BOOK REVIEWS

Hope from Physics

The Physics of Immortality. Modern Cosmology, God and the Resurrection of the Dead. FRANK J. TIPLER. Doubleday, New York, 1994. xxviii, 528 pp., illus. $24.95 or $C32.95.

This daring book with a catchy title, written by a physicist at Tulane University, elaborates on the conviction of the author that the results of current cosmological theories have finally proved the existence of God, and much more. Readers of E. T. Bell's *Men of Mathematics* may remember the questionable anecdote in which Euler reportedly told an unbelieving Diderot in Catherine the Great's court, "Sir, $(a + b^n)/n = x$, hence God exists." The mathematically untutored Diderot (so the story goes) could not reply and promptly went back to France. This book may be regarded as a more serious, and considerably expanded, version of Euler's quip.

The book interprets the many insights of modern cosmology in terms that should be soothing to the average person who has been let down by the dismal long-range predictions of 19th-century thermodynamics and 20th-century astrophysics. Scientists like Pierre Duhem, Balfour Stewart, and P. G. Tait once tried to circumvent the ominous Clausius prediction of a heat death that would eventually consume the entire universe, but they did not carry the day. Now at last we have a more optimistic treatise whose cheerful thesis is developed on the "physical assumption that the universe must be capable of sustaining life indefinitely" (p. 11). Its message should also be exciting to theologians and others who speak with some authority, if not first-hand experience, on afterlife, for it argues that an essential consequence of 20th-century scientific probing is the discovery that heaven and purgatory do exist, as reported in some of the highly revered holy books of the world. More important, Tipler claims to have shown that resurrection of the dead will occur, as reiterated periodically in many dominical sermons. But before we rush to make special arrangements for our caskets on this basis, let us note that by "resurrection" the author means simulation of ourselves "in the computer minds of the far future" (p. 227).

It is all based on the picturesque Omega Point Theory. "Omega Point" refers to the final state of the universe. It is to the future what the Big Bang is to the past: a terminal point on the time axis. It is not some poetic metaphysical concept but comes in the context of quantum cosmology with wave function, boundary condition, and all. Tipler gives half a dozen (what he calls) experimental tests for his theory (pp. 139–153), although the final confirmation may not come in the next hundred billion years. The universal wave function is the Holy Spirit. The Omega Point not only will resurrect us but also will love us. Furthermore, there are aspects of Tipler's theory (Turing-test–passing subprogram) that correspond to angels (p. 157). His theory also absolves "God of moral responsibility for evil" (p. 264), which has often been an embarrassment for traditional theologians.

Tipler declares himself to be a non-Christian, indeed an atheist. He confesses that he does "not yet even believe in the Omega Point" (p. 305). But he assures the orthodox that he will attempt to avoid any of the standard heresies regarding the doctrine of the Trinity (p. 313) and is eager to prove that 20th-century science is confirming Judeo-Christian visions of the divine.

Nevertheless, in conformity with the multicultural spirit of our times, Tipler is commendably inclusive in his references to religious beliefs. He shows that "the resurrection model in the Omega Point Theory is natural to the Chinese tradition" (p. 272). He assures us that "the afterlife predicted by the Omega Point Theory is quite consistent with the afterlife expected in most African societies" (p. 280). He quotes from Hindu scriptures to let us know that "the afterlife of the *Rig Veda* is completely consistent with the . . . Omega Point Theory" (p. 273). Similarly, though some Buddhist scholars may insist that their religion is atheistic, Tipler finds reasons to believe that "the Blissful Realm of Japanese Buddhism seems completely consistent with the Heaven predicted by the Omega Point Theory" (p. 278). Also, "The nature of resurrection according to the Qur'an is essentially the same as that outlined in this book" (p. 299); and his theory is "in agreement with the universal Muslim belief on the absolute oneness of God" (p. 304). Furthermore, unlike most other attempts at a United Nations approach to religions, Tipler's does not ignore the religious beliefs of Amerindians. "If the Omega Point Theory is true," he informs us, "the hopes of the Native Americans will be fulfilled" (p. 283).

