled, and Dr. Donald B. DeYoung was nominated by Williams for this position on the ballot.

For nominations and election of the president, Rusch turned the chair over to Vice-president Howe; and Rusch being unopposed was reelected. He resumed the chair and the following candidates were elected by unanimous vote without opposition: Vice-president, Frair; Secretary, Kaufmann, Treasurer, Klotz; Membership Secretary, Wolfrom; Editor-elect, Smith.

There was a discussion regarding the question of whether the officers should be in for longer than one-year periods and also whether the standing committees should retain the same membership from year to year.

The motion was made and passed that both Klotz and Wolfrom individually are authorized to sign checks on financial accounts of the C.R.S.

Korthals suggested an Auditing Committee for checking C.R.S. records; and a motion was passed that Zimmerman be asked to serve as the official auditor of the C.R.S. records annually starting in 1985.

A motion was passed that the 1986 Board of Directors meeting be held 17-19 April at Howard Johnson's Motor

Lodge and at Concordia College in Ann Arbor, MI. The meeting was adjourned at 1330 hours.

Wayne Frair, Secretary

The following candidates have been nominated to the Board of Directors to serve beginning in 1986:

David R. Boylan
Donald B. DeYoung
Duane T. Gish
David A. Kaufmann
Emmett L. Williams
Paul A. Zimmerman

CHANGES IN THE CONSTITUTION

Article III - Membership and Associated Categories

Section 1. No change.

Section 2. Membership in the Creation Research Society shall be in one of the following categories:

a. Voting: persons with an earned degree in a recognized field of natural or applied science at the Master's or Doctor's level.

b. Sustaining: persons who are interested in the work of the Society but who do not choose to be voting members and/or who do not have a Master's or Doctor's degree in some field of natural or applied science. Sustaining Members have all rights and privileges except those of voting and holding office.

c. Life: voting or sustaining members who have made a single gift in amount designated by the Board of Directors to the Creation Research Society Endowment Fund. Life members are exempt from the payment of further annual dues.

d. Senior: voting and sustaining members who have reached the age of 65. Senior members are entitled to membership at a reduced membership fee.

e. Student: persons matriculated in high school or college as undergraduates who want to participate in the work of the Society. Student members are not entitled to vote or hold office but are entitled to a reduced membership fee.

Section 3. Other Categories:

a. Fellow: persons elected by the Board of Directors at an annual meeting by ballot vote on the basis of their scholarship and/or service to the Society. To be designated as a fellow an individual must receive a favorable vote of 2/3 of the members of the Board of Directors.

b. Subscriber: persons, schools, churches or organizations interested in the literature of the Society and its activities but not interested in or qualified for membership categories.

Section 4. Previously numbered Section 3. No change.

Proposed Amendment of Article II of the Bylaws

The following amendment will be voted on at the 1986 meeting of the Board of Directors.

Article II

Present:

Section 1. The Board of Directors shall consist of 18 members.

Section 2. No individual shall be elected to the Board of Directors who is past his 75th birthday. Board members who do not qualify for reelection under this section shall serve as Board members emeriti and may attend Board meetings but at their own expense and without vote.

Section 3. The Board of Directors shall appoint the Editor of the Society's Quarterly. He shall serve for a period of three years and may be reappointed.

Proposed:

Section 1. The Board of Directors shall consist of 12-18 members, the number to be decided at each annual meeting. Diminishing the size of the Board is to be effected by not filling vacancies.

Section 2. No change.

Section 3. The Board of Directors shall appoint the Editor of the Society's Quarterly. The Editor shall serve for a period of five years and may not accept two consecutive terms.

Creation Research Society Editorial Policy

A. Basic Acceptance Criteria for Technical Quarterly Articles

1. Any article in which scientific macroevolution, theistic evolution, progressive creation, or the gap theory are espoused shall be rejected by the editor.

2. Any article in which there is an attack on the inerrancy of the Bible or in which questions are raised concerning the historical or scientific truth of the original autographs shall be rejected by the editor.

3. Any article in which the account of origins in Genesis is challenged as factual presentation of simple historical truth shall be rejected by the editor.

4. Any article in which there is a rejection of the view that all basic types of living things were made by direct creative acts of God during the Creation Week shall be rejected by the editor.

5. An article in which any biological changes (other than changes within the original created kinds) are accepted as occurring since the Creation Week, shall be rejected by the editor.

6. Any article in which the Noachian Flood (as an historical event worldwide in its extent and effect) is attacked shall be rejected by the editor.

7. Any article in which there is a challenge against the need of an individual to accept the Lord Jesus Christ as one's personal Savior shall be rejected by the editor.

8. Any article in which questions are raised concerning the fall of man into sin shall be rejected by the editor.

B. Basic Acceptance Criteria for Other Sections of the Quarterly

1. The Panorama of Science section in the Quarterly shall contain technical notes. These notes are subject to the same editorial criteria as technical articles (items 1-8).

2. Book Reviews are subject to the same editorial criteria as technical articles (items 1-8).

3. Letters to the Editor may express any opinion and may be published at the editor's discretion.

4. If an article, technical note, or book review contains significant scientific information that would be of value in the Quarterly and contains objectionable material not acceptable by criteria 1-8 listed above, and the author agrees to remove the objectionable material, then the article can be considered for publication.

C. Editorial Requirements

1. Technical articles for the Quarterly shall be limited to approximately 10 Quarterly pages. Articles of greater length shall be serialized.

2. All technical articles and technical notes will be reviewed before publication by at least two referees competent in the subject matter contained in the manuscript. The editor is required to obtain such technical referee opinion.

3. All figures and drawings for articles, technical notes, or letters to the editor must be prepared professionally. It is the author's responsibility to meet this requirement. The editor shall require authors to abide by this.

4. Authors shall provide an original typed, double-spaced manuscript including artwork plus two copies to the editor of the Quarterly.

5. The Quarterly is a journal of original writings. Only under unusual circumstances will the editor of the Quarterly accept previously published manuscripts. Each author shall sign a statement to the effect that the submitted manuscript has not been published and is not being considered for publication elsewhere.

6. Instructions to authors shall be printed in each June Quarterly.

Contract for Research With George F. Howe

The Creation Research Society (CRS) agrees to pay George Howe a stipend of \$2400 plus expenses up to \$1600 for work to be performed at the GCES May 1985-April 1986, on some of the following projects:

- a. Research on identity of Grand Canyon Yucca and on species boundaries in the genus Yucca.

- b. Native American plant usage.
- c. Repeating the Burdick intertonguing research, North Rim Trail.
- d. Continuing the vegetational studies in quadrats at GCES.
- e. Examining quadrats at GES and carrying out vegetational surveys in Caddo County, Oklahoma.
- f. Long-term study of geological forces involved in establishing major physiographic features (mountain, plateaus, etc.) that determine the vegetational character of various regions.
- g. Emmett Williams' sand experiment collecting.
- h. Continued participation in the Burdick pollen experiment.
- i. Work on establishing rights to pump water from our well. Liaison with lawyers, etc.
- j. Possible base level studies on insects of the GCES regions with collecting and identifying by two specialists.
- k. Participation with Meyer in the Shiva Temple project.
- l. Production of a paper on design as seen in the pollination of camphor weeds.

Expenses will include hiring of various people to fulfill correlated tasks, travel, food, lodging, copying, books, equipment, and miscellaneous costs directly related to the research. Expenses will be paid periodically upon submission of receipts to the Research Committee Chairman for forwarding to the Treasurer.

The stipend payment schedule will be as follows: Howe will be paid his stipend in two parts-one upon submission of the research report (see below) and the other after submission of the progress report. Authorization of these payments will be made by the Research Committee Chairman to the Treasurer.

