

ANNOTATIONS FROM THE LITERATURE

ANIMO-ACID DATING

Kimber RWL, Griffin CV. 1987. Further evidence of the complexity of the racemization process in fossil shells with implications for amino acid racemization dating. *Geochimica et Cosmochimica Acta* 51:839-846.

Summary. In their 1987 report Kimber and Griffin present a detailed analysis of amino acid racemization associated with accelerated aging of modern and fossil mollusc shells. They produced accelerated aging by maintaining powdered shell in 110°C water for 1, 2, 4, 8, 16, 32, and 64 days. Their results clearly show that after 4-16 days of such accelerated aging the D/L ratio of some molecular subfractions and of some total hydrolysates may actually decrease with further processing which is the opposite of what would be expected with aging.

This surprising observation can be accounted for by differing molecular stabilities, i.e., differing chemical breakdown rates during aging, among the peptide components of the shell. If the amino acid sites in these various peptide molecules have differing racemization rates, the average chemical composition later in the aging process could contain a higher representation of sites at which the racemization curve [D/L ratio versus time] departs from the ... ideal ... sites in a peptide chain racemize more slowly than those at external sites, the authors say, "In theory, the degree to which the racemization curve [D/L ratio versus time] departs from the ... ideal ... should reflect the number of the stable amino acids remaining in internal positions during the aging process." In what may appear to be a contradictory statement, they also say, "... valine, isoleucine, and leucine all display ... curves ... indicating a slow initial racemization (epimerization) followed by more rapid rates."

There is no uncertainty regarding their conclusion "that considerable research is still required to understand fully the complexities of the amino acid racemization process in fossil materials and that this may have implications for accurate quantitative dating."

CREATIONISM

Gange RA. 1986. *Origins and destiny*. Waco, TX: Word Books. 193 p.

Summary. Gange presents a fresh approach to the argument for design from the viewpoint of a physical scientist. The author argues

that the fitness of the environment of our earth for life is unique and beyond happenstance, that the origin of life demands intelligent design, and that man has characteristics above the level of naturalistic explanations. The book is well written in a style that avoids technical details, which are relegated to an appendix.

Geisler NL, Anderson JK. 1987. *Origin science: a proposal for the creation-evolution controversy*. Grand Rapids, MI: Baker Book House. 198 p.

Summary. The authors analyze the creation-evolution controversy in the context of its historical background. This book gives much-needed breadth to an often oversimplified argumentation. The authors, who are creationists, emphasize the religious roots of modern science and the inadequacies of naturalistic explanations, as well as the scientific evidence in favor of creation.

Huse SM. 1983. *The collapse of evolution*. Grand Rapids, MI: Baker Book House. 178 p.

Summary. This book is a general, non-technical account of the standard arguments used by creationists against evolution. Unfortunately, it suffers from a lack of critical judgment, with both good and bad arguments being used. Use of this book is recommended only in conjunction with supplemental material that evaluates the various arguments. Given the lack of information in certain specific areas, it will do little to convince the knowledgeable individual about the general validity of creation. An appendix includes a glossary and the names and addresses of 73 creationist organizations.

CRETACEOUS-TERTIARY EXTINCTIONS

Officer CB, Hallam A, Drake CL, Devine JD. 1987. Late Cretaceous and proxysmal Cretaceous/Tertiary extinctions. *Nature* 326:143-149.

Summary. The impact hypothesis is unsatisfactory as an explanation for the end-Cretaceous extinctions for several reasons. No crater has been found for the proposed impact, the extinctions appear to have occurred over too long a period of time, multiple iridium anomalies exist, the clay layer is of different chemical composition in different regions, and the extinctions are too selective. These features are better explained as the result of intense global volcanic activity over a moderately extended period of time, combined with a major sea level regression. The geologic and biological evidence at the Cretaceous-Tertiary boundary is more consistent with such a scenario than with the impact of an extraterrestrial body.

