

the possibility of global warming to limit the production of carbon dioxide. The foremost is that fossil fuels, the primary source of carbon dioxide, are non-renewable resources which are vital to modern Western civilization.

Acknowledgment

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SYMPOSIUM ON VARIATION—XII

THE LIMITS TO VARIATION

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Abstract

Variation can be readily observed within species and can be shown to be involved in speciation through mechanisms such as random change occurring in the genome, and selection pressure acting on populations. However, there is no evidence that "missing links" occur and punctuated equilibrium theory, while providing an explanation for this, does not provide proof that "evolution" has caused the changes required to create new phyla.

Variation

There can be no doubt that considerable variation occurs within species. Variation in morphology is apparent in man (e.g., color, fingerprints, eyeshape) and selective breeding of pets and livestock has been practiced since before records began. Perhaps the most obvious example is provided by the many varieties of domestic dog which are all one species (whether Great Dane or Chihuahua) and which can often interbreed now only with the intervention of man. Yet from the time of Aristotle western scientists have generally perceived that the living world is highly ordered in a hierarchical system despite the variation. Nearly all the great biologists who founded comparative anatomy, taxonomy and paleontology, such as C. Lyell, R. Owen, G. Cuvier, C. Linnaeus and L. Agassiz, adhered strictly to a discontinuous topological model of nature. However, from the 1860's evolutionary biologists, building on Darwin's ideas, have been claiming that the same pattern provides support for organic evolution. This is the concept of species change by the natural selection of heritable differences which arise at random in each generation.

With the development of genetics and more recently molecular biology, the complex changes in genes and DNA sequences that drive genetic and thus phenotypic variation have been revealed. This has provided the mechanism upon which the concept of gradualistic non-random evolution has become firmly established. The theory, perhaps better described as a metaphysical dogma is now known to its followers as "Neo-Darwinism" or the "Synthetic theory."

Although there has been much debate about Darwinism as a philosophy, even within the scientific community (e.g. Halstead, 1980, p. 215; 1981, p. 403; Eldridge, 1986, p. 54; Perutz, 1986, p. 36)), there is no doubt that at the species level at least "micro-evolution," in the sense of change, has occurred. Clear and unambiguous sequential arrangements of DNA can be reconstructed to show the process by which new genes arise. Because of their much faster generation times, change is best seen in micro-organisms and in smaller invertebrates such as copepods where, for example, studies of the segmentation and setation of the limbs has enabled extensive lineages of species to be traced to taxonomic levels above that of Order. Comparison of genera and species of fish and their parasitic Copepoda from New Zealand and Australia led Jones (1988) to strongly suggest that the New Zealand copepod parasite fauna was derived from the Australian with subsequent speciation. Among vertebrate groups, an example of species formation among birds is provided by the phenomenon known as circular overlap. The following example is provided by Denton (1986, p. 81). In Europe there are two species of gull, *Larus argentatus* (the herring gull) and *L. fuscus* (the black backed gull). These distinct species co-occur but do not interbreed. Further to the east, in Russia, the herring gull does not occur. The black backed gull becomes increasingly unlike the European type but resembles the herring gull until in the United States the herring gull only is found.

Mechanism of Variation

Given that variation does occur and can lead to differentiation at the species level, what is the mech-

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anism by which it happens? Neo-Darwinian theory proposes the concept of "natural selection" or the gradualistic selection of advantageous mutants by environmental selection pressures. However, the development of the Neutral Theory by Kimura in 1968 (see Kimura 1985, p. 41) proposed that the majority of evolutionary changes at the molecular level are caused, not by Darwinian selection but by the random fixation of selectively neutral, or nearly neutral, mutants. The most important evidence for this theory was the discovery of "pseudogenes" or genes that had lost their function. In these "dead" genes it has been estimated that the "evolutionary" rate (the change in DNA sequence) is much faster, by about a factor of 10, than in the normal genes. If change is caused by natural selection of the fittest, it is difficult to see why the functionless genes should be evolving so fast. But neutral theory maintains that in a pseudogene all mutations are neutral, occurring at random and accumulating over time. Change is slower in normal genes because many mutations are deleterious to function. We also know that the cells can incorporate bacterial and viral DNA. For example McKenzie (1990, p. 14) explains that schistosomes can incorporate genes from retrovirus, while Chesnick and Cox (1986, p. 291) provide a review of bacterial symbiosis in cells. There is now strong evidence from RNA comparisons that plant chloroplasts and cell mitochondria were once symbiotic bacterial cells (see Gray, 1984, p. 693).

It should also be noted that the inheritance of acquired characteristics, proposed by Lamarck and vigorously attacked by evolutionists, has not yet been disproved. The evidence that animal populations can change their phenotype in response to the environment is well established. A good example is provided by Lindsey (1981, p. 1497). Until we understand the mechanism we are in no position to dogmatize about the effects of the environment on the genome. Lamarckism has always been an anathema to Darwinists (Maddox, 1981). The apparent ability of the bacteria *Escherichia coli* to generate beneficial mutations in response to the environment, reported by Lewin (1990, p. 15), has again fueled this debate.

Are There Limits to Variation?

There is no evidence that the major divisions in nature can be crossed by the processes just discussed. There is obviously an enormous difference between the speciation in fruit flies and the hypothesized development of birds from reptiles. Agassiz, for example held that all variation was merely variation on an underlying theme or design that was fundamentally immutable: all birds are equirepresentative of Aves; hair is unique to mammals. These limits have also been recognized by Neo-Darwinists. The problem of the "missing links" is as real today as it was in the 1860's. Even 130 years of searching have not produced one convincing example, despite the requirement for a graduation of intermediate forms between phyla which gradualistic evolutionary theory would require. Moreover, many of the sequences of fossils that have been assembled seem to have started simultaneously or in groups of sequences that suddenly "jump" to new series (e.g., the Cenozoic mollusc sequences reported by Williamson, 1981, p. 437) from the Turkana

Basin. These jumps, or "Punctuated Equilibrium Theory," which does away with the need for missing links, are a direct contradiction of Darwin's assertion that nature does not make jumps. The theory was vigorously attacked by Darwinists. More recently with the development of the idea of genes switching on and off, and of mathematical models that show that bursts of rapid change following long stable periods are consistent with classical Neo-Darwinist mechanisms, including selection, the theory has been absorbed into the dogma of Darwinian evolution as explained by Lewin (1986, p. 672). Though punctuated evolution theory explains how the observed changes in the fossil sequences might have occurred, it provides no evidence that they actually occurred through Darwinian selection mechanisms. Indeed the magnitude of the sudden changes required to put into place new organ systems strain credibility. Crawley (1985, p. 1463) cites an excellent example. The development of complex structures such as the eyes of the Australian female net casting spider which work at an aperture of $f/0.58$ with perfect chromatic and spherical aberration correction cannot be explained by evolutionary theory which would have gradual change from a simple to a complex eye while maintaining perfect vision throughout the series.

A Personal View

A basic problem is the lack of any coherent alternative theory. Any such theory must not only fit the observed facts but must also have a predictive capability such that it fits new facts as they emerge. This creationists have failed to do. It is easy to pick holes in other theories, but evolution, with all its faults, offers a comprehensive (if incomplete) explanation of observed variation and a framework in which new discoveries in genetics and molecular biology can be tested. However, I recognize that evolution fails to provide answers on a microbiological scale. What I believe to be happening is the occurrence of a form of classical typology. Fixed "kinds" (corresponding more or less to phyla) occur within which variation occurs by random mutation, genetic recombination, gene switching and environmental selection pressures (in a sense, a fall from the original genome). Within "kinds," change in species can be monitored and phylogenetic 'trees' constructed. In this way the complex and highly modified parasite fauna, especially the parasitic Copepoda with which I am familiar, such as *Sphyrion* or *Mugilicola*) can be traced back to free-living ancestral forms. Reptiles never have, and never will "evolve" into birds nor will fish become apes. There are no missing links. Where the "kinds" came from can be explained by several theories, such as polyphyletic evolution, but I prefer to ascribe their origin to an act of Original Creation.

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SYMPOSIUM ON VARIATION—XIII

THE LIMITATIONS OF VARIATION

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Abstract

Variation is a normal characteristic of living organisms, and the operation of the laws of chance under natural conditions maintains the stability of these respective kinds. It is necessary to prevent natural conditions in order to produce and maintain new strains of livestock and vegetables, and the new varietal characteristics would usually hinder survival in the wild state. The effect of the gene pool is noted in variations in color, including albinism and melanism. Unusual Australasian forms are discussed in the light of the fossil record. Other variables include bird life and isolation, and human disease resistance. The relationships of environment to variation are discussed in reference to animal size, climate, elevation, degrees latitude, high temperature, salinity, moisture, aridity, and geographic distribution, along with the limits that can be endured by living organisms.

