Eldridge, N. 1986. Progress in evolution. *New Scientist* 110:54-57.
Gray, M. 1984. The bacterial ancestry of mitochondria and plastids. *Bioscience* 33:693-699.
Halstead, B. 1980. Popper: good philosophy, bad science? *New Scientist* 87:215-217.
———— 1981. Halstead's defense against irrelevancy. *Nature* 292:403-404.
Jones, J. B. 1988. Zoogeography of parasitic Copepoda of the New Zealand region. *Hydrobiologia* 167/168:623-627.
Kimura, M. 1985. The neutral theory of molecular evolution. *New Scientist* 107:41-44.
Lewin, R. 1986. Punctuated equilibrium is now old hat. *Science* 231:672-673.
———— 1990. Can bacteria direct their own evolution? *New Scientist* 127:31.
Lindsey, C. C. 1981. Stocks are chameleons: plasticity in gill rakers of coregonid fishes. *Canadian Journal of Fisheries and Aquatic Sciences* 38:1497-1506.
Maddox, J. 1981. Too soon for the rehabilitation of Lamarck. *Nature* 289:631-632.
McKenzie, D. 1990. HIV and African parasite may be linked. *New Scientist* 127:30.
Perutz, M. 1986. A new view of Darwinism. *New Scientist* 112:36-38.
Williamson, P. G. 1981. Paleontological documentation of speciation in Cenozoic molluscs from Turkana Basin. *Nature* 293: 437-443.

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 characteristics 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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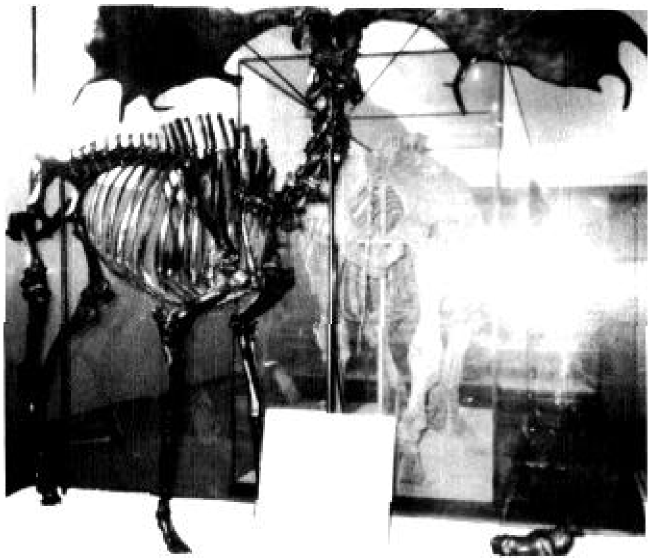

Figure 1. Skeleton of the Irish Elk. Photographed in the American Museum of Natural History, New York City.

than the northern fox grape *(Vitis labursca)* 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. swansoni),* Harlan's *(B. harlani),* and short-tailed *(B. brachyurus).*

Melanism in man is more complex. Scheinfelt 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 (Scheinfelt, 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); (Serventy, 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 aculeutus)* 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 calilfornianus),* the whooping crane *(Grus americana),* and the ivory-billed woodpecker *(Campephilus principals).*

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 *(Odocoilius arrginianus)* 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 lagopa* and *Lagopus mutus.).* As we have noted, some are white all year, such as the arctic wolf *(Canis lupis)* 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 *(Gloeothece 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

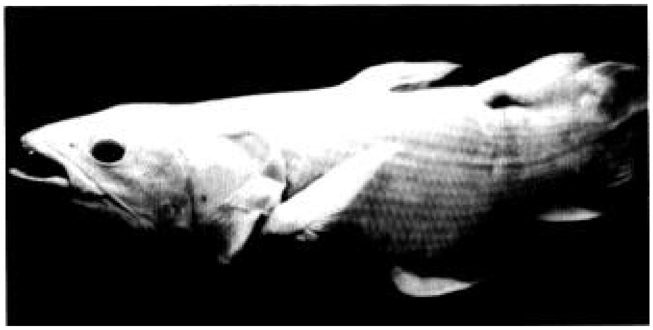

Figure 5. Coelacanth, photographed in the Science Museum in London.

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.

References

Botting, D. 1976. Wilderness Europe. Time-Life International. New York.

Brittin, N. and A. Brown. 1970. An illustrated flora of the Northern U.S. and Canada. Dover. New York.

Culp, G. R. 1990. Remember thy Creator. Amish Mennonite Publishing. Minerva, OH.

_________ 1966. The geographical distribution of animals and plants. *Creation Research Society Quarterly*. 25:24-27.

Fenton. C. 1972. Evolution. The World Book Encyclopedia. Field Enterprises. Chicago. 6:329-334.

Fenton, C. and M. Fenton. 1958. The fossil book. Doubleday. New York.

Garms, H. 1967. The natural history of Europe. Paul Hamlyn. London.

Gould, S. J. 1977. The return of the hopeful monsters. *Natural History*. 86(6):22-30.

Grzimek, B. 1970. Grzimek's animal life of the world. Van Nostrand, Rheinhold. New York.

Harris, C. 1972. Dead Sea. World Book Encyclopedia. Field Enterprises. Chicago. 5:48-49.

Haynes, J. H. 1949. Handbook of Yellowstone National Park. Haynes Studios. Bozeman, MT.

Hurt, W. and R. Grossenheider. 1966. A field guide to the mammals of North America. Houghton-Mifflin. Boston.

Kurry-Lindahl, K. 1964. Europe, a natural history. Random House. New York.

Kynstautas, A. 1987. The natural history of the USSR. Century. London.

MacKinnon, J. and K. MacKinnon. 1974. Animals of Asia. Holt, Rhinehart, Winston. New York.

Main, B. Y. 1967. Between Wodjel and Tor. Jacaranda Press. Brisbane.

Mitchell, J. 1962. The illustrated reference book of animals. Windward. Leicester, England.

Mumford, R. E. 1984. The birds of Indiana. Indiana University Press. Bloomington.

Norwalk, R. M. and I. L. Paradise. 1963. Walker's mammals of the world. Johns Hopkins University Press. Baltimore.

Petersen, R. T., G. Mountfort and P. A. D. Hollom. 1954. A field guide to the birds of Britain and Europe. Houghton Mifflin. Boston.

Robins, C. S., B. Braun and H. Zim. 1966. Birds of North America. Golden Press. New York.
Robinson, B. and M. Fernals. 1968. Gray's new manual of botany, American Book. New York.
Scheinfelt, A. 1965. Your heredity and environment. Lippincott. Philadelphia.
Serventy, V. 1972. Wildlife of Australia. Toplinger. New York.
United States Department of Agriculture. 1938. Soils and men. U.S. Government Printing Office. Washington, D.C.
Van Den Brink. 1968. A field guide to the mammals of Britain and Europe. Houghton Mifflin. Boston.

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.