Howe will submit to the Research Committee of CRS the following items:

1. One or more research reports, suitable for publication on or before November 30, 1985.
2. A progress report on or before March 30, 1986.
3. Other research reports before March 30, 1986 as they are completed.

QUOTE

These United States of ours have indeed proved a fertile ground for that optimism which saw in science only the harbinger of happiness and prosperity. For the past hundred years, the notion of a rather naive progress could thrive in our midst in coexistence with a doctrine, Darwinism, which in fact offered progress (or mere survival) for only a relatively few and meekly condoned the perishing of the great majority in each class, group, or species, if you wish. Social Darwinism saw its heyday in our country not too long ago. In fact, it still has a few rearguard apostles who are not taken aback even by the obvious, such as the late J. Bronowski. He could go to such extremes as to exculpate science of any and all responsibility concerning Hiroshima and Nagasaki.

Jaki, Stanley L. 1984. God and man's science: a view of Creation in Morris, Lynne, editor. *The Christian vision: man in society*. The Hillsdale College Press. Hillsdale, MI, pp. 37-8.

LETTERS TO THE EDITOR

Keeping Our Models Separate—Biblical Creationism Distinct From Creation Science

Considerable confusion concerning the nature of "scientific creationism" might be avoided if it were openly acknowledged that much of the creationist literature being produced is not intended primarily as scientific discourse, but is instead aimed at convincing people to place faith in the Bible, in God, and in the Christian meaning of life.

Recently editors of the same "scientific" journals that have routinely been closed to data-based articles by scientific creationists have opened their pages to a spate of religiophilosophical treatises by avowed theological liberals, itinerate humanists, and general anti-theists. These writers have criticized the intermingling of theological tenets with scientific evidence in the non-technical creationist literature, and rightly so, as we shall discuss. But seldom do they deal with the data-based creationist articles and frequently they dismiss the whole creation venture as totally and hopelessly "religious" (by which they intend no compliment) and that is unfortunate.

We creationists ought to distinguish more clearly between articles intended to be religious in character and reports in which we want to tie our own scientific findings to an underlying creation model of origins. Evolutionists do this consistently and there is nothing essentially sneaky or underhanded about such a procedure. For example, many evolutionists are philosophically humanists or atheists but they routinely keep their foundational theological opinions out of the data papers they present for such journals as *Evolution*. Here they merely attempt to show how the data seem to fit best with the scientific aspects of macroevolutionism. However, in letters, private conversations, articles for the popular press, and almost anywhere else, the same people promulgate their more philosophical and religious views on origins. Too often we as creationists have mingled our creation as theology (Biblical creationism) with our presentation or analysis of research data. In the future we will do well to define our models more closely and to distinguish more clearly between those articles produced as a Christian apologetic and those we intend for scientific libraries. Two journals in which the principle has been applied with a fair degree of regularity include the *Creation Research Society Quarterly* and *Origins Research*. The following list should illustrate how this concept of separation can be workable and beneficial in creationist papers.

1. There is ample evidence in nature to make a strong case for the *existence of a Designer*. But it is not possible by use of science (without the Bible) to show that this Designer was the personal, Judeo-Christian, trinitarian God. Perhaps the only concepts concerning God that can be defended from the field of natural science alone are that *a highly intelligent, provident, and powerful deity exists and was operative in creation*. Other details supporting this Designer would have to come from extra-scientific sources.

2. Only in the Bible could one determine that the Creator created in six days. Perhaps the best one could do in a scientific vein along this same line would be

to present evidence supporting rapid action rather than slow and gradual mechanisms in creation. Evidence for the *rapid and almost simultaneous creation of various life forms* comes from the interrelatedness found between all parts of the ecosystem and from the complex interdependencies of various parts in the eucaryote cell upon all other parts. But as *scientists*, creationists can never hope to ascertain whether the creation took place in six days, six weeks, six months, six years, or just six seconds!

3. Creationists holding the relatively young earth view should first establish that it is impossible to assign *scientific* dates beyond 5000 B.P. (before present) to anything with any degree of certainty. After accomplishing that, we can assert that while some methods appear to fit with vast time speculations, *many other dating methods support a young earth* on the order of only millions or even thousands of years old. We can, of course, express our beliefs that the methods giving short ages are valid and that is about as far as a creation scientist can go with the "age of the earth." We are thus affirming from science that the Designer worked in relatively recent times but to set an exact date for creation based on science is a task as impossible as it is for certain macroevolutionists to demonstrate the vast ages they espouse and for which we criticize their lack of scientific discrimination. Only in the *theological* domains of either creationism or macroevolutionism can one argue for exact origins dates.

4. Based on scientific evidence alone we can affirm that *the Designer set limits or boundaries for the various types of life* produced and did not form all life from one kind. The task of determining the extent of those boundaries in the realms of botany, zoology, and microbiology will remain one of the foremost challenges facing creationist biologists.

5. Only in the Bible is there mention of one global Flood. The Bible writers did not even specify that it was this Flood which caused most of the fossil record although a Bible student might logically make such an inference. Thus actual data collected thus far could likewise fit with multiple floods of a global or local scope. Perhaps in our scientific endeavors as creationists we should simply say that we report *evidence in support of "... at least one great catastrophe in earth's history*." Such terminology would put the subject into its proper scientific orientation.

It is obvious as well that creationists, as scientists, can never expect to demonstrate from the fossils which life forms were created on day five or which ones on day six because the fossils were evidently formed by catastrophe(s) which came long after the creation period itself.

While still dealing with the Flood, let us recognize that specific creationist reference to Noah is scientifically unverifiable and will remain so until an ark or other clear cut archeological records of the Flood are unearthed. Although they certainly give scientific support to the survival of a favored family in a Flood catastrophe, other flood traditions use names other than "Noah." The best we can say scientifically at this date is *that man has survived some flood catastrophe and that he appears to be monophyletic*.

Lengthy discussions of God's supernatural role in protecting the ark and its life forms are largely religious. While such details are fascinating, they rest properly in the domain of Biblical creationism.

Often while speaking publicly creationists are forced to bring up these topics during the question/answer period. Let us answer direct questions frankly but in so doing attempt to show audiences that it is our intent to keep such Biblical considerations distinct from what we feel represents the scientific facet of our views.

6. The water canopy or vapor canopy model is based primarily on one interpretation of Genesis. While some creationists will find studies on the plausibility and possible effects of such a canopy most stimulating, the concept rests as much on the theological side of our model as on any compelling scientific base. It will be well to admit, as some workers clearly do, that *the canopy view is both scientifically and Biblically speculative.*

In that same vein, belief in a universally warm earth during pre-flood times is but one among several Bible interpretations. Let us deal with the conflicting body of *scientific data* when we make assertions about *paleoclimatology.*

7. Some of the creationist explanations for fossil and lithological sequences are based on concepts directly taken from Scripture without independent confirmation. *Creation scientists need to do more field, laboratory, and library research if they wish to make a sizeable and more permanent imprint, especially in the field of geology.*

8. *Creation scientists should deal with specific issues and avoid confusing analogies.* Although quite graphic and appealing, the way the parts of a watch are put together is physically and chemically quite different from the sequences involved in forming a complex biochemical compound. In their scientific treatises, creationists should focus on design in biochemistry as biochemistry itself and not in terms of analogies to Mount Rushmore, watches, or airplanes, tempting as these may be. Such avoidance will really improve their arguments because in most cases the physiological and biochemical intricacies are far greater than those brought to mind by false analogies.