Introduction

Variation refers to a deviation in the structure or character of an organism from that of the majority of others of the same species or group. Variation is one of the features in the plant and animal world which magnify the beauty and intricacy of the handiwork of God. *Speciation* is more difficult to define, inasmuch as this term implies an assumed development of one species into another. The distinction of whether one organism's deviation from another is sufficient to constitute a new species is a subjective and controversial one with scientists, even with evolutionists who disagree where to draw the line to indicate a different species. Thus the term *kind* may be more significant than that of *species*, and is frequently used in the vocabulary of creationist biologists. The extent of variation among plants and animals, and the factors that limit variation, constitute a vast subject. This study is therefore limited to comments on the gene pool and some important environmental factors.

The Gene Pool

Variation according to traditional evolution depends on the "laws of chance." For example, for every random gene for longer legs, one for shorter legs should appear also. The result is that the overall effects of these are cancelled and the status quo tends to be preserved. These extremes usually cannot survive without other genes being present to compensate the effect of the new character. Shorter legs will result in slower running, and longer legs may compromise balance on difficult terrain, so larger animals with deviant char-

acteristics will be more easily captured by predators and smaller ones by birds of prey. There are some animal kinds in which the population has always been short-legged as indicated by the fossil record. Thus alpine species are relatively short-legged, and those which dwell in subterranean burrows are quite short-legged. Animals which have been long-legged as far back as geological evidence can be found are equipped to inhabit plains, steppes, and particularly the African savannas, and are well equipped to avoid their predators by their sheer speed.

Some evolutionists have conjectured that the huge Irish elk, which had an antler spread of up to 11 feet, developed its size and large antlers by evolution, to the point where it suffered extinction by having its antlers caught in the foliage of trees (Figure 1). Not only is there no evidence for this, but such thinking is inconsistent. According to the teaching of the survival of the fittest, it could not gradually evolve an antler larger than that which would be optimal for survival. In contrast, extinction by a *sudden* environmental change would give evidence for catastrophism.

Variations which provide more significant differences, or *sports*, are sometimes claimed as evidence for organic evolution. Examples include sweet Concord grapes, hornless cattle, short-legged sheep, "double" flowers, and new varieties of seeds (Fenton, 1972, p. 332). A second look at this list, however, indicates that these characteristics would not last in the wild, as all of them compromise the species' chance of survival. For example, the Concord grape, while serving mankind as a superior grape (particularly when used fresh), is much less insect- and disease-resistant

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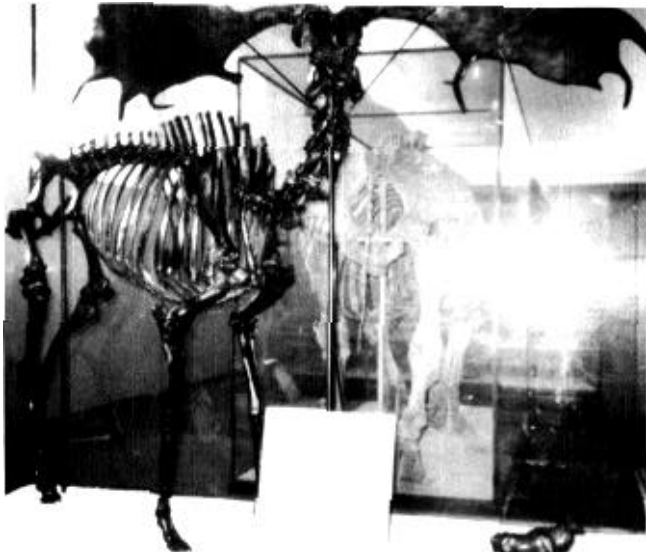


Figure 1. Skeleton of the Irish Elk. Photographed in the American Museum of Natural History, New York City.

than the northern fox grape (*Vitis labrusca*) from which it stems. Obviously, a hornless strain of cattle would be at a distinct disadvantage in warding off predators in the wild state.

The fine tomatoes we have developed have been selected for characteristics which decrease their survival in the wild. Large size, tender skin, few seeds, juiciness, and flavor all make them more susceptible to the ravages of insects and disease. We need to go back to the wild tomato for breeding in disease resistance. The same is true of domestic animals such as dairy cows. Further, the only way that the new varieties can be maintained is by artificially preventing natural selection. That is why the dairymen must carefully maintain the blood lines in sire and dam, and the tomato breeder must cover his blossoms to prevent random pollination. Otherwise the cows revert to scrub cows, and tomatoes revert to small, less desirable tomatoes with more wild characteristics.

Variation in Color

Variation in color contributes much to our enjoyment of wildflowers and bird study. Some examples of these are the swamp rose-mallow (*Hibiscus palustris*) which is usually white with a crimson center, pure light pink, or pink with a crimson center, although pure white and pure dark pink can be found (Figure 2). Occasionally a dark red with smoother petals can be found, but the petals are more strap-like and somewhat defective. Likewise the alien chicory (*Cichorium intybus*), although usually blue, can often be found with white and lavender variants growing among them.

Striking examples of color variation are found in pure albino animals and birds with pink eyes and pure white fur or feathers. These are usually rare and are at a disadvantage to survive, because the absence of pigment in the retina causes poor vision and makes one stand out from its environment. Also, other animals or birds tend to pick at it and threaten it by assault. In the arctic some animals that are not true albinos are white all year; others only in winter. The arctic wolves

on Ellesmere Island, at the very northern tip of Canada, are white but do not have pink eyes. However, they are the same species (*Canus lupis*) as the black and gray wolves found in Alaska, Siberia, and the lower United States. Polar bears also have uniformly white fur with a tinge of yellow, and dark eyes and nose. White squirrels are resident in Olney, Illinois where complete protection perpetuates inheritance of the trait. Many arctic species are white only in winter, becoming brown in the spring and summer.

Similarly, the Cuni Indians, inhabiting the San Bias Islands off the east coast of Panama, have the highest proportion of human albino births in the world, 7%. This percentage is maintained somewhat artificially by favoring the albinos in family and tribal relations, and also by tribal law which prohibits intermarriage with whites. Albinism is caused by the presence of inhibitor genes which prevent the formation of the pigment called melanin.

Many degrees of partial albinism, with large white areas mingled with darker areas, can be found in animals such as blue-eyed white bison, white-tailed robins, and mule deer with large white areas in the hide. In the same family one mule deer may be approximately one-half white and the other one-fourth white (Figure 3). Albinism in plants, such as corn, is lethal because of the absence of chlorophyll, except where the plant is saprophytic as in the Indian pipe (*Monotropa uniflora*) or parasitic as in some fungi.

On the opposite end of the spectrum, melanism denotes an excessive deposit of melanin in hide or feathers. Rudyard Kipling's "black panthers" in the *Jungle Book* are examples of melanism in leopards of India, a trait found also in the jaguar in the Western Hemisphere. The black silver fox illustrates this also. Usually black leopards and foxes have normal-colored

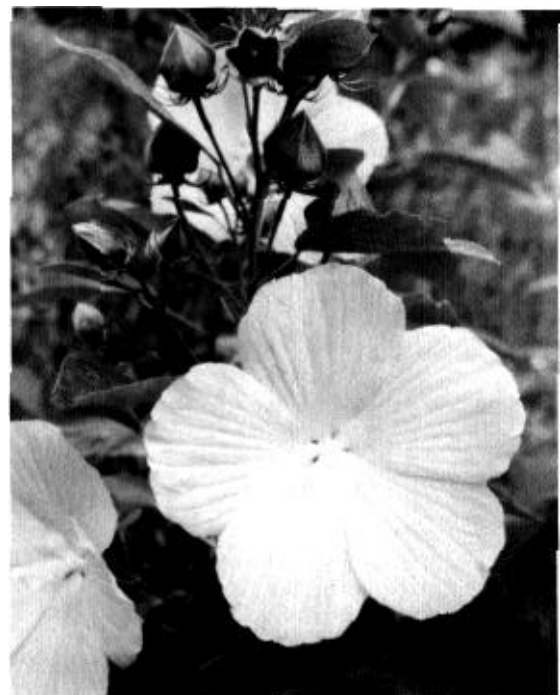


Figure 2. Pure pink Swamp Rose Mallow (*Hibiscus palustris*). Photographed on the author's home property.



Figure 3. Partial albinism in mule deer (*Odocoileus hemionus*) which invaded the author's camp in Olympic National Park. WA.

siblings. In the black leopard, spots can still be seen although largely masked by the melanism. In animals melanism is a minority or recessive trait, and ordinarily would seem to decrease the likelihood of survival. Partial melanism is found in the dark phase of hawks such as the rough-legged (*Buteo lagopus*), ferruginous (*B. regalis*), red-tailed (*B. jamaicensis*), Swainson's (*B. swainsoni*), Harlan's (*B. harlani*), and short-tailed (*B. brachyurus*).