EVOLUTION

Dawkins R. 1986. *The blind watchmaker*. NY: W.W. Norton & Co. 332 p.

Summary. This is one of the most challenging books to creation in this decade. *The Blind Watchmaker* addresses what is considered by many to be the most convincing argument for creation, namely, the argument for intelligent design. The book derives its title from William Paley's argument that, since a watch must have a watchmaker, the complexities of living organisms must have a Creator. To Dawkins the "blind watchmaker" is natural selection and other naturalistic explanations for both the origin and evolution of life. The last part of the book is devoted to a discussion of controversies within evolutionary thought, including a chapter criticizing punctuatedism, entitled "Puncturing Punctuatedism."

Comment. Dawkins is an excellent writer and argues quite convincingly as he attempts to bring all of reality down to his understanding of it. The book is a beautiful package of assumptions built on assumptions which the unwary reader would be ill-advised to take for granted. Nevertheless, in this book — which is worthy of study — the argumentation is comprehensive and embellished with many examples.

Lewin R. 1987. The surprising genetics of bottlenecked flies. *Science* 235:1325-1327.

Summary. Genetic bottlenecks (in which the size of a breeding population is reduced to a very few individuals) are believed to play an important role in speciation. According to conventional wisdom, the gene pool would be reduced in size, resulting in a decrease in genetic variance. This would be true if genetic variance is simply additive, but the results of experiments by E.H. Bryant et al. suggest the situation is not so simple. When fruit-fly populations were passed through bottlenecks of 1, 4, or 16 breeding pairs, genetic variance actually increased in the new populations, especially those started from 4 or 16 pairs.

Comment. This study has important implications for creation theory concerning speciation in small populations after the flood.

Opadia-Kadima GZ. 1987. How the slot machine led biologists astray. *Journal of Theoretical Biology* 124:127-135.

Summary. This article challenges the concept that chance mutations produced a new enzyme preadapted to new conditions. Instead, the author argues for post-adaptational mutations, which he describes as more Lamarckian than Darwinian. His conclusion is based on his review

of all the new enzymes he could find reported in the literature — a total of two. Both enzymes were detected in strains of *Escherichia coli* having a deletion for the beta-galactosidase gene. On further examination, the two enzymes were found to be identical, so there is really only one example, which has arisen twice. But preadaptation was not a factor in either case. The new enzyme appeared only in the presence of lactose, and in all cases studied was regulated by the presence of lactose. Never has any colony of lactase-deleted *E. coli* produced a new enzyme without exposure to lactose. These results have two important consequences to evolutionary theory. First, preadaptation appears to be absent, with adaptative mutations occurring only after environmental stress. This is directly contrary to conventional neo-Darwinism. Second, the new enzyme showed no evidence of being produced by a random process. The same enzyme was produced by the single strain in one experiment and each of the 34 strains in the second experiment. This suggests that *E. coli* bacteria possess the capacity to produce a new enzyme under the appropriate conditions.

Comment. One cannot help wondering whether the “new” enzyme is not truly new to the cell, but is a pre-existing enzyme with low affinity for lactase, being produced in abnormally large quantities due to a change in regulatory processes.

HISTORY

Lindberg DC, Numbers RL, editors. 1986. God and nature: historical essays on the encounter between Christianity and science. Berkeley: University of California Press. 516 p.

Summary. This volume contains papers presented by church historians and historians of science at an international conference on the historic relations of Christianity and science. The eighteen essays provide a comprehensive view of the relation between science and religion from the time of the early church to the present.

Comment. This book is not a polemic, neither does it “set up” an adversarial relationship between science and religion, as has been the custom in previous treatises on the subject. It is a good reference that is sure to remain a classic in this area.

PALEOBIOGEOGRAPHY

Case JA, Woodburne MO. 1986. South American marsupials: a successful crossing of the Cretaceous-Tertiary boundary. *Palaios* 1:413-416.