9. Scientific research is now done almost exclusively by specialists in particular fields. During the early stages of the creation movement it was not possible to follow such a rigid pattern and it was hence not infrequent for a paper on the origin of life to be produced by a theologian or one on natural selection by a lawyer. Before we suggest modifying such a procedure, let us note that any person who sets aside an otherwise well-handled argument for creationism because the author happened to have professional training outside the specific narrow discipline under discussion is committing a logical fallacy known as *argumentum ad hominem.* But since much creationist scientific literature has been fostered by non-specialists working outside their fields of training, we are vulnerable to the claim that creationism is something other than science. Illogical as such attacks are, we may avoid them if we begin to *restrict ourselves more closely to writing books or articles within the scope of our particular academic training and proficiency. It would be well where possible to do as some have done by*

publishing several papers on a certain subject in technical journals before undertaking to write a creation research paper on that same topic.

10. In writing or speaking some creationists refer to their efforts as a "ministry." While individual Christians may rightly consider their work in science as a service to God and man, it is confusing and perhaps misleading and pointless to present the work this way to scientifically trained non-theists and others. Most non-Christians would simply not understand the Christian idea that all of one's positive activity is a type of ministry.

On a parallel line of thought, some creationists make direct reference to salvation through Jesus Christ in their scientific origins treatises. While Christian witness is honest and commendable, we would suggest that such a worker *prepare separate articles or tracts to deal with the tie between Creation, the Fall, and Christ's redemptive work for mankind.* Desirable as integration may seem to some workers, it is our belief that these topics should be separated so that our peers in the pluralistic field of natural science will realize that we do understand the boundaries of the scientific method. The fact that this has contributed to the hostility we experience from anti-creationists should lead us to practice more restraint in years ahead.

If creationists can work along these lines, we may discover that our views will receive more serious consideration from other experimental scientists and we will have made no sacrifice of truth in the process.

George F. Howe

Director, Grand Canyon Experiment Station
Creation Research Society

Mailing address: 24635 Apple St.
Newhall, CA 91321

Difficulty in Classical Hominoid Theory

It seems apparent that at present the problem of one-sided presentation of evolution in our schools, to the degree that amounts to indoctrination, will not be satisfactorily dealt with by legislation. Indeed, many creationists themselves oppose such, concluding that a fair presentation of the origins questions will not ensue from legislation and may result in an attempt to demean the creationist position during the time it is to be presented. On the other hand, it seems that if the large amount of discrimination against creationists who are legitimately entitled to tenure, degrees, etc., could be prevented or reduced, then creationists could pursue research and publish, etc., in areas which would help explore the already demonstrated inadequacies of classical evolutionary theory. This is further discussed in my latest book, *The Criterion*, (Onesimus Pub., 6245 Newton Ave., South, Richfield, MN 55423, \$6.95).

A good example is the recent prominence of the science of molecular anthropology. This field studies the protein structure of primates in order to understand evolution. They assume that mutations take place at a fairly consistent rate, and thus comparison of the similarity of proteins can be used to determine how close two species are. Researching the proteins of humans and apes finds that they are remarkably similar, actually fully as close as that between grizzly and brown bears. While this may seem-

ingly support evolutionary theory, it has actually caused major problems. For example, evolutionists generally assume that humans and apes diverged 15 to 20 million years ago. Ramapithecus existed from about 10 to 15 million years ago and is regarded as an important evolutionary link. On the other hand, molecular anthropology indicates that humans and apes diverged less than only three to four million years ago, indicating that many, if not most, of the supposed human ancestors could not be such. The molecular anthropologists also stressed that even Australopithecus and the Paranthropus would have to be excluded from the hominid line on this basis. While one could argue about the accuracy of their dates, nonetheless it clearly illustrates that new research in many areas is causing serious difficulties for classical hominoid evolutionary theory.

Jerry Bergman, Ph.D.
1306 North Orleans
Bowling Green, OH 43402

Selection of L-Amino Acids

I would like to draw your attention to the article "Origins of Biomolecular Handedness" by Stephen F. Mason which appeared in *Nature* 311:19 (6 Sept. 1984). In this article the author claims that the selection of α amino acids for proteins by living organisms was "fully determinate, and not a matter of chance."

It would be most interesting to have the views of a creationist scientist on this article in a future issue of the *CRS Quarterly*.

David MacBride
52 Three Anchor House
Three Anchor Bay
8001 South Africa

When the Cat's Away

An old adage: When the cat's away,
the mice will play.

The "cat" in this case consists of a satisfactory explanation of the modus of biological life. Lacking this restraint, strange theories will come on stage like liberated mice. Such is abundantly demonstrated in the letter of Frederick Edwards, editor of *Creation-Evolution* in response to H. L. Armstrong's article: "Vitalism—a Neglected Weapon?" (*CRSQ* 21:78)

In a previous response I pointed out that the Vitalism-Mechanism dilemma was unacceptable per se in the origins theory of Herman Dooyeweerd. There could be no stronger justification for Dooyeweerd than the case Mr. Edwards builds should this dichotomy be accepted. I quote Mr. Edwards:

If NOTHING can work without vitalism, then there are no truly "self-organizing systems" in nature.

Does this then do away with evolution? Not at all!... There is, after all, a new trend among "New Age" mystical folks that evolution works through the agency of spiritual agencies... And some creationists have sought to argue that without vitalism evolution is impossible! Does that mean that with vitalism creationists can begin to accept evolution?

That is the irony, the dilemma, and the paradox. A consistent rejection of vitalism leads to mechanism. A consistent acceptance of vitalism leads to spiritualistic evolutionism. It is only a partial acceptance of vitalism that makes 'scientific creationism' possible, a delicate mixture of naturalism and supernaturalism so just the right biblical result emerges.

I do not find in this irony, dilemma, or paradox. What I do find is a *reductio ad absurdum* as withering as it is unintentional and therein a strong added justification for Dooyeweerd.

At this point it should be further articulated just what is Dooyeweerd's refutation. His basic premise is that each sphere of being has an imponderable nucleus, and that it is only when this nucleus is lost sight of that the unnatural cleavage of dichotomy takes place. This irreducible nucleus—something like Kant's *ding an sich* is not subject to mental manipulation. In the first sphere—mathematics—this center is number. In the second sphere—space—this center is extension. In the third sphere—covered by physics and chemistry—this center is natural motion. And then we come to the fourth sphere, the biotic, the sphere of our present concern. What is the center, what is the imponderable nucleus, of this biological sphere? This imponderable nucleus, according to Dooyeweerd, is... *life*. That's right—simply *life*. Life, in other words, is the imponderable undergirding of the biological sphere, not some kind of substance the human mind can manipulate and certainly not a factor of "spiritualistic evolution."

I will only briefly articulate this proposition but there are circles in which it has already won high regard. Thus Prof. Hebden-Taylor over a decade ago wrote of Dooyeweerd's "Copernican Revolution" in the field of biology.

Dooyeweerd states his position in various sections of the *New Critique* and one is on page 108 of Vol. 2:

Life is a fundamental modality, not a concrete phenomena. It belongs to the fundamental modal horizon of human experience, which lies at the basis of the concrete phenomena considered to be manifestations of life.

Therefore the contest between mechanists and vitalists in biology cannot be decided by experiments. For as soon as we establish the fact that a living being has originated, we appeal to an irreducible modal aspect of experience and not to phenomena whose scientific interpretation as manifestations of life pre-supposes this fundamental aspect of experience. ... the mechanistic interpretation of life is the result of a philosophical prejudice, not the outcome of special scientific research.