Melanism in man is more complex. Scheinfeld feels it may be determined by two pairs of genes, with two black and two dark melanoid genes in Caucasians, with intermediate forms in between and many other genes possibly involved (Scheinfeld, 1965, pp. 88-89). These chromosome locations govern principally the extent of melanin deposition in the skin in granular form, and "melanoid" in diffuse form. Thus the offspring from two mulatto parents may vary from quite dark to quite light, but this can be true to a lesser degree when both parents are white. Other factors that seem to alter skin color are hemoglobin, and a tinge (not pigment) of color imparted to skin by deep opaque underlying layers of skin which scatter the light and give the bluish end of the spectrum. It is thought that the darkest skin, eyes, and hair are caused by an intensifier gene. Yellowness of the skin may be increased by carotene, a yellowish pigment related to that in carrots, and also melanin in finely dispersed form. Some have theorized that races of Mongoloid origin may possess an intensifier gene for carotene. In African negroes and blacks in Australia and South Pacific Islands, melanism is associated with other facial and body features, whereas in India it is present with the typical European phenotype. In tropical climates it would appear to favor survival, whereas the blond, blue-eyed Nordic type survives well in northern areas. Melanism in man is expressed by an additive effect of the number of genes governing it, and thus the latter have intermediate degrees of melanism in contrast with that in lower animals, which is a recessive trait in the examples given.

The dark form of the peppered moth (*Biston betularia*) seems to have increased in smoky districts of England subject to heavy industrialization. Its color camouflages it better there against predation by birds such as the native tits. Some contend that this is an example of evolution, but this is rather an example of simple variation.* Both dark and light forms are the same species, the dark variant having been in existence long before the industrial era.

Australasia-Structural Variation

Theoretically, the gene pool would seem to be affected by the size of the breeding population, and isolation would favor increased variation. The evolutionist would claim then that speciation would likewise be a natural result in Australasia. The number of living marsupials in South America and the large number of marsupial fossils in both North and South America (Fenton and Fenton, 1958, p. 379) indicate that this theory is not correct. In addition, the fossils of marsupials in Australia itself are all in surface deposits with no underlying fossils indicating gradual change in their direction. One must also consider that isolation actually limits the size of the gene pool.

An enthusiastic Audubon lecturer in our area, showing pictures of Australia and New Guinea, became carried away by this subject and began to use superlatives such as, "This is an ideal place to study the evolution of animals and plants, as new species are forming all the time." He attempted to fortify this statement by trying to show differences between the echidna, an egg-laying mammal (*Tachyglossus aculeatus*) in New Guinea and Australia (Figure 4); (Serenty, 1972, pp. 16-18). Actually these differences are minor, and one can identify them as the same animals at a glance. The Tasmanian echidna is also structurally and externally essentially identical but having more hair than the other two, and they are all classified as the same species (Norwalk and Paradise, 1983, pp. 4-5). These differences are obviously less than those manifested between the races of man, all of which are recognized as *Homo sapiens*.

Bird Life and Isolation

Isolation is particularly difficult to maintain among bird life. North America is visited by many species from abroad, some accidentally, some regularly. Among the European birds that find their way to our shores are the lapwing, ruff, European woodcock, European teal, barnacle goose, European widgeon, Baikal teal, black-capped petrel, and Harcourt's petrel. From Mexico, South America and the West Indies come the jacana, masked duck, red-billed tropic bird, blue-footed booby, brown booby, Mexican duck, thick-billed parrot, elegant tern and bridled tern. Asiatic visitors are the blue throat, wheat ear, arctic warbler, Harcourt's petrel, New Zealand shearwater, slender-billed shearwater, pale-footed shearwater, scaled petrel, and white-tailed tropic bird. When our sandhill cranes (*Grus canadensis*) migrate to Canada and Alaska, a number of the latter fly to Siberia to be with the same Siberian species nesting there.

*Editor's Note: See Williams, E. L. 1986. A reevaluation of the English Peppered Moth's use as an example of evolution in progress. *CRSQ* 23:27-28.



Figure 4. Tasmanian echidna (*Tachyglossus aculeatus*) of the same species as that found in Australia and New Guinea.

Variation in Bird Migrations and Calls

Some scientists are not satisfied with the separation of eastern and western meadowlarks entirely on the basis of differences in song, as they cannot be distinguished by field marks. As Mumford had indicated, "... one difficulty with records of singing birds [is that] some individuals sing both the western and eastern meadowlark song." This was discovered by Samuel W. Witmer who watched and listened to one singing both songs in 1937 near Goshen, IN (Mumford, 1984, p. 332).

Especially interesting are the "regularly scheduled" migration flights of birds and fishes. The arctic tern flies 22,000 miles from the Arctic just after the sun is beginning to sink below the horizon at midnight, after six months of continuous light, and arrives in the Antarctic about the time the midnight sun can be seen, and continues there for six months. It spends most of its life in nightless splendor. If it had tried simply to find a cool region far to the South, it would have been persuaded to turn back in the region of the equatorial calms, where the air is traveling vertically upward in hot blasts to the upper atmosphere. This argues for a migratory instinct placed within it by its Creator.

Similarly, the eels from North America and Europe congregate to spawn near the Bermuda Islands in the Sargasso Sea. They then die and the fingerlings that develop from the eggs begin their long migrations back to North America and Europe without their parents or chart or compass. It takes a year for the American eels and three years for the European ones to find their way to the same ancestral waters from which their parents came. The American species never become confused and migrate eastward to Europe, nor do the European ones migrate westward. This seems to offer powerful evidence for a created instinct placed within them in centuries past.

Variation in Inheritance of Human Disease Immunity

When the white man came to this country, he brought with him not only valuable foreign plants and animals such as the potato and horse, but also his diseases. The Indians had not been exposed to these illnesses, and had not developed immunity against them. Consequently, the death rate among them was high when they were exposed to such diseases as smallpox, with entire villages being wiped out.

Two groups of whites in America have lived for several generations in semi-isolation: the Amish and the Hutterites. Both stem from the Anabaptists, originally the most evangelistic groups of the Reformation period. Persecuted relentlessly by both Catholic and Protestant state churches, the second generation withdrew to forested mountains and any refuge where they could survive and raise their children in peace. They were somewhat forced to intermarry under these circumstances, and consequently they have been studied extensively by the Ford Foundation, Johns Hopkins University and other similar institutions. The Amish have demonstrated a high incidence of congenital and inherited diseases, including mongolism (Down's Syndrome), polydactyly, muscular dystrophy, various anemias and chondroplastic dwarfism, to name some of the most prominent of these disorders. On the other hand, the Hutterites, beginning with few ancestral families have almost none of these maladies. This is presumably because the Hutterites have taken special precautions such as forbidding marriage between cousins. *Disease resistance* is related to the immune system, and does not affect structural change. *Inherited* diseases, until very recently, caused early death, and in older societies those diseased were not considered marriageable and thus could not compete with their siblings.

Environmental Factors Causing Variation

It has been observed that large size can be a detriment to survival. Most of the largest birds, such as the moa, have already become extinct. Further, those that survive but are on the verge of extinction are the largest in their respective groups. This is particularly outstanding among the largest birds, e.g. the trumpeter swan (*Olor baccinator*), the California condor (*Gymnogyps californianus*), the whooping crane (*Grus americana*), and the ivory-billed woodpecker (*Campephilus principalis*).

The farther we travel northward from the equator the larger the animals are *within their respective group*. The largest specimens among timber wolves, moose, brown bears and song sparrows are all found in Alaska. Likewise the smallest race of Virginia deer (*Odocoileus virginianus*) is the Key deer in the Florida keys, which is the size of a dog. The northernmost tiger (*Panthera tigris*) is the Siberian race which is the largest, whereas that found in the South Sea Islands is the smallest.

We find a few exceptions to this, however, the gaur (*Bos gaurus*), a wild cattle found from India to Malaya, is comparable to the largest of the wild cattle with a weight of up to 1000 kg, the maximal size obtained by other large wild oxen, including the more northern yak (*Bos grunniens*) (Norwak and Paradise, 1983, pp. 1250-1253).

Traveling northward into arctic regions, animals become more scarce, but the waters, especially the ocean, are teeming with fish. Many animals become white in winter and replace the fur with dark hair or feathers in the spring, including the short-tailed weasel, the arctic (*Lepus arcticus*) and snowshoe (*L. americanus*) hares, and the ptarmigans (*Lagopus lagopus* and *Lagopus mutus*). As we have noted, some are white all year, such as the arctic wolf (*Canis lupus*) and the polar bear (*Thalarctos maritimus*). Notable exceptions however are the darker musk ox (*Ovibos moschatus*), woodland caribou (*Rangifer caribou*) and black and gray phases of the wolf (*Canis lupus*). Animal life can be found as far north as land continues. Plant life on land becomes stunted in the far north until finally the last trees, often aspen (*Populus tremuloides*) and tamarack (*Larix laricina*) disappear. Herbaceous plants likewise are shorter and are able to endure freezing weather partly because of increased osmotic pressure in the protoplasm, and the fact that water molecules are adsorbed on the surfaces of colloids within the protoplasm and are not free to freeze. Despite these variations which enable survival in the far north, when the snow line is reached all surface vegetation disappears on land although the snow line may vary on the same mountain from one year to another.