Tipler's insistence that theology should be a part of physics (p. 10) is essentially a call to return to medieval scholasticism, in which there was indeed no distinction between science and theology. He correctly recognizes that "religion can be based on physics only if the physics shows that God *has* to be personal, and further, that the afterlife is an absolutely solid consequence of the physics," and asserts that his Omega Point Theory accomplishes these feats (p. 327).

However outlandish some of Tipler's claims may sound to the average practicing physicist, his arguments are based on both an understanding of current physical theories and a study of sister disciplines like philosophy and religion. Even when he talks of the soul and immortality, of resurrection and paradise, Tipler defines the terms using concepts like the Penrose c-boundary, the Poincaré recurrence theorem, and levels of implementation (computer jargon referring to processes within virtual machines). Immortality for him is when information processing never ends. Only here and there are his psychological motivations explicitly stated. For example, after giving a series of arguments in favor of Everett's many-worlds interpretation of quantum mechanics, he states that if this interpretation is true, "then we can *prove* to be true what most people would very much *like* to be true" (p. 172).

Essentially, the Omega Point Theory conjectures the evolution of super-minds before the final dismal astrophysical catastrophe gobbles up the whole universe in one final black hole. These minds would then persist indefinitely, rejoicing in their own virtual reality.

Besides being fascinating in its bold proclamations, this is, in fact, a very weighty book, filled with complex ideas and sophisticated results. Unlike some others who rush to these themes where angels fear to tread, Tipler displays an impressive breadth of knowledge and engages the reader in quite a bit of profound thinking. Unfortunately, many practicing physicists are likely to chuckle at Tipler's claims without even going through his pages, and very few non-physicist readers will be able to decipher the bulk of his Appendix for Scientists, which demands more than a modicum of knowledge of global general relativity, current advances in high energy physics, and computer complexity theory: frameworks on which the Omega Point hypothesis rests.

Tipler intends his work to be a "popular book," and indeed it has been featured on at least one popular TV show. However, not too many people whose lives have been enriched by faith in God will even bother about the mathematical proofs for the divine principle. The "ergo est" formulation of God's existence is of interest only to professors, authors of books and papers, and debaters, not to the spiritually awakened souls of the world.

In 1888, when the positive sciences were on the ascendant, Madame Blavatsky published *The Secret Doctrine*, a massive tome replete with ancient writings and quotations from 19th-century scientists, to establish that all the results of the physics and cosmology of her period lay implicit in the occult writings of ancient Egyptians, Hindus, and Buddhists. Tipler's book is on target with our own Zeitgeist. We live in an age when people feel they have had enough of science and rational thought, which have led us to theories that make God irrelevant and ethics a function of situations. Our sciences have dragged us to doubt and atheism; while technology, with all its creature comforts, has engendered pollution, population problems, and the depletion of rain forests. Add to all this a degrading drug culture, crippling crime waves, promiscuous sex, broken families, and low SAT scores to boot: we have had it. It's time to sing, "Give me that old-time religion."

The only snag has been that (at least for the college-educated lot) it is difficult to be convinced *de rerum natura* by soothing songs and eloquent sermons. Most book-readers cannot rid themselves of the suspicion that science tells it like it is, while religion and poetry are only meant to make us feel good. Now, if only science can prove that there is indeed a Santa Claus, some of the deepest emotional problems of the modern world would be considerably alleviated. This calls for a rebirth of the old physics. Books like *The Tao of Physics* and *The Dancing Wu Li Masters*, condemnation of Descartes and belittling of the Enlightenment, holistic medicine and multiculturalism, all have set the stage for such a paradigm shift, unwittingly spawning a resurgence of interest in astrology, telepathy, and psychic revelations.

Tipler has written a masterpiece for the Age of Aquarius, conferring much-craved scientific respectability on what we have always wanted to believe in. His insight that "in the end, reason will sway emotion" (p. 9) may not be entirely correct, for often it is the opposite that occurs.