In Vol. 3 a final discussion of this problem constitutes the climax and close of the entire book. The mechanistic view is rather briefly disposed of on pages 733-4:

The mechanistic view, even nowadays adhered to by most of the biologists concerned with analytical investigations, continues to seek for a bio-synthesis by means of protein combinations. According to this standpoint colloid-chemistry has the task to disclose all the "secrets of life." This trend is still entirely inspired by the classical science-ideal striving after perfect domination of nature by means of a complete causal determination even of vital phenomena.

It starts from an a priori absolutization of the physico-chemical energy-aspect of empirical reality.

Consequently, in principle it denies the irreducible nature of the biotic modality of experience. It necessarily involves itself in inner antinomies resulting from the absolution of a modal law-sphere.

Following this about 45 pages are taken up with analyzing and refuting the vitalistic positions of Dreisch and Woltereck. We will here summarize what is said about Dreisch.

Due credit is given this distinguished biologist for his remarkable experiments with the eggs of sea hedge-hogs. These experiments showed it is possible to take away any part from the young germ cells without affecting the final result—the rise of a complete living individual. The germ-cells themselves develop by continued division as a “harmonic equipotential system” in which all the elements possess an equal disposition to lead to the final result in mutual harmonic cooperation. They do not operate after the pattern of quantitative physico-chemical causality but according to a typical totality-causality.

So far, so good. Dreisch has avoided the error of the mechanists in wrongly seeking to interpret events in the biotic sphere from the perspective of the preceding sphere of physico-chemistry. However, beyond this is not so good.

But this does not imply an acceptance of the neo-vitalistic view as such. It appears that Dreisch lacks any insight into the modal structures of our experiential horizon. This is why he has recourse to the substance-concept to account for the fundamental difference between biotic and physico-chemical functions. ‘Life’ is now conceived phylogenetically as a ‘super-individual substance’ lacking temporal genesis, as an invisible immaterial ‘organic form’ in the pseudo-Aristotelian sense, of which all visible individual forms are only materialized products. This substance is called ‘entelechy.’

Note how for Dooyeweerd the crux of Dreisch’s failure lies in conceiving of entelechy as a “substance.” In my previous letter (CRSQ 22:48-9) I noted how Dooyeweerd denied at its roots the concept of substance in a scientific sense. This theme runs throughout the *New Critique*. It is already noted in Vol. 1, p. 291 that David Hume a few centuries ago had stigmatized the scientific concept of substance as a false absolute. This note is sounded again in Vol.3,p.23:

The constants of modern physics have indeed nothing to do with the rigid ‘material units’ which in Newton’s system were assumed as the ultimate substantial points of reference for all natural events. We may establish that this concept of substance lay at the foundation of the whole mechanistic view of reality construed according to the classical Humanist science-ideal. The main point, however, is that, just as the Aristotelian idea of primary “ousia”, it was fundamentally different from the naive concept of a thing. The same may be said with respect to the substance-concept in modern biological theory which has only caused a fundamental confusion in the scientific manner of posing problems.

In this vein the case against Dreisch is climaxed on page 745:

So long as life is viewed as an ‘immaterial substance’ working upon a ‘material substance’ the question how such an operation is possible will remain the chief crux of theoretical metaphysical sense, implies

an unconquerable antinomy.... The reason is that it elevates a theoretical abstraction to an independent being.

An entelechy in Dreisch’s neo-vitalistic sense cannot exist in temporal reality; for it is nothing but a theoretical abstraction of the biotic modality of experience, absolutized to an ‘immaterial substance.’ This concept of entelechy is nothing but the vitalistic counterpart of the mechanistic concept of ‘matter’ which modern physics was obliged to relinquish because of its incompatibility with the micro-structure of energy.

So to complete what seems to me a powerful case from Dooyeweerd’s writings not only against Mr. Edword’s concept of “spiritualistic evolution” but against the entire concept of vitalism vs. mechanism.

This has been all too short a review of a profound subject and obviously questions remain. Dr. Verbrugge’s recent excellent book *Alive* explores this issue at greater length. Also his recent series in *CRSQ* (21:79-81, 137-40,182-4) on the Dooyeweerdian biologist De Wit should challenge creationists anew to the contributions being made in this school. Differences exist but certainly these can be worked out in view of the higher unity beyond.

In his foreword to the *New Critique* Dooyeweerd writes:

It has always been a law of human knowledge that the truth is gained only in the conflict of ideas. May then the conflict about this philosophy be carried on merely for the sake of truth and thus in a chivalrous fashion.

Certainly this proposition should be implemented here and now! The time should be past for Dooyeweerd to be never more than tolerated in creationist circles. It is time to relax, sit down, talk things over, give and take.

Samuel Wolfe
100 N. LaCumbre, Apt. 16
Santa Barbara, CA 93110

Lucy—Evolution’s Solitary Claim for an Ape/Man Her Position is Slipping Away

There has been a great deal written in the scientific literature since Johanson and White in 1979 claimed an ape/man classification (*Australopithecus afarensis*) for their famous fossil known as Lucy.¹ Now, six years afterwards it will do us well to review and evaluate the evidences in the light of continuing studies. We shall see that her position has become very shaky in the intervening period.

Even before the startling 1979 announcement was made, many students had other views of Lucy’s significance. Even Johanson himself, speaking of the original find in 1976, stated firmly - “Lucy has massive V-shaped jaws in contrast to man,” and again - “she was far from the genus Homo.”² As late as two years after his announcement on Lucy, Johanson must have had continuing doubts. In 1981 he wrote that Lucy was not typical of the Afar fossils (sites 162 and 333) and that she was “embarrassingly un-Homo like.”³ Time Magazine reported in 1977 that “Lucy was suprisingly short legged,” and that she was approximately three million years old.⁴ In the article covering Johanson’s 1979 announcement, Time also stated that Lucy had a tiny skull; a head like an ape and a brain size of a chimp - 450 cc.⁵

The famous British researcher, Richard Leakey was never convinced. In 1979 he stated his disagreement and

pointed out that there were two species at Afar one was "early" man and the other an Australopithecine.⁶ Leakey wrote further on the subject in 1982 and 1983. He says: "there is too much variation within the Afar fossils for only one species to be present."^{7,8} Leakey was again critical of Johanson's claims in 1982 when he stated: "paleontologists *do not know* whether Australopithecines (including Lucy) walked upright." He was also convinced from the famous foot prints at Laetoli that the genus *Homo* existed 3.75 million years B.C. (700,000 years before Lucy).⁹

The French paleontologist Dr. Yves Coppens also was unconvinced when he appeared on BBC-TV in 1982. Dr. Coppens pointed out the two separate species from Afar and was able to assemble the human type and ape type fossils in separate lines. He stated unambiguously that some of the bones were clearly human while the others were undoubtedly ape like.¹⁰

Well known British science writer Dr. Jeremy Cherfas admitted in 1983 that "there are large discrepancies between Lucy and chimps on the one side and humans on the other side is *unmistakable*." Dr. Cherfas further stated that the females at Afar were ape-like and suited to climbing in trees; and that Lucy's talus (ankle) tilted backward like a gorilla instead of forward as in humans (for upright locomotion).¹¹

In the June issue of *Science* '83, diagrams of Lucy are shown which indicate strongly the resemblance to a chimp.