Alpine plants must similarly withstand extremes of cold and high wind velocity. Small plants, thicker leaves, brighter floral coloration all favor survival. The apparent isolation and climatic rigors would seem, to some scientists, to favor change as expressed by organic evolution, but the high altitude and wind velocity favor widespread dissemination of seed and pollen. Alpine plants are thus unusually stable and enjoy freedom from isolation in comparison with those at lower altitudes. The snow-lotus (*L. himalaya*) is covered with white hairs and white flowers, and its roots can penetrate stony alpine soils to a depth of more than three feet, enabling it to blossom and bear fruit even when the ground is snowy. The ability to withstand high wind velocity and cold has its limitations, however, and these factors can ultimately overcome any tenacity to survive, as evidenced by the appearance of "balds," even on top of southern mountains such as the Great Smoky Mountains in Tennessee and North Carolina, and barren heights on southwestern mountains.

The ability to withstand high temperature also has its limitations. Emerald Pool in Yellowstone National Park appears to have emerald-green hot water. This is due to the presence of three blue-green algae in the water, a unicellular alga (*Gloeotheca yellowstonense*), and two filamentous algae (*Phormidium rubrum* Tilden and *Phormidium faveolarum* [Montagne] Gomon). These, combined with the natural deep blue in the hot pools, produce the clear deep green for which this pool is famous. Dr. Arthur Nash, former ranger naturalist, recorded the water temperatures at 69.5° C. (Haynes, 1949, p. 86). It is amazing that these algae can withstand such high temperatures. There is a limit to this, however, as the protoplasmic proteins undergo chemical change and the cells die if the temperature is much higher. Nearby Morning Glory Pool has a higher temperature, and no algae can

survive in it. Therefore it is a deep blue due to reflected blue of the sky and the blue imparted to the waters of the area by the presence of colloidal silica.

Cold waters also discourage plant growth, as evidenced by the dearth of aquatic flora on the shores of cold lakes in the high Cascades in Oregon in contrast with the abundance of wild flowers on the shores around the warmer lakes of the middle West such as in Indiana and Southern Michigan.

Soil pH—acidity and alkalinity—can be observed in the Western States such as Western Nebraska and the Great Basin where the rate of evaporation exceeds the rate of precipitation; under these conditions alkali soils and alkali lakes form. Alkali lakes may support good fishing and ducks, geese, muskrats and beaver. The dry alkali soils will support a few tolerant grasses and sedges, but where the alkalinity is excessive, we find only white alkali flats that are essentially bare.

Neutral soils and lakes support a wide variety of flora and fauna, including the climax maple-beech forest. Acid soils support a good but lesser growth of vegetation. They are caused by the leaching of bases (e.g., calcium, magnesium, sodium, potassium) from the aluminum silicate exchange particles in the soil. These are replaced by hydrogen ions which produce acids in the soil complex. In addition to rainfall, other factors tending to increase soil acidity are temperature, age of soil, and type of vegetation. Pines and other evergreen trees do well on acid soil.

Sphagnum bogs produce an environment for acid-loving trees and herbaceous plants. Tamaracks (*Larix laricina*), blueberries and cranberries do well, as also certain species of rare wildflowers such as pink lady's slipper (*Cypripedium acaule*). However, many plants will grow best only within narrow limits of pH. Thus the white lady's slipper (*C. candidum*) and the yellow lady's slipper (*C. parviflorum*) are found more likely in neutral soils in what are sometimes incorrectly called bogs, but are actually fens.

As to salinity, some plants do well along the ocean shores, such as the mangrove trees growing right in the salt water along shores in Florida and the Caribbean Islands. Brackish waters support many plants in bayous and saline estuaries. Many birds such as shorebirds, black brant, and some ducks do especially well. However, living protoplasm can endure only a certain concentration of salt in the aqueous environment before shrinking of the cell membranes and protoplasmic contents which, if not interrupted, causes the death of the cells. The two saltiest bodies of water are the Dead Sea in Palestine and Great Salt Lake in Utah. The latter is so salty that no life can live in it except the brine shrimp and the larval stage of a fly. The Dead Sea water has 24% solid matter, mostly sodium chloride, but it also supports a small crustacean and a few plants (Harris, 1972, pp. 48-49).

Moisture made available when rainfall is heavy develops luxuriant forests in eastern United States and the western edge of Pacific Coast states. Jungles and tropical forests develop where precipitation is great in areas near the equator. Farther away from the western coast of the continents rainfall may be scanty and deserts are found. This climate is very healthful, despite low food production in the area. Dunes may form inward from the shore near the ocean as well as

near the Great Lakes in Canada and the United States. Because of high winds coming off the lakes from the west, "blow-outs" may occur, removing tons of sand and depositing it elsewhere. The most successful tree grown in the dunes is the Carolina poplar (*Populus deltoids*). When sand is removed from around the roots by wind, the root growth downward keeps ahead of the sand removal, taking in much needed soil water. When wind piles sand up around the trunk, new adventitious roots form to stabilize the tree and grow outward to absorb soil moisture. Sometimes shifting sands are excessive and the poplar tree succumbs in spite of its capacity to adjust to rising and falling levels of sand, which is largely silicon dioxide. The striking white sands in New Mexico are actually gypsum (calcium sulphate).

Conclusion

We have reviewed briefly examples of variation in the gene pool, and the fact that these do not account for evolutionary change because of the limitations of the effects that they may have. We have also indicated many variations in the environment, and indicated how these are met by living organisms which in themselves demonstrate variation which can enable them to survive under adverse conditions. We have observed also how their ability to endure environmental extremes is limited and can affect significantly their ability to survive in a particular environment.

For most of the period since Darwin, interpretation of these variations has been left largely to speculation by scientists of a humanistic persuasion who have argued that, given enough time, these variations can account for development into other species by gradual organic evolution, ultimately from amoeba to man. It is my conviction that variation must be interpreted in the light of sound scientific evidence. The fossil record argues decisively that they have not led to significant change, but have remained much the same as they appeared in fossil remains. The lowest fossiliferous strata in the Grand Canyon in Arizona bear fossils essentially the same as living counterparts today. We have a sizeable number of "living fossils" today which argue that they have not changed since the days they were laid down in fossil form (Culp, 1990, pp. 85-87). The striking example, of course, is the Coelacanth, which was known only in fossils until the mid-20th century (Figure 5). Because of the peculiar fleshy portion of its fins, it was given a prominent place in evolutionist charts, allegedly demonstrating a transition stage from fish to amphibians over a period of 90 million (some said 300 million) years. In 1952 a fisherman in the Indian Ocean pulled up a lively five foot specimen and the fleshy appendages had not changed since its fossil counterpart was laid down under flood waters! Similarly, fossil redwood remains called "dawn redwood" (because they were supposed to be the primitive ancestors of our California redwoods) were said by "experts" to have become extinct millions of years ago, but were found growing in the mountains of China in the 1940's. I have a prize specimen of it growing in my lawn for demonstration purposes. Such evidences have caused even many evolutionist scientists to abandon Darwin's theory of gradual change, and adopt another equally speculative-theory



Figure 5. Coelacanth, photographed in the Science Museum in London.

of the "hopeful monster," progressing by great leaps (Gould, 1977, p. 22).

Another critical line of evidence is that of geographical distribution of plants and animals. Evidence is accumulating that the great majority of the large animals in North America have counterparts in Eurasia which are now recognized as the same species with no significant change in the many centuries which have passed since they came to this continent, presumably over a land bridge in the Bering Strait area (Culp, 1988, pp. 24-27). We are accumulating even larger lists of plants and birds which corroborate this conclusion. I challenge our evolutionist friends to seriously consider these evidences, and join us in helping our generation emerge from a position of science fiction to one of solid factual evidence.

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PANORAMA OF SCIENCE

Gaia and Lynn Margulis

It had to happen sometime. The rise of the new age movement, in particular with its emphasis on pantheism, eventually had to marry science. The result is the gaia hypothesis. In this note I emphasize a recent magazine dedicated to the analysis of the gaia hypothesis, the *Spiritual Counterfeits Projects Journal (SCPJ)*, and why Lynn Margulis, a respected botanist, has embraced gaia (Mann, 1991).

The gaia hypothesis, taken after the Greek goddess of the earth, postulates that the earth is alive. The earth itself shapes and regulates the biota and the environment. The earth possesses self-regulating mechanisms "... to maintain the climate and the chemical composition at a steady state favorable for life" (Lovelock, 1986, p. 393).

The *SCPJ* (1991) has five excellent articles dedicated to the gaia hypothesis. The articles describe gaia as a religion of the earth, thus gaia is the mother earth goddess. The gaia hypothesis has spawned several sects the most radical being the "Earth First!" group and the animal rights movement. These groups wish to dethrone man from his preeminent place in nature and bring him down to the level of the rest of nature. This is consistent with the theory of evolution in which man is just a risen animal. Earth goddess worship has come of age within some segments of the feminist movement.