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Fossils Worth Studying

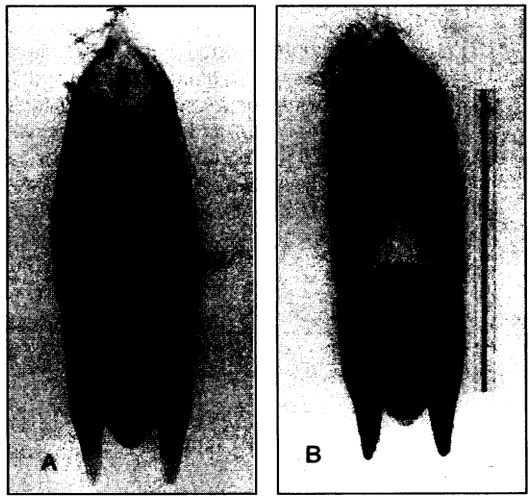
Quaternary Insects and Their Environments. SCOTT A. ELIAS. Smithsonian Institution Press, Washington, DC, 1994. xvi, 284 pp., illus. $40 (overseas orders, $47.95) or £31.25.

At the 1977 meeting of the International Quaternary Association in Birmingham, England, many Quaternary scientists first became aware that fossil insects were a legitimate topic of study. There Russell Coope (the father of Quaternary paleoentomology as we know it) and his students demonstrated the enormous potential of Quaternary beetles and other insects in paleoenvironmental studies. Now there are about 40 scientists studying paleoentomology and over 450 published papers; this research has made important contributions to our understanding of global change. The research has shown that most species of Quaternary fossil beetles and other insects are still extant, that their modern biogeography is an excellent source of paleoclimatic information, and that their wide range of habitats allows detailed paleoecological reconstructions. Until recently, this information was widely scattered in the literature. It is a good time for a synopsis of the field.

Elias's book concentrates on beetles but includes some information on other insect groups and on arachnids. The first few chapters deal with the history of Quaternary insect studies, fossil preservation, sampling, extraction, and general principles of identification. A middle group of chapters summarizes the value of insects in paleoecology, paleoclimatology, zoogeography, and archeology. The last third of the book comprises descriptions of the faunas of individual sites and their chronology and paleoenvironmental significance.

The book contains many interesting details in several biological areas that you won't find anywhere else. Here are some unrelated examples. Many studies show that beetles especially are sensitive indicators of climate. They are able to migrate so rapidly in response to climatic change that they often record climatic fluctuations that the slower-colonizing plants show no hint of. In Britain during the last glaciation, beetles record a short, intense warming, so rapid and brief that thermophilous plants never reached the British Isles. Elias cites studies on such diverse sources of insect fossils as human mummies, coprolites, and agricultural areas that indicate that humans have been plagued (sometimes literally) by fleas, lice, and chiggers for well over 1000 years.

Ideas about insect evolution may need to be revised in light of evidence from the fossil record. Insect fossils reveal that most fossils in the last million years or so are modern species. Few insects have become extinct or have shown any measurable evolution in the last million years or more, thus being a very conservative group. Yet one species of bot fly found in mammoth carcasses is extinct. Related species inhabit modern elephant carcasses, and this species may have become extinct because its host became extinct. Another example involves elm, which is known to have declined suddenly over a large area of Europe during a short interval of Neolithic time; the elm bark beetle, carrier of the Dutch elm disease, appears in those same deposits—a prehistoric pathogen?



"Light microscope photographs of fossil (A) and modern (B) aedeagi of *Helophorus aquaticus*. The fossil specimen is from the Starunia site in the Ukraine. . . . It was originally identified as *Helophorus dzieduszckii* by Lomnicki (1894). . . . Scale bar equals 0.5 mm for both." [From *Quaternary Insects and Their Environments*; photographs courtesy of Robert Angus]

The discussions of research in the later chapters are simply paragraph-length descriptions of what insects were found at different sites in each major region. This approach makes for tedious reading for the non-entomologist, and it is unfortunate that a more comprehensive synthesis was not attempted. It also would have been helpful if results were presented more graphically (rather than by way of lists of species) and more quantitatively. Even in 1977, Coope and students were able to summarize with compelling visual images how beetle faunas of the United Kingdom changed through time. Perhaps the number of sites and the chronology are still so mea-