Researchers Susman and Stern of New York University, Stony Brook, closely examined the Lucy fossils. They stated afterward that Lucy's thumb was ape-like rather than human-like and that her limb proportions made it clear that she did not have an efficient upright walk, and her toes were long and curved for tree climbing. They wrote: "She probably nested in the trees and lived like other monkeys."¹² Tuttle of Chicago University went further and stated that: "Lucy's pelvis was flared in such a way that it gave evidence that Lucy was much better suited for tree habitation than for living and walking on the ground."¹³

Paleontologist Adrienne Zihlman (University of California, Santa Cruz) reports that: "Lucy's fossil remains match up remarkably well with the bones of a pigmy chimp" and says that some anthropologists believe that two species were present at Afar. Zihlman, however, also states that there are some differences between Lucy's pelvis and a chimp's pelvis.¹⁴

When Dr. Owen Lovejoy toured the U.S. in 1979 he showed a computerized multivariate print-out analysis of Lucy's knee joint. The data clearly showed the knee joint right in the middle of the ape range.¹⁵

Dr. Peter Andrews (British Museum of Natural History) wrote in May 1984 that:

There is much evidence that the two fossil species (*A. afarensis* and *A. africanus*) were ancestors of the robust australopithecines, but *not of humans* to complicate matters further, some researchers believe that the *afarensis* sample (Lucy) is really a *mixture of 2 separate species*. The most convincing evidence for this is based on characteristics of the knee and elbow joints.¹⁶

No fossil teeth of Lucy have been found. At the original find in 1975 no teeth were found at the Lucy site 162 but some human teeth were recovered at site 333 some miles away.¹⁷

The evidence given above makes it overwhelmingly likely that Lucy was no more than a variety of pigmy chimpanzee, and walked the same way (awkwardly upright on occasions, but mostly quadrupedal). The "evidence" for the alleged transformation from ape to man is extremely unconvincing.

References

1. Anon. 1979. The Lucy link *Time* January 29 p. 49.
2. Johanson, D. C. 1976. Ethiopia yields first family of early man *National Geographic Magazine* 150:790-810.
3. Johanson, D. C. and M. A. Edey, 1981. Lucy - a 3.5 million year old woman shakes man's family tree *Science* 81 2(2):53-55
4. Anon. 1977. Puzzling out man's ascent *Time* November 7, pp. 68-9.
5. Anon. 1979. *Op. cit.*
6. Anon. 1979. General science *Newsweek* May 31 pp. 28, 60.
7. Anon. 1983. Interview with Richard Leakey *Omni* March p. 102
8. Cherfas, J. 1982. Leakey changes his mind about man's age *New Scientist* 93:695.
9. *Ibid.*
10. Television program, 1982. The making of mankind. BBC-TV.
11. Cherfas, J. 1983. Trees have made man upright *New Scientist* 97:172.
12. Anon. 1982. *Bible-Science Newsletter* p. 4.
13. *Ibid.*
14. Ahlman, A. 1984. Pigmy chimps, people, and the pundits *New Scientist* 104:39,40.
15. Gish, D. T. 1980. Personal communication.
16. Andrews, P. 1984. The descent of man *New Scientist* 102:24.
17. Johanson, 1976. *Op. cit.*

A. W. Mehler
7 Honeyman St.
Mt. Warren Park, Queensland
Australia 4207

QUOTE

There is also the ever-present human fallacy of wishful thinking: namely, the desire to see something where there is nothing. The case of those who claim to have seen balls moved by their mere mental concentration on them reveals plenty of the humanness of science in that very sad sense. Other, less known examples are the alleged discovery, early this century, of N-rays, and the claim made about ten years ago of experimental evidence of a very slight difference between the negative and positive electric charge. That some scientists take upon themselves the role of universal sages, pontificating on any and all problems and issues, is more evidence of science being very much man's science—that is, a very human affair.

Jaki, Stanley L. 1984. God and man's science: a view of Creation in Morris, Lynne, editor. *The Christian vision: man in society*. The Hillsdale College Press. Hillsdale, MI, p. 37.

BOOK REVIEWS

Darwin's Enigma by Luther D. Sunderland. 1984. Master Book Publishers, El Cajon, California. 177 pages, \$6.95.

Reviewed by Wayne Frair*

Sunderland, though a professional aerospace engineer, has had a better than two-decade avocational interest in the subject of origins. During this time he has devoured literature dealing with creation and evolution, has maintained close contact with proponents of various viewpoints, and has addressed many hundreds of audiences with singularly momentous impacts, particularly with his personally-designed audiovisual presentations. Although he has published articles dealing with creation and evolution, this is his first - but hopefully not his last - book on this subject.

Emphasizing the fossil record, the book has woven into its narrative the essence of taped interviews between the author and five prominent paleontologists: Dr. Colin Patterson, London; Dr. Niles Eldredge, New York City; Dr. David M. Raup, Chicago; Dr. David Pilbeam, Boston; Dr. Donald Fisher, New York State. Sunderland says:

If information about the true nature of the fossil record, so vividly described in these interviews, were to be presented without bias in public school textbooks, there would be no need for over half of the state legislatures to be considering legislation requiring open academic inquiry into the teaching of theories on origins. . . the main issue is that textbooks and other school materials are completely devoid of certain very significant scientific information which is talked about behind closed doors but not made available to the public. Should the information presented in this book be openly discussed in public education, the controversy would be defused and cease to be the hottest issue in public education (pp. 11-12).

In chapter one, entitled "The Problem Won't Go Away 100 Years After Darwin," we learn that "fossils were an enigma to Darwin . . . because they did not reveal any evidence of a gradual and continuous evolution . . . proof which he needed to support his theory" (p. 9). In chapter two, "Darwinism and Science," we learn that the "trade secret" of evolutionists or the:

Achilles' heel of evolution theory turned out to be the very problem which troubled Darwin the most, namely, the lack of any fossil evidence to support the supposition that all life had come from a common ancestor. Indeed, although Darwin fervently hoped that further geological exploration would vindicate his theory, the fossil record has become Darwin's Enigma (p.22).

Also in this chapter Sunderland presents his "two general concepts on origins," namely *evolution* (by which he means macroevolution) and *abrupt appearance*. He points out that "one-time-only historical events (such as the appearance of various forms of life) may be true, but they are not part of science for there is no way of repeating them, observing them and subjecting them to testing" (p.26).

Chapter three is "The Fossil Record - Nonlife to Reptiles." Here we learn about the "Cambrian Explo-

sion," that time was not the hero of the abiogenesis plot, and that gaps exist between major groups. Chapter four, "The Fossil Record - Reptile to Man," continues to deal with the lack of transitions in supposed vertebrate and plant series, as well as the origin of insects. This is followed by "More Problems Than Solutions," chapter five, wherein there is discussion of punctuated equilibria, lack of fossil formation today, and some non-paleontological matters including genetics and embryology.

"Darwinism's Lack of Scientific Foundation," chapter six, ends with eight pages of summary containing two "safe" (not likely to be refuted) conclusions:

1. A number of different types of living organisms first appeared abruptly on Earth in completely functional form at some unknown times in the past. All life did not have a common ancestor.
2. The fossilized organisms were buried in rapidly catastrophic events, some of which were on a worldwide scale (p.152).

Following chapter six are the References for each chapter and then a respectable Bibliography. An Author Index and a Topical Index are next; both of these I found generally to be well-prepared.

The book testifies to the author's considerable ability to synthesize, analyze and compile. Any consequential adverse criticisms of the book would, I think, have to focus on empathy problems between the author and those he quotes. But I believe that the author has exercised considerable care to represent fairly the thoughts of others.

Genevieve S. Klein says in the Preface, "The time has come for the powers-that-be to recognize that our students at all grade levels are entitled to know both sides of the creation/evolution controversy" (pp.5-6). This book by Sunderland will hasten the day when this condition will be actualized. *Darwin's Enigma* merits a broad readership especially by evolutionists and those with serious questions about the subject of origins.

Origin of the Nations. by John Pilkey, 1984. Master Books Publishers, San Diego, CA. 346 pages, \$9.95 plus \$1.00 postage and handling. Monogenetic Studies, P.O. Box 878, Newhall, CA 91322-0878.