Respected scientist James Lovelock invented the gaia hypothesis. He believes in evolution but reasons that the delicate balances of life and the environment could not have evolved by random, purposeless processes. Gaia causes evolution over an almost infinite amount of time. Lovelock has personally researched the fine-tuned balance of the biota and the environment. Besides his books dedicated to the gaia hypothesis, he publishes his research in respected scientific journals (Lovelock, 1986; Charlson et al., 1987). Lovelock clothes the gaia hypothesis in scientific garb; the hypothesis is becoming a powerful and influential scientific theory.

The new age and pantheistic underpinnings of the gaia hypothesis are evident. Stuart Chevre (1991, pp. 29-30) states:

What is the root cause of our current predicament: moral degradation, narcissistic alienation, environmental destruction, the threat of nuclear holocaust and possible extinction of humanity? According to Lovelock, it is because we no longer practice the rites of the ancients by whom "the Earth was worshiped as a goddess and believed to be alive."

Lovelock as well as others blame the Judeo-Christian worldview for the present environmental woes and for destroying the peaceful goddess-orientated culture of old Europe. To answer the former charge, the *SCPJ*

(1991, pp. 33-34) gives excerpts from Francis Schaeffer's ecological defense of Christianity (Schaeffer, 1970). A proper understanding of creation is the answer to the ecological mess.

A recent article in *Science* (Mann, 1991) describes Lynn Margulis's belief in the gaia hypothesis and the reaction of her peers. She is dedicated to the scientific aspects of the hypothesis and rejects anything that suggests the spiritual. She is branded as a respected maverick, who has been correct previously. Lynn Margulis widely promulgates gaia through the copious attention the media pays to her. Of special interest to creationists are the reasons she accepts the gaia hypothesis and the challenges she presents to her colleagues.

Specifically, she does not believe in neo-Darwinism, which she describes as a complete funk and "... a minor 20th-century religious sect within the sprawling religious persuasion of Anglo-Saxon biology" (Mann, 1991, p. 380). She further describes neo-Darwinism as:

... a "quaint, but potentially dangerous aberration that needs to be tossed out in order for science to answer "basic questions" like why stasis is so prevalent in the fossil record, and how one species can evolve from another (Mann, 1991, p. 378).

She admits that scientists really do not know how evolution supposedly worked. This is also indicated by a remark made by Niles Eldridge in his response to Margulis's gaian belief: "Understanding speciation is indeed difficult..." (Mann, 1991, p. 379).

Lynn Margulis does believe in natural selection, but redefines it as the reciprocal actions between organisms and the environment. She does not believe the slow buildup of chance mutations could result in the fantastic array of living forms. In her scientific addresses, she challenges biologists in the audience to name a single, unambiguous example of the evolution of a new species by the increase of chance mutations. Although biologists can suggest disputed possibilities, so far they have apparently failed to offer one unambiguous example. Instead, Lynn Margulis believes the source of evolutionary novelty is the acquisition of symbionts, in which two organisms co-exist together for mutual benefit. After awhile they somehow become melded together into a new organism.

In one of her talks an engineer challenged her belief that the earth is conscious. She threw the challenge back by saying: "Look if you accept the standard definition of consciousness, it's very easy to prove that most people, biologists included, are totally unconscious their whole lives" (Mann, 1991, p. 381).

It is too bad that few evolutionists take her challenges seriously. She is exposing glaring weaknesses. But instead of embracing creationism, scientists that reject the postulated mechanisms of evolution embrace a new age caricature of creation.

The Gaian scientists are discovering environmental processes that further show the unique balance of nature. It points more naturally toward a purposeful Creator. Creationists may also find the discoveries helpful for creation research. For instance, oceanic phytoplankton probably increase the reflectivity of clouds (Charlson et al., 1987). Lovelock assumes this is another self-regulating mechanism, and for the current earth he is probably correct. However after the Flood, increased phytoplankton, especially coccolithophorids, and the lack of sea ice would substantially increase the amount of sulphur in the atmosphere. This sulphur oxidizes to form an aerosol that increases the cloud condensation nuclei (CCN). More CCN result in a greater number of water drops that reflect more sunlight back to space. This unique process would be another cooling mechanism that would contribute to an ice age after the Flood (Oard, 1990).

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Genesis Kinds

I have pleasant memories of the CRS organizational meetings. As I recall, at that time we engaged in no discussion of the nature of Genesis types or kinds. I could wish that since then there had been a little more sharing of our respective views. The Bible tells us that the Genesis kinds were created by the Word (the Son, Christ, John 1:1-3).

I would like to make known a few items of my philosophical science. It is important to recall that by the time of Creation Week Lucifer, an angel who had been formed the highest of all created beings, full of wisdom (Ezekiel 28:12), had given himself over to a strong desire for self-exaltation and deep jealousy toward his Creator, and as a result had been excluded from heaven. With his angels he took his abode on our earth as soon as it was brought into existence.

One of the attributes of our Creator is foreknowledge. He could see the coming fall of man and the eventual takeover by Satan of our natural world. He knew Satan would search the secrets of the laboratories of nature and learn how he could most effectively mar nature's face. Certainly Satan would attempt a confusion of the kinds of organisms through cross-breeding and thereby a horrible condition would rapidly develop around the world. Therefore the Creator isolated each kind of organism in such a way that Satan would be foiled. Even the highest created being could not solve the problem of how to cross two Genesis kinds.

What is the scientific support of such a view? Just this: never in the history of organisms has it been possible to solve how to cross two Genesis kinds. Lester and Bohlin in their book, *The Natural Limits to Biological Change* (1984, p. 156), suggest my theory of gametic union is "rather simplistic" because it offers no rationale for why kinds cannot cross. How could I explain what I still assume to be a secret of the Creator, a secret which has proved to be an untold blessing to mankind and all nature?

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Catastrophism and Rapid Erosion—III

Introduction

Earlier notes (Williams, 1986; Williams, 1991) discussed rapid erosion, primarily within a catastrophic framework. Austin (1984) has noted many instances where catastrophic geological forces have shaped the earth's surface. Creationists who believe in a worldwide Flood generally suggest that catastrophic conditions are much more important than so-called slow, gradual uniformitarian processes. Creationists often use present-day catastrophic floods, storms, winds, etc. as small-scale models of what could have taken place during and after the Genesis Flood to rework the surface of the earth.

A Cloudburst and Rapid Erosion

Uniformitarian geologists have recorded the results of violent storms and have suggested to their colleagues that possibly they should consider catastrophic processes more seriously. Moneymaker (1938) recorded the erosional effects of a storm in the Tennessee mountains.

On August 5, 1938, a cloudburst of proportions very unusual for the Southern Appalachians occurred on Webb Mountain, located in the southeastern portion of Sevier County in the immediate vicinity of Pitman Center, about fifteen miles southeast of Sevierville. According to the most reliable information available, the downpour commenced at 2:00AM and lasted about four hours. The amount of rain that fell in the four-hour period cannot be precisely determined, but unofficial records indicate that the maximum was in excess of twelve inches. Nearly all of the streams draining the mountain were heavily swollen and even within a few hundred feet of the crest the water was as much as fifteen feet deep in gullies having gradients steeper than thirty degrees. On some of the more uniform slopes the water was not concentrated in channels but moved down the mountain in sheets (Moneymaker, 1938, p. 190).

Webb Mountain is a steep east-west trending ridge about five miles in length. It is 2800 feet above sea-level and stands approximately 1400 feet above the larger streams in the area. As Moneymaker (p. 190) noted:

The unusually heavy rainfall on Webb Mountain resulted in a stupendous amount of erosion in a very short time. Numerous large scars, which are conspicuous for many miles and which no doubt will remain evident for many years, developed on the steeper slopes within a few hours. The channel of nearly every stream in the area was enlarged, even in bedrock, wherever the gradient was steep . . .

Money maker (p. 190) categorized the erosional effects as gullies, landslides and channel erosion.

Channel Erosion and Deposition

Erosion into bedrock was discussed (p. 194).

In the upper courses of some streams, where the gradient is steep and where the rocks dip downstream, the channels have been deepened as much as four or five feet in bed-rock by the ripping off of the much weathered phyllite and thin-bedded quartzite along cleavage and bedding planes and dip joints.

He then noted examples of deposition and postulated that much of the "bottom" land below Webb Mountain could have been brought into existence as a result of a single flood (p. 195). Money maker concluded that:

A study of the erosional effects of the Webb Mountain cloudburst brings to light some facts bearing on erosion and transportation not always fully appreciated by geologists (p. 195).

He observed that a stream can suddenly deepen its channel and that small "bottoms" along mountain streams in the Southern Appalachians may be quickly formed and quickly destroyed by catastrophic floods (p. 196).