Summary. The North American fossil record of marsupials shows a dramatic decrease across the Cretaceous-Tertiary boundary, with

only one genus continuing through to the Paleocene. The South American fossil record, although not so well known, shows a different trend. The number of fossil marsupial taxa increases across the Cretaceous-Tertiary boundary, with four taxa at or near the genus level found both above and below the boundary.

Comment. This paper provides an illustration of the pitfalls of using the data from one continent to extrapolate conditions for the whole world. It also shows that the end-Cretaceous impact hypothesis has some serious problems.

Hendrickson, D.A. 1986. Congruence of bolitoglossine biogeography and phylogeny with geologic history: paleotransport on displaced suspect terranes. *Cladistics* 2:113-129.

This paper examines the relationships of a group of New World plethodontid salamanders to the geologic history of their areas of distribution. Most species in the group are found on suspect terranes, which are believed to have accreted to the North and South American continents at various times, beginning during the Cretaceous. The historical and geological relationships of the terranes are compared with previously proposed phylogenetic relationships among the salamanders. The results were suggestive, but not compelling, that these salamanders may have drifted onto the Pacific Coast on microplates from a distant source. The author suggests the possibility that other groups may have arrived in South America via drifting microplates. This might explain the presence of various groups of "island hoppers" in South America before the Late Pliocene land bridge was established.

Houde P. 1986. Ostrich ancestors found in the Northern Hemisphere suggest new hypothesis of ratite origins. *Nature* 324:563-566.

Summary. The large flightless birds of the southern continents are known as the ratite birds and are believed to be related to each other. Their distribution on the southern continents is often explained as the result of an ancestral Gondwanan distribution, with subsequent fragmentation and divergence as a result of continental drift. The fossil record does not support this scenario. The only fossils of living families are restricted to the Neogene, long after the conventional date for the breakup of Gondwanaland. This paper identifies a Paleogene European fossil as an ostrich, placing the ancestry of the family in the Northern Hemisphere. Other fossils believed to be ancestral to the ratites are known from the Paleogene of both Europe and North America, but none have been found from any of the southern continents. This conclusion challenges the relationships among the ratites, and also the

basis for calibration of the DNA molecular clock (see: Sibley CG, Ahlquist JE. 1981. In: Scudder GGE, Reveal JL, editors. *Evolution Today*. PA: Carnegie-Mellon University).

Shaw CA, McDonald HG. 1987. First record of giant anteater (*Xenarthra*, *Myrmecophagidae*) in North America. *Science* 236:186-188.

Summary. One of the most frustrating problems in historical biogeography is dealing with negative evidence. If no fossils of a species are found in an area, does that mean the species was never present in the area? A bone from a giant anteater has been found in northwestern Sonora, Mexico, more than 3000 km north of its present range. Because anteaters are considered to be tropical animals, this finding was unexpected. Evidently, either climatic conditions or anteater ecology, or both, have been different in the past. The fossil locality is considered to be early Pleistocene (Irvingtonian).

PALEONTOLOGY

Rose KD. 1987. Climbing adaptations in the Early Eocene mammal *Chriacus* and the origin of Artiodactyla. *Science* 236:314-316.

Summary. Orders of living mammals are often hypothesized to have their origins in generalized Paleogene mammalian ancestors, which may be represented by fossil remains or may be hypothetical. Typically, dental morphology forms the basis for postulating such relationships. *Chriacus* belongs to the family Arctocyonidae, of the extinct Order Condylarthra, and has been proposed as being near the ancestry of the artiodactyls (even-toed, hoofed mammals such as deer, cattle, camels, etc.). However, the recent discovery of a nearly complete skeleton shows that *Chriacus* was adapted for climbing trees, and could not have been ancestral to artiodactyls.

Comment. This article illustrates the difficulty of trying to reconstruct the habits and relationships of an extinct type of mammal from its dental morphology, as well as the uncertainties in determining the ancestries of living mammals.