Reviewed by George F. Howe*

In this volume the author attempts to fill a void in human knowledge surrounding the development of Noah's family and the origin of human nations after the Flood. Based on years of study, the book is a synthetic reconstruction of the events and people of this largely forgotten period of history.

The author, Dr. John Pilkey, has earned post-graduate degrees in both literature and theology, and has carried out deep studies as well into such fields as art, chronology, mythology and philosophy. He is uniquely qualified to advance a project that was begun by the Christian euhemerists of the nineteenth century but has been studiously neglected during the last hundred years.

Readers will find that the book is based on young-earth creationism and that the author espouses a tightly woven chronology in which the Noachian deluge occurs at 2150 B.C. Pilkey realizes that "to dispute high

*Wayne Frair, Ph.D., is Professor and Chairman, Biology Department, The King's College, Briarcliff Manor, New York 10510.

*George F. Howe, Ph.D., receives his mail at 24635 Apple St. Newhall CA 91321

chronology with a Darwinian is like blaspheming against the idea of eternity" because vast time periods have become for the Darwinists "a substitute for eternity" (p. 247).

He writes a compelling apologetic for what he calls "Noachic science," which he feels is "the atomic physics of world history" (p. 270). Pilkey believes that Noachic science when fully conceived will liberate us from Darwinism so that we will then be able to see the past for what it really was.

The author carefully and brilliantly exegetes such archeological sources as the Gunderstrup Caldron and Mesopotamian Seals. While paying attention to Scripture, Pilkey demonstrates that the myths and king lists of ancient societies support the Biblical pattern of monophylogenetic human origins.

He moves with ease from his main thesis to a wide array of spiritual and secular topics from eschatology to entertainment literature. He traces the roots of antichrist, for example, to an ancient rebellion unleashed against Noah. He perceives that man's apocalyptic awareness has been all but banished by Darwinian thought but that it lives on in literature of "the post-Romantic fictional and dramatic subgenres of historical romance, gothic fiction, murder mystery, and local color fiction" (p. 284).

Pilkey asserts that:

These modern forms, socially remote from the world of scientific reasoning, testify to what is lacking in modern attempts to interpret high antiquity: spiritual dimensions of legendary reverence, supernaturalism, cosmic amplitude, coherent intrigue, and personal memory (p. 284).

At another juncture he adds:

The gothic writers should be honored for the way their work scandalizes passive materialistic notions of reality and strips away the cloak of sentimental palaver from the stunning metaphysical promises of the faith (p. 261).

Pilkey believes that the gothic argument for the reality of apocalyptic truth as seen in the works of M. R. James, Tolkien, and Lewis, "has much to gain from the development of Noachic science" (p. 263). He sees and clearly describes striking parallels to these modern literary tastes in both the Gunderstrup Caldron and the Biblical Revelation.

Pilkey attempts to bring identity between such widely separated fields as human mythology, Biblical truth, and the plight of modern man. Fascinating parallels are drawn, for example, between Peleg's struggle with Canaan and Elijah's later conflict with Jezebel, herself a Canaanite descendant.

The task of evaluating the many identifications and assertions in this book will lie with those skilled in philology, historiography, and the many other disciplines it spans. Pilkey's underriding belief, for example, that today's human races arose directly from four matriarchs, each of different skin color and racial stock (Noah's wife and his sons' wives) ought to stir considerable discussion and may even lead to some profitable research in genetics.

To those who would argue that the Bible should be treated as a book of salvation alone, ignoring any of its historical, cultural, or related features, Pilkey answers as follows:

The Bible functions as a book of salvation precisely because it is a book of science, literature, and philosophy. True science is salvation from ignorance;

historical literature is salvation from pagan amnesia; and true philosophy is the Logos Jesus Christ, the Truth and Savior. One reason that 'secularism has spread in our day' is that persons of 'religious background' have become spiritually and therefore, intellectually lazy, unimaginative, and apathetic toward key issues of faith (p. 274).

The book contains photographs of the Gunderstrup Caldron, a comprehensive bibliography of sources, a set of notes at each chapter's end, and a generous index. Specialists in history or mythology would do well to read the nine chapters consecutively. Interested general readers, however, might wisely begin with the last three chapters to achieve an overview of the principles involved before attempting to assimilate the array of details found in the earlier chapters.

Creationists and others desiring to understand Noah's family and its contribution to present day national governments will find this volume indispensable. All students of ancient literature and mythology should consider their work deficient if they do not study this truly landmark endeavor.

Glacial Geology, by N. Eyles (ed.), 1983. Pergamon Press, New York, 409 pages. \$60.00 hb, \$17.95 pb

Reviewed by Michael J. Oard*

I assume creationists believe in either one ice age or none. The latter I cannot address. However, new evidence as presented in *Glacial Geology* points more and more to one ice age, although the authors would not agree. They are committed to the multiple ice age model, which is in great confusion due to the results from deep-sea cores, that indicate possibly 30 or more successive glaciations. Uniformitarianism is one guiding principle in glacial research. However, this book, as well as others, leaves the impression there are many unknowns in present glacial processes, especially for glacial erosion and deposition. It should be difficult to construct accurate models for past ice sheets or to know whether some catastrophic mechanism is needed to explain them. *Glacial Geology* is written primarily for engineers who work with glacial sediments and need state-of-the-art three-dimensional information. The first half of the book discusses the new concepts for analyzing glacial sediments, which is of interest to creationists, while the second half of the book delves into the engineering applications, which has little direct bearing on creationism.

The method of analysis is called the landsystem approach in which characteristic surface landforms over large areas in conjunction with more sophisticated glacial models combine to estimate the subsurface geology. It was developed from modern glaciers and the deposits of past glaciers over Northeastern North America and Britain. The approach includes all glacial sediments down to bedrock, but in practice mainly applies to the sediments from the last ice sheet since the earlier ice age deposits are rather ill-defined and/or reworked. The classification is general because there are many local exceptions.

The first landsystem is called subglacial because it was laid down at the base of the glacier. There are two types for Quaternary glaciers, one characteristic for the interior and the other for the periphery. This reflects differences

*Michael J. Oard, M.S. receives his mail at 3600 Seventh Avenue, South Great Falls, MT 59405

in glacial deposition, most likely depending on the basal thermal regime. The interior or shield areas consist of well-exposed knobby bedrock of moderate relief with coarse grained glacial sediments found mainly in depressions. The periphery is characterized by rather thick finer-grained sediment with drumlin fields.

The second type of landsystem is the supraglacial and is located at the margins of ancient ice sheets. This landsystem is caused by basal debris forced upward into the glacier and eventually to the surface, due to a variety of horizontal compressive forces. When the glacier melts, either a hummocky surface with numerous kettles or a generally flat till plain results with gradations between, depending upon how much till flows into the kettles. The supraglacial landsystem is often found above the subglacial landsystem and was often mistaken for it. (p. 71)

The third type of glacial landsystem is the glaciated valley, which includes most modern glaciers as well as those in the past from mountainous terrain. This landsystem offers little new information to creationists and will not be discussed.

The three-dimensional approach is replacing the type section method, which depends upon one or a few vertical profiles of stacked sediment layers. These profiles were considered ideal for the geographic area and other stratigraphic layers were correlated to it. This is still common practice for sediments of all evolutionary ages. More detailed knowledge indicates the type section method is simplistic: "Many studies show that applying generalised stratigraphic names derived from a single or a few 'type-sites' obscures the real nature of regional and local sedimentary sequences." (p. 15) Glacial sediments are much more complex and previously defined till sheets often change character laterally and vertically. Consequently, much overlap of till sheet measurements are found, making glacial stratigraphy useless:

The vast majority of glacial stratigraphies have been and are still being described by simply (*sic*) references to analytical data (i.e. grain size (*sic*) clay chemistry, bulk geochemistry, clast lithology, calcite/dolomite ratios, colour, etc. etc.) but the true nature of the stratigraphy remains anonymous. (p. 13,15)

Thus the facies or depositional basin approach, as defined by landsystems, is advocated and should be a more accurate method for studying glacial sediments.