Suggested Applications

The erosional effects of this local flood are similar to the effects recorded in Nelson County, Virginia when hurricane Camille dumped 30 to 40 inches of rain in portions of the county in a six-hour period (Williams and Guy, 1973; Williams, 1986; Williams, Meyer and Wolfrom, 1991). The damage in Nelson County was more severe but both of the areas, Webb Mountain and Nelson County, have similar topographies, i.e., steep mountains with narrow valleys. Williams and Guy (1973, p. 1) speculated the erosion from this one flood in Nelson County was likely the equivalent of several thousand years of normal denudation.

Extremely heavy precipitation producing large quantities of water that move rapidly down steep slopes carrying enormous quantities of abrasive material can cause unbelievable erosional damage. As the water moves from a high altitude to a lower level, its potential energy can be converted into kinetic energy and the resulting raging torrents and moving sheets of debris and water are capable of removing massive quantities of consolidated and unconsolidated material.

Consider the formation of canyons, particularly the Grand Canyon of the Colorado River. Sometime after the Flood, large quantities of rapidly-moving water from the higher uplifted elevations flowing into the lower basin and range regions could have scoured out massive areas of sediment, especially if they were not in a fully-consolidated state. See Austin, et al., 1992,

pp. 69-91; Brown, 1989, pp. 74-75, 83; Burdick, 1974, pp. 26-27; Cunningham, 1977, p. 2; Williams, Meyer and Wolfrom, 1991. Other catastrophic mechanisms such as cavitation could have developed to further accentuate the damage (Holyroyd, 1990a, b). Under such conditions, large canyons may have developed in a relatively short time.

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Who Can You Believe?

Science and Scripture

The positions we hold with regard to "creation science" and evolution are closely connected with our views on scientific research and the Bible. Both our confidence in the integrity of the scientific community and our degree of confidence in the inspiration, veracity in scientific matters, and infallibility of the Scriptures play a large role in shaping our opinions. A high view of scientific integrity would tilt us in the direction of the uncritical acceptance of data published in establishment journals in the area of evolution and its chronology. A high and literal view of Genesis on the other hand leads us to question and distrust the scientific literature when it touches these matters. For example, the authors of *Science Held Hostage*, each of whom is "wholly committed to the Christian faith, firmly believing that God and the physical universe are related in a way that is profoundly portrayed by the Creator-Creation metaphor" (Van Till et al., 1988, pp. 42-43) urge caution on the application of Biblical truth to scientific concern:

A question of direct concern to many Christians is, Does the Bible provide any data relevant to the construction or evaluation of theories in the natural sciences? Persons equally committed to

the Christian faith differ widely in their judgment in this matter. Some persons, for example, judge that the Bible provides data relevant to theories concerning the events, processes and chronology of the formative history of the universe. Others are convinced that it was never intended to address such concerns. Resolution of these differences is not a simple matter. The Bible contains a rich diversity of forms of historical literature—forms often very different from what we are accustomed to. Furthermore, the agenda of the Bible's historical literature is authentic to its ancient Near Eastern cultural and religious context—a setting quite different from our modern Western world. Thus all persons, whether committed to the Christian faith or not, must exercise great care and caution in making statements about biblical data and its relevance to contemporary scientific theorizing.

In speaking of the "Creator-Creation metaphor" we have terminology at odds with the literal six day creation described by Exodus 20:11.

But not only is this view of Scripture lower but the view of the current scientific literature higher. Consider this quotation from the chapter, "The Legend of the Shrinking Sun": ". . . both geological and radiometric evidence indicate a terrestrial age of billions of years" (Van Till et al., 1988, p. 60) or this one:

In our judgment, however, Steidl paid far too little attention to a vast array of empirical and theoretical considerations which have led the professional scientific community to the well-founded *conclusion* (not assumption) that the solar system formed about 4.6 million years ago." (Van Till et al., 1988, p. 62).

We can observe here and throughout this book a willingness to accept the basic integrity of the established scientific community even when its findings cast doubt on the Biblical chronology given in Genesis 1. Perhaps those that hold to similar views as these authors would think that I exhibit a hopeless naivete when approaching the Scriptures but we do not have to be naive about scientific research as it is currently practiced at least in some academic circles.

Human Nature

The scientific community has been rocked by the allegations of Margot O'Toole about the lack of validity of data published by Nobel Laureate David Baltimore, Tufts University immunologist Thereza Imanishi-Kari, and four others. Furthermore, forensic analysis of Imanishi-Kari's laboratory notebooks showed that she had fudged them. In O'Toole's opinion it was not important to Baltimore to correct the lies. She even mentioned the contempt the authors of this bogus paper had for the labor of people trying to repeat the work (Zurer, 1991, pp. 35-40). Perhaps this is an isolated case, but we should be alert to the danger signals since most published data is never replicated, some of it never even read. Simply put, there is no money in it; research grants are given to produce new findings, not rehash old ones.

All sorts of pressures are developing on the \$10 billion academic research enterprise. The system is

bedeviled by questions concerning research ethics, questionable accounting and inconsistent funding. Universities today function not only as knowledge centers but increasingly as financial conglomerates. Historian Page Smith gives a harsh indictment of big-time research:

Is not the atmosphere hopelessly polluted when professors are forced to do research in order to make a living, in order to avoid being humiliated—and terminated. What kind of research can possibly come out of such a system? The whole nature of intellectual activity is hopelessly distorted, the nature of knowing the roots of life (Lepkowski, 1991, pp. 40-42).

Summary

Let us inquire as to the funds available to a scientist with the temerity to question the scientific establishment and their firm "conclusion" of an old earth and even older universe. Even if the "god of this world" had not blinded their understanding, normal economic and social forces would. A new world order is arrayed against the Bible believer. It offers to us neither money, prestige, position or respect, but we are still better situated outside of the camp, bearing His reproach.

It behooves us, therefore, to be certain that our research is of the highest quality and integrity. We cannot expect that researchers who play fast and loose with government grants (Stanford University will serve as an example of this practice) will suddenly be honest in the laboratory. But we do have a right to expect that creationists will be rigorously honest in all of their communications. Otherwise, the rising tide of mediocrity will sweep all of us away.

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A Classical Case of Mimicry Runs Afoul

A "subparadigm" of evolutionary theory states that many species of butterflies and moths evolved similar wing-color patterns. One mechanism for this transformation is called Batesian mimicry in which a tasty butterfly evolves the wing color pattern of a foul tasting species. For more than 100 years the classic example has been the luscious viceroy butterfly evolving a very similar wing pattern as the nasty monarch butterfly.

Would you believe this classic example has never been tested and now is considered false? Tim Walker (1991, p. 348) in *Science News* states: "New research indicates, however, that the viceroy has successfully deceived scientists, not birds." The basis for this conclusion is a recent taste test reported in *Nature*. Using just the abdomens of viceroy, monarch, and queen butterflies, Ritland and Brewer (1991) discovered that viceroys are just as unpalatable to birds as monarchs.

Have scientists given up on viceroy mimicry as a result of the new test of their hypothesis? No, Ritland and Brewer have just switched from one mimicry mechanism to another. The new mechanism, called Mullerian mimicry, goes something like this: If two noxious butterflies have different wing patterns, birds would have to eat many of each to learn to avoid them. But if one species evolved its wing pattern to mimic the other, the birds would eat about half as many butterflies.

The notion of mimicry has always seemed irrational to me—one of those seemingly endless subsidiary hypothesis to patch a leaky foundation. Both mechanisms come close to attributing conscious planning on the part of the butterflies. Many logical conundrums arise concerning the mechanisms of mimicry. For instance, in Mullerian mimicry, why would not both species try to evolve towards the other, resulting in a chaos of variant wing patterns, or a third wing pattern after much trial and error?

The most significant point of this research for creationists is the reason why the viceroy's avian palatability had never been tested. Walker (1991, p. 348) states:

One reason, says entomologist Austin P. Platt of the University of Maryland-Baltimore County in Catonsville, is that the viceroy evolved from a group of tasty admiral butterflies. "So it was just widely held that the viceroy itself was also palatable," he explains.

Investigators just assumed evolution and never tested their hypothesis! How many other *testable* evolutionary/uniformitarian conclusions have never been tested before and just assumed true based on the truth of evolution?

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The Origin of *Euglena*

Plant or Animal

Euglena is a unicellular organism with both plant and animal features. Many workers classify it as an animal in phylum while botanists put it into a plant division of its own called Euglenophyta. On the plant side the organism possesses chloroplasts in which photosynthesis occurs. There are also pyrenoids which are embedded in the chloroplasts, where starch accumulates. During the palmella stage, when growth occurs, numbers of cells are enclosed within a gelatinous matrix.

Did it Arise by Endosymbiosis?