The significance of the landsystem approach to creationists is that many glacial sediments attributed to multiple glaciations are now considered deposits from one dynamic glacier. Former ice sheets are now believed to have undergone many advances, retreats and surges, as observed on modern glaciers. A surge is a change from normal flow to one of rapid movement, as much as 100 times faster, and lasting from a few months to as long as three years. The evidence for multiple glaciations comes from the periphery of ancient ice sheets, where the sediments are thick (about 100 meters) and where the type section method was employed. Lodgement till from the subglacial landsystem was discovered to have been deposited discontinuously, resulting in layers of till with erosional breaks and glaciofluvial deposits between. It is all one till unit, but a type section analysis would have shown multiple glaciations. (p. 38-41 and Fig. 2.11) Supraglacial landsystems can have stacked till bands with non-glacial sediments or even organic remains between that resemble multiple till sheets:

In drumlinized terrain ubiquitous 'tripartite' clays and upper till(s) have been used extensively as mapping units and taken to indicate multiple glaciation. Many multiple successions can probably be explained by the former presence of subglacial melt-streams coupled with shifting ice divides and changing ice flow directions. (p. 222)

Surging glaciers that stop at the same location can also cause stacked supraglacial sediments. In fact several major lobes of Quaternary ice sheets are assumed to have advanced by surges (p. 28), and modern sediments laid down by surging glaciers show great similarity to Quaternary supraglacial landforms in some areas. (p. 77) Meltwater streams, as well as glaciolacustrine processes, are presently seen as more important. Proglacial lakes were extensive south of the ice sheet margins. Consequently, abundant clay, silt and sand would be deposited between till sheets, which have probably been interpreted as "interglacial" sediments. Consequently, "This approach sees multiple tills as the normal expectation in glacial sediments." (p. 85)

Glacial geologists definitely have not adopted a one-ice-age scheme. Those who study continental deposits still pigeonhole the data into several major glaciations. Previous ice age sediments are assumed eroded. From this reviewer's point of view, the principles already learned can be extended to include all Quaternary glacial sediments. The ice sheet would be more dynamic than glacial geologists are willing to admit, but already realizing in part. For instance, in Britain three distinct glaciations are recognized. The last is called the Devensian. The earlier two extended further south, but the boundary of the second is poorly defined. Thus sediments assigned to the earlier glaciations are lumped together and called, Pre-Devensian. They are found at the surface south of the Devensian limit mainly as cap-pings on dissected terrain and are more weathered. (p. 218) In a one-ice-age scheme, this pattern could be explained by two major ice sheet locations, the older further south becoming rapidly eroded and weathered after exposure due to the extremely wet climate.¹ The same principle would apply to the other recognized glaciations in other areas.

The Canadian shield, supposedly the center of successive ice sheets four to five kilometers deep, shows evidence of one thin ice sheet. The coarse-grained nature of the thin sediments indicates little erosion, transport, deposition and reworking. The bedrock has moderate relief, also indicating little erosion. In fact, the topography of the Precambrian shield of Northeastern North America is similar below the Lower Paleozoic sedimentary cover further south. (p. 227) This puzzling state of affairs is no longer explained by enhanced erosion with deposition further south at the ice sheet periphery, but by ineffective deposition on the shield. (p. 4) The new explanation does not fit the facts because each glaciation which retreated to the shield and melted should have thick subglacial and supraglacial sediments similar to the periphery area. It would be difficult to blame the regional difference on the cold temperatures of the shield since observations on Spitzbergen show supraglacial landforms that were deposited after a recent advance. (p. 74,75) In a rapid post-Flood ice age, as envisioned by this reviewer, the Canadian shield, especially its western portion, would have a thinner ice sheet due to its distance from copious

moisture sources. Most snowfall would be along the edge of the ice sheet. Little glacial erosion and deposition over the shield would be a result of the ice sheet being cold based and its surface being relatively flat (glacial flow is proportional to the surface slope).

A number of other new ideas were discussed in this volume. Hudson Bay, assumed glacially eroded in the past, is at least partially the result of tectonic subsidence. (p. 227) U-shaped valleys have been considered glacially eroded. However, they are "frequently the result of postglacial slope processes that erode sediments along the valleysides and redeposit them as coalescing fans." (p.91) The classic area where four ice ages were first developed was the Alps. Because of the modern triumph of the astronomical theory of the ice ages, the Alps sequence as defined by gravel terraces is now assumed "a result of repeated tectonic uplift cycles not widespread climatic changes per se." (p. 217) There are a number of periglacial features found south of ancient ice sheets. Chapter 5 emphasized that although they represent very cold conditions, none are unique, as non-glacial processes can duplicate them. (p. 111, 122, 133) There is controversy over drumlin and esker formation, and some creationists have questioned whether they develop from glaciers at all. The latter question seems answered by observations of both from a retreating Icelandic glacial lobe. (p. 45 and Fig. 2.9a, b, p. 32-35)

New observations of modern day varves and their mode of formation has clouded their meaning for the post ice age time scale. They are admittedly poorly understood, and the one year "time framework is difficult to demonstrate however." (p. 150) Research from modern lakes has shown that turbidity currents are often responsible for laminated clay and silt layers:

There is increasing recognition that many sequences previously described as varves are multiple turbidite sequences of graded silt to clay units without any obvious seasonal control on sedimentation. (p. 151)

Some varves or varve-like sequences can be quite thick near the glacier; the coarse summer layer has been measured up to one meter thick.

In summary, creationists should find much of value in *Glacial Geology*. One technical criticism is the numerous typographical errors in the text.

Reference

1. Oard, M. J. 1979. A rapid post-Flood ice age. *Creation Research Society Quarterly* 16:29-37,58.

The Living Planet: A Portrait of the Earth by David Attenborough. 1984. Little Brown, Boston. 320 pages. \$25.

Reviewed by Jeffrey Marsh (reprinted from *The Washington Times Magazine* (January 14, 1985) by permission.

The unavoidable response evoked in the reader by David Attenborough's *The Living Planet* is a sense of wonder at the immense variety of forms of life inhabiting the earth, the wide range of environments and how living organisms have succeeded in colonizing the whole planet.

The book is a companion to the author's PBS television series. Mr. Attenborough's mastery of TV trans-

fers surprisingly well to the printed page. The book is divided about equally between full-page color pictures, some of quite astonishing beauty and others guaranteed to provoke intense curiosity about their subjects, and a descriptive text that succinctly discusses the natural history of both the illustrated creatures and many others which the reader wishes he also could see.

From the author's preface, it appears that there are differences between the book and the series, so that the eager reader who watches diligently may still miss seeing various phenomena whose description has piqued his interest. Overall, however, the structure of the two versions is the same, and the book's faults are the same as those we associate with TV, in particular a lack of depth, so that after finishing the book one feels like a man who has eaten a multicourse meal consisting entirely of appetizers: with a full stomach but still hungry for a main plate.

Mr. Attenborough's final chapter shows how man has transformed his environment, both physically and by deliberately selecting certain strains of the original wild population of flora and fauna to domesticate food grains, sheep, cattle and pets. Man also has encouraged unintentionally a variety of unwanted pests—rats, roaches and pigeons—to flourish in new and quite unnatural surroundings, and has unthinkingly caused the extinction of numerous other species, by overhunting, destruction of habitats and by the introduction of predators into previously sheltered environments.

The concluding words of the book are dramatic: "We are alone in space. And the continued existence of life is in our hands." This alarming warning, fortunately, is quite inconsistent with the inescapable message of the rest of the book.

Man's extermination of various other species is perhaps regrettable, although it is arguable that the dodo, by our knowledge of its extinction, actually has played a more significant role in the world than it would have, had it remained flourishing and obscure. It is not, however, a remarkable phenomenon in a world which, as Mr. Attenborough shows, is the scene of a continuous life-or-death struggle between species for food and resources.

The only moral that can be drawn from the multitude of examples he gives is the ability of living creatures to adapt to the most unpromising circumstances. For example, the word from Smithsonian Institution researchers just a few weeks ago that plant life can exist in depths of water far greater, and under levels of illumination far lower, than previously was believed possible.

Indeed, it may safely be concluded that even under the worst possible misbehavior by humanity—a full-scale thermonuclear war, with the worst consequences postulated by the most pessimistic recent studies of the resulting "nuclear winter" brought about by massive fires—many forms of life on earth assuredly would survive.

Each of the 12 chapters deals with a different region of the globe, and describes the specific ways in which its typical inhabitants have adapted to it. Mr. Attenborough begins with the most hostile environment of all, the superheated, sulphurous waters discharging from undersea volcanos, which deepsea explorers in the 1970s discovered were colonized by a previously

unimagined variety of specialized forms, including giant worms, fish, crabs and clams.

Next, the author moves on to the more familiar, but scarcely less hospitable, frigid mountaintop and polar regions, where specialized algae are able to survive under the surface of the snow.

He then proceeds through the major geographical regions of the earth. Moving away from the poles, with their birds and mammals with characteristically thick layers of fat and water-resistant fur, Mr. Attenborough passes through the subpolar regions with their vast forests of coniferous trees, able to resist snow and conserve water, through the well-watered temperate forests and drier grasslands, populated by leaf-eating and grazing animals and insectivorous birds, to the tropics, where an abundance of light, heat and moisture provides the optimal conditions for a lush plant life, which in turn supports an unparalleled richness of animal and bird life adapted to every available niche.

Above us, the sky makes a home for active flying creatures like the birds, bees and bats and serves as a route for the passive transportation of wind-borne

spores, seeds and spiders. It plays a vital role in the recycling of water transpired by trees and evaporated from the seas, rivers and lakes which themselves serve both as sources of that vital fluid and provide another environment which, depending on its rapidity, salinity and transparency, can support many more kinds of life.

Perhaps the most intriguing environments, however, are the isolated regions, islands and remote valleys, where a plethora of highly specialized and unique forms have developed and provided the most striking examples of adaptation of living species. It is not coincidental that these cases have provided the major inspiration for biological thinkers from Charles Darwin to Ernst Mayr.

It is unfortunate that Mr. Attenborough concludes his book with such atypical indulgence of anthropocentric egotism. A more suitably humble perspective on the complex beauty of the natural order from which the human species has benefited so much, and one which assigns a more plausible motivating responsibility, was formulated by the Psalmist: "How great are Thy works, O Lord, all of them created in wisdom. The earth is full of Thy possessions."

CREATION RESEARCH SOCIETY

History The Creation Research Society was first organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a real need for an association devoted to research and publication in the field of scientific creation, with a current membership of over 600 voting members (with graduate degrees in science) and over 1500 non-voting members. The *Creation Research Society Quarterly* has been gradually enlarged and improved and now is recognized as probably the outstanding publication in the field.

Activities The society is solely a research and publication society. It does not hold meetings or engage in other promotional activities, and has no affiliation with any other scientific or religious organizations. Its members conduct research on problems related to its purposes, and a research fund is maintained to assist in such projects. Contributions to the research fund for these purposes are tax deductible.

Membership Voting membership is limited to scientists having at least an earned graduate degree in a natural or applied science. Dues are \$15.00 (\$17.00 U.S. for overseas) per year and may be sent to Glen W. Wolfrom, Membership Secretary, P.O. Box 14016, Terre Haute, IN 47803. Sustaining membership for those who do not meet the criteria for voting membership, and yet who subscribe to the statement of belief, is available at \$15.00 (\$17.00 U.S. for overseas) per year and includes subscription to the Annual Issue and Quarterlies. All others interested in receiving copies of all these publications may do so at the rate of the subscription price for all issues for one year: \$18.00 (\$20.00 U.S. for overseas).

Statement of Belief Members of the Creation Research Society, which include research scientists representing various fields of successful scientific accomplishment, are committed to full belief in the Biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution), both of the universe and the earth with its complexity of living forms.

We propose to re-evaluate science from this viewpoint, and since 1964 have published a quarterly of research articles in this field. In 1970 the Society published a textbook, *Biology: A Search for Order in Complexity*, through Zondervan Publishing House, Grand Rapids, Michigan 49506. Subsequently a Revised Edition (1974), a Teachers' Guide and both Teachers' and Students' Laboratory Manuals have been published by Zondervan Publishing House. All members of the Society subscribe to the following statement of belief:

1. The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in all the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths.

2. All basic types of living things, including man, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.

3. The Great Flood described in Genesis, commonly referred to as the Noachian Flood, was an historic event worldwide in its extent and effect.

4. We are an organization of Christian men of science who accept Jesus Christ as our Lord and Saviour. The account of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Saviour for all mankind. Therefore, salvation can come only through accepting Jesus Christ as our Saviour.

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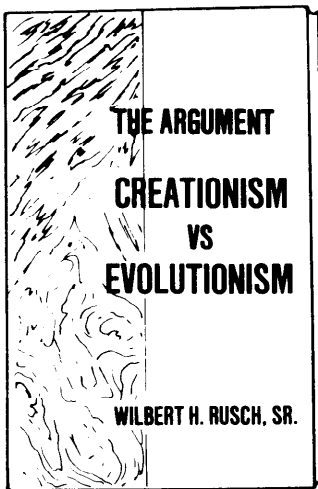
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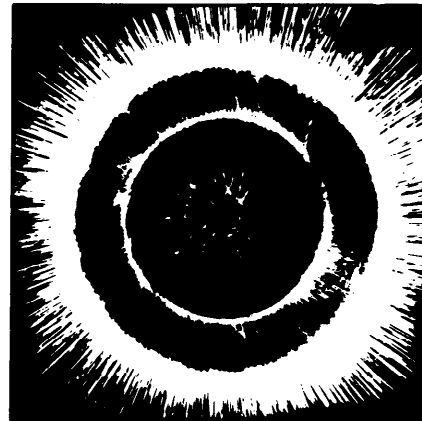
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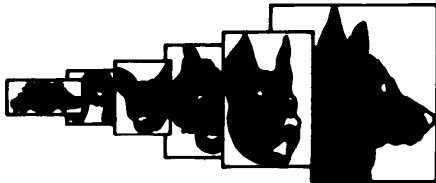
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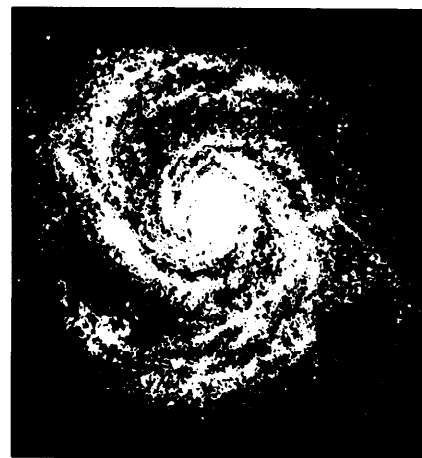


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