There are a number of possibilities for the origin of *Euglena*. One supported by many evolutionists is the symbiotic origin of the green chloroplasts. This view assumes the chloroplasts arose when independent algae entered the cytoplasm and took up residency. The chloroplasts have a three-membraned envelope (Leedale, 1982, p. 13). It was initially thought that the two

inner membranes were the chloroplast envelope proper, and the outer membrane was that of the plasmalemma of the original host cell which the algae invaded. It was found that the outer membrane does not bear ribosomes, nor does the membrane connect to the nuclear envelope. Leedale suggested that green chloroplasts of *Euglena* were taken from algae, just as the genus of algae called *Peranema* supposedly cut their way into another cell to produce *Cladophora* of today (Leedale, 1982, p. 1). In this way the chloroplasts could have been engulfed by *Euglena*, but failed to be digested and thus become a part of the make-up of what we now call *Euglena*. The two inner membranes would be the original algae chloroplast and the third, outer membrane would be the *Euglena* cytoplasmic membrane picked up by the invading algae. It is believed this also explains the presence of chlorophyll B in *Euglena*, a pigment normally limited to algae of other taxonomic divisions. The ancestors of *Euglena* would therefore have been colorless because of a lack of the algal symbiont. While this may be the means the Designer used to originate *Euglena*, it seems unlikely. There are many problems facing endosymbiosis as an origin theory applied to other organisms.

Let us examine this idea of endosymbiosis as it might apply to *Euglena*. There are no algae with three-membraned chloroplasts that would serve as possible progenitors of *Euglena*. It would be an odd state of affairs if all the algae with three membranes had later disappeared simply because a few colorless *Euglena* had taken some of them on board as part of their anatomy. It also is unlikely that the invading algae would have acquired and retained the host cell's plasmalemma as part of its own equipment. Thus the concept of endosymbiosis falls short as an explanation of the three-membraned chloroplasts of *Euglena*.

Did the Origin of *Euglena* Involve the Gene Theme Approach?

The Creator may have used a procedure that I call the gene-theme model (Brown, 1987). Here, God has taken certain design patterns and used them throughout creation. This could have involved either the use of the same or similar genes, or different genes altogether to produce a similar phenotypic result, remembering that genes can have more than one function. In the case of *Euglena* the Designer may have originally given it the option of a number of lifestyles. All these modes of life were of a non-predator-prey relationship. Indeed, this is true of most of the genus *Euglena* at present. In the gene-theme perspective, the three-membraned chloroplasts of *Euglena* would be unique, for some reason yet unknown.

Reproduction in *Euglena* is asexual. This rules out direct descent from many algae of the genus *Chlamydomonas*, as a number of these have sexual reproduction. Because of this, and because the chloroplasts of *Euglena* are unique, it appears clear that *Euglena* in no way arose from any other green algal ancestors. Under the Designer's control, *Euglena* may have been produced by an act of endosymbiosis. However, it was more likely produced in its present form as a separate kind, possessing unusual three-membraned chloroplasts as a tribute to the Creator's versatility.

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Reprinted CRSQ Volume 6

Introduction

The *Creation Research Society Quarterly* has been published since 1964 (27 complete volumes). Many of the early Quarterlies are out-of-print, yet these past issues contain articles of continuing interest and value. In an effort to make these volumes available, the Board of Directors has incurred considerable expense to reprint them. In order that those interested in good scientific creationist articles, sound criticisms of the evolutionary hypothesis, along with the needed literature citations accompanying the treatises will have a general idea of the contents of each volume, brief synopses will be written to appear in this and future Quarterlies. See Williams, 1990a pp. 57-58; 1990b, pp. 93-94; 1991a, pp. 136-138; 1991b, pp. 27-29; 1991c, pp. 67-69.

Genetics

In the lead article of the first Quarterly of this volume, Dr. Walter E. Lammerts, founder of the Society, answered the bold assertion of some geneticists that modern developments invariably support the organic evolution concept (Lammerts, 1969, pp. 5-12, 26). Using data on beans, roses and corn, he showed that variation is *limited*, not unlimited. His discussion on mutations was very enlightening and he pointed out that these mistakes could not be used as mechanisms for molecules-to-man evolution. Other topics discussed were the research on fruit flies, natural selection, chromosome doubling and recombination. John Klotz (1969, pp. 45-48) examined each type of chromosome aberration. Since gene mutation is thought to be the source of variability in evolution, then polyploidy and chromosome change in general are often pictured as the source of new genes. Klotz concluded that these aberrations are not of the type that would be required for any major evolutionary upward step.

Embryology

"Ontogeny recapitulates phylogeny"—it was Ernst Haeckel who popularized the idea that an embryo of a complex animal retraces the stages of evolutionary development as the fetus grows. Wilbert Rusch (1969, pp. 27-34) not only enumerated the scientific shortcomings of this "biogenetic law," but he discussed translations of original German papers which clearly showed the fraudulent nature of Haeckel's drawings and arguments. Mennega (1969, pp. 121-126), employing both science and philosophy, investigated comparative morphology. He carefully noted that the creationist position provided coherent explanations of such phenomena as homology, embryology, pharyngeal pouches, kidneys and even the so-called "human tail."

Comparative Anatomy and Homology

Many science instructors glibly assert that "similarity means kinship." In "The Form and Structure of Living Things," Frank Marsh (1969, pp. 13-25) showed such particulars as homology and convergence find ready explanation within the creationist framework. Other topics presented were the creation of plants and animals, classification systems, origin of human beings, the fossil record, variation and fixity within the kind framework, microevolution and macroevolution. Dr. Russell Artist (1969, pp. 55-64) elaborated how that similarities can be viewed as a product of creation according to a common plan. As well as emphasizing design, the author gave evidence of evolutionary dogmatism in textbooks. Homology is not a key evidence for the "fact" of evolution.

Botany

William Tinkle, in one of his notes on wildflowers (1969, pp. 65-66), illustrated how "Jack-in-the-Pulpit" (*Arisaema triphyllum*) could not have evolved but must have been designed. George Howe, editor of the Quarterly, presented a history of creationist botany (1969, pp. 85-95). In this very interesting article, Dr. Howe discussed plant physiology, plant design, paleobotany, morphology, homology, analogy and plant genetics. This article is an excellent introduction for anyone wishing to do an in-depth study of plants from a creationist perspective.

Biochemical Evolution

"Missing links" are often used to show the deficiencies in macroevolutionary philosophy. Larry Butler (1969, pp. 127-128) noted two biochemical missing links (intermediate forms of two alleles). The author mentioned the lack of predictive value of the naturalistic hypothesis based on this evidence.

Anthropology

In "Fossil Man: Ancestor or Descendant of Adam?" Daniel Shaw (1970, pp. 172-181) examined the topic from a creationist viewpoint. Briefly discussing the evolutionary concept of the origin of the genus *Homo*, he then outlined the Australopithecine, Pithecanthropine and Neanderthal stages, the region of the origin of man, genetic action on small populations and morphology. He provided a creationist model for the data. The late Harold Armstrong developed an interesting creationist nomograph for use in human population statistics (1970, pp. 183-184).

Overthrusts

The so-called geologic column was developed to "show" evolutionary sequences preserved in a particular inviolable sequence of sedimentary strata. In some areas of the earth's surface these strata are found in a supposed "wrong order." The concept of overthrusting of an "older" stratum over a "younger" one is employed to explain this wrong order. Burdick and Slusher (1969, pp. 49-54) investigated one such overthrust in the Empire Mountains of Arizona. They concluded that there was no physical evidence for an overthrust at this location. The authors suggested the overlying Permian layer was actually younger (deposited later) than the Cretaceous layer beneath it. Burdick (1969, pp. 96-108)

also reported on his field work concerning the Lewis Overthrust in Montana and Alberta. He found no evidence of overthrusting. The contact line in several locations was studied and photographed.

Other Geological Studies

The excellent research on the classic Joggins petrified trees by Harold Coffin (1969, pp. 35-44, 70) was presented in this volume. Dr. Coffin concluded that the evidence available from his investigation indicated that petrified trees and coal deposits are allochthonous in origin. This careful field and laboratory work deserves serious study. Bernard Northrup examined the Sisquoc diatomite fossil beds in California (1969, pp. 129-135). He postulated that the formation of the diatoms occurred after the Flood and a redeposition of the organisms in a post-Flood catastrophe. In an extensive book review, Northrup (1970, pp. 161-171) suggested that the formation of the Franciscan assemblage of rocks could best be explained with a catastrophic rather than a uniformitarian framework.

Miscellaneous Articles and Notes

Robert Whitelaw (1969, pp. 71-73) published another paper on radiocarbon and potassium-argon dating. Using the evidence available, he formulated a model for a young earth. Employing a book review as a vehicle, Norbert Smith (1969, pp. 73-74) discussed population control without predation. Mosher and Tinkle (1970, pp. 182, 184) noted the inadequacies of the natural selection concept. Henry Morris (1970, pp. 199-200) explained how the second law of thermodynamics prohibited any molecules-to-man development. Many varied topics were covered by technical notes in the Comments on Scientific News and Views format in each issue. A considerable number of significant book reviews also appeared in this volume. Thus readers can find much of interest in another early volume of Quarterly writings.

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MINUTES OF 1991 CREATION RESEARCH SOCIETY BOARD OF DIRECTORS MEETING

On Thursday, 11 April 1991, a meeting of the Executive Committee was held at the Wolverine Best Western Motel, Ann Arbor, Michigan, from 2000 to 2250 hours to set agendas for the committee meetings on Friday. On Friday, 12 April 1991 between the hours of 0800 and 1700, the Constitution/Bylaws, Financial, Publications, Quarterly Editorial, Research and Temporary Meeting Committees held meetings each of approximately two hours. The chairman of each committee recorded the business in preparation for the Saturday business meeting.

The official annual meeting of the Society was opened at 1900 hours by President Frair in Room 102 of the Science Building at Concordia College, Ann Arbor, Michigan. Present: D. Boylan, E. Chaffin, D. DeYoung, W. Frair, D. Gish, G. Howe, D. Kaufmann, J. Klotz, L. Lester, J. Meyer, D. Rodabaugh, W. Rusch, E. Williams, G. Wolfrom. Also present were 136 visitors. The President welcomed everyone to this meeting of the 28th year of the Creation Research Society. This was followed by silent prayer.

Dr. Ted Aufdemberge, Professor of Science, Concordia College, welcomed CRS members and guests to the College. President Frair expressed gratitude from the CRS to Mr. David Golisch, President of the Creation Science Association of Detroit, for providing refreshments. Mr. Golisch spoke briefly on the programs of his group.

Meyer gave a report on the CRS Research Station in North Central Arizona. Editor DeYoung gave a report on the status of the CRS Quarterly. Williams gave a report on the status of CRS publications. Frair summarized the latest developments of creation in the news.

Rodabaugh introduced the speakers of the mini-symposium. Boylan spoke on "Creation Science: Is It Really Science?" Chaffin spoke on "Geology of Southwest Virginia." Meyer spoke on "Creationist Challenges in Ecuador." Williams spoke on "Big Bend and Grand Canyon Expeditions: Howe spoke on "Vestigial Organs in Flowering Plants." Rusch spoke on "Baked Rocks or Things Are Not What They Seem." Gish spoke on "Recent Proofs for Evolution." The meeting was adjourned at 2215 hours for refreshments and social discourse.

On Saturday, 12 April 1991, the closed business sessions of the Board were called to order at 0830 hours. Present: D. Boylan, E. Chaffin, D. DeYoung, W. Frair, D. Gish, G. Howe, D. Kaufmann, J. Klotz, L. Lester, J. Meyer, D. Rodabaugh, W. Rusch, E. Williams, G. Wolfrom.

The minutes of the 1990 meeting were read and accepted. Secretary Kaufmann reported the following were elected to the Board for a three-year term: Chaffin, Klotz, Lester, Rodabaugh and Wolfrom.

The financial report by Meyer was given as follows: for the 1991 fiscal year the income was \$89,624.93; expenses were \$88,930.26. The report of the independent auditor was accepted.

The membership report by Wolfrom was given as follows: total membership for 1990-91 was 1873 (673 voting, 779 sustaining, 379 subscribers and 42 students). This is an increase of 83 over 1989-90.

The editor's report by DeYoung was given as follows covering the period from 11/88 through 3/91: 131 articles were received; 61 (46%) were published; 70 (54%) were rejected. Also published were: 37 book reviews, 44 panorama of science items (technical notes) and 54 letters.

The constitution/bylaws report was given by Boylan as follows: the removal of the Editor position as an officer in Bylaw Article 1, Section 1 was approved. The Board proposed a Bylaw addition of Article 1, Section 2 as follows: Position descriptions for offices shall be formulated and reviewed by the Constitution/Bylaws Committee and approved by the Board.

The research report by Meyer was given as follows: it was passed that the Research Committee provide total expense information for the construction and maintenance of our Research Center in Arizona for our next Board meeting. The President appointed a special Fund Raising Committee (Chaffin, chair; Klotz; Meyer; Wolfrom; Zimmerman) to raise money for the Research Center and increase the Endowment for the purpose of sustaining fiscal support for the Research Center Director. It was passed that all undesignated funds be turned over to the Research Endowment Fund.

The publications report by Howe was given as follows: CRS books will sell *Natural Limits to Biological Change* by Lester and Bohlin, *Genesis and the Dinosaur* by von Fange. It was decided that correspondence by Frair with Accelerated Christian Education and Zondervan be continued to secure all "rights" to the CRS high school textbook, *Biology: A Search for Order in Complexity*. No decision was made at this time to republish the book.

It was passed that a catalogue and brochure be developed by Williams and be disseminated to advertise our books. It was passed that permission be granted to videotape the CRS Friday evening meeting under the following provisions: prior permission to videotape

be approved by the Chairman of the Friday evening session, the tapes not be copied for sale and one complete copy be sent at CRS expense to the Chairman of the Friday evening session.

The financial report by Klotz was given as follows: it was passed that the Treasurer consult with the auditor on a voucher system of payments to be shared with the Financial Committee for possible implementation in the future.

It was passed that we enlarge the Board to 16 members. It was passed that the six incumbents (Boylan, DeYoung, Gish, Kaufmann, Williams, Zimmerman) along with Russell Humphreys and Robert Gentet be nominated for the 92/93-94/95 Board. The top six vote-getters will be elected for a three-year term while the last two vote-getters be nominated for a one-year term with eligibility to be nominated again the next year for a three-year term.

The following were elected as officers: President—W. Frair, Vice President—E. Chaffin, Secretary—D. Kaufmann, Treasurer—J. Meyer, Financial Secretary—P. Zimmerman, Membership Secretary—G. Wolfrom.

It was passed that anyone requesting access to our archives at the Concordia Historical Institute at St. Louis be required to get written permission from the President of CRS.

It was passed that our 1992 Board Meeting be 9-11 April at Ann Arbor, Michigan.

It was passed that Wolfrom be authorized to purchase an IBM compatible computer system for \$5830.

The Board acknowledged the 28 years of service of Bill Rusch to the Society. The Board on behalf of the CRS recognized Dr. Rusch's retirement from the Board as the end of an era during which he provided exceptional leadership to the formation and development of CRS. His influence on the cause of creationism is reflected by hundreds of students who are now dedicated to creationism.

It was passed that the President write a letter to the Editor of the *Scientific American* protesting the disqualification of Forrest Mims for a position because of his creationist views.

The meeting was adjourned at 1520 hours.

David A. Kaufmann, Secretary

DINOSAUR UPDATE

DON B. DEYOUNG* AND JOHN R. MEYER**

Received 25 June 1991; Revised 15 July 1991

Abstract

The authors summarize a National Science Foundation-sponsored workshop on the Biology of Dinosaurs, conducted by J. Michael Parrish, a leading paleontologist. Current ideas and uncertainties about dinosaurs are discussed. Possible creationist research areas are noted.

Introduction

During March, 1991 we attended a workshop on the Biology of Dinosaurs at Northern Illinois University, DeKalb. The meeting was sponsored by the National Science Foundation and was designed especially for college professors. There was no acknowledgement of an awareness of non-evolution views of dinosaur origins, existence, and demise. However we were surprised and encouraged by the openness of the group to question much of the traditional evolutionary dinosaur "doctrine," and especially to question many of the new claims published in the last decade. Not that the concept of evolution was in question, just its mechanism and evidence! The following report gives our impressions of the workshop and related literature.

Technical Literature Resources

The primary suggested text for the course was *The Age of Dinosaurs* by Kevin Padian (1989). This work is the product of 13 contributing experts in dinosaur biology and covers in considerable detail the current data and speculation on such subjects as taxonomy, behavior, physiology, anatomy, ecology, extinction, tracks and trackways. The stated goal of this publication is to form "... the basis of an increased number of dinosaur courses in college and university curricula"

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(Preface). Thus, the text, and indeed the entire conference was geared toward giving undergraduate college teachers the background necessary to teach a rigorous course in biology, using dinosaurs as the integrating theme. A reasonably detailed, technical bibliography makes the text a valuable resource not only for teachers, but also for researchers who may want access to the most recent, significant literature in the field.

Current Controversies

Dinosaurs are being studied by more experts than ever before; graduate schools of paleontology are crowded. There is fundamental, emotional debate in a large number of areas. We see this as a healthy sign that dogmatism regarding dinosaur fossil interpretation within the professional community is in decline. The reader should not assume, however, that this openness necessarily extends in all cases to actual skepticism of evolution itself. The following are some of the controversial areas where diversity of opinion reigns:

Classification The details of the supposed dinosaur family tree are interpreted differently by nearly every researcher. Phylogenetic systematics or cladistics now often involve extensive data sets and sophisticated statistical analysis by high-speed computers. The new taxonomies have largely replaced older classifications, and show great variation depending on who does the study.

At the base level, the group of Thecodonts are no longer thought of as dinosaurs, but as the ancestors of