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Review: Aspects of Evolution

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## ENDANGERING SPECIES AND OURSELVES

**Extinction: The Causes and Consequences of the Disappearance of Species**, by Paul and Anne Ehrlich. Random House, New York, 1981, 305 p., illus., \$15.95 (80-6036).

Perhaps nothing is as depressing on the contemporary scene as the relentless destruction of nature by modern man. The story of the extermination of the Carolina parakeet, the passenger pigeon, the dodo, and the moas of New Zealand has often been told. What is much less well known is the fact that the same fate has met literally thousands of other species of animals and plants. Some, like most species of whales, have been pushed near to the level of extinction. Whenever there is a conflict between commercial interests and common sense (a steady-state renewable resource), the greed for "profit now" always seems to win out. This has killed not only the whaling industry, but also the California sardine fisheries, the North Sea herring industry, and other enterprises exploiting specific animal or plant species. Regrettably, there is nothing new about man's thoughtlessness, since there is little doubt that man was at least in part responsible for the late Pleistocene and post-Pleistocene extermination of much of the European and North American mammalian megafauna.

Conservationists can point with pride to the numerous cases where a species was saved from extinction by heroic efforts at the last minute. This was done either by providing sanctuaries (whooping crane, European ibex) or by propagation in captivity (Père David's deer, Hawaiian goose). Success in these cases is very costly in manpower and can be considered normally only for conspicuous large animals and plants. Financial constraints set severe limits to the number of species that can be saved by such ad hoc conservation.

Most of the readers of this review hardly need to be persuaded of the virtue of saving vanishing species and their habitats; but we biologists are unhappily an infinitesimally small minority. Unless our knowledge and our sentiments become far more widespread, there is little hope for much of the biota of our world. Education, then, is our major weapon, and to educate people the Ehrlichs have written this volume. They have done a beautiful job. They have written sensitively and intelligently, their account being based on a profound knowledge of the subject. They show what unique properties every species has, even the lowliest animal and plant, and how their extinction impoverishes our world.

In chapters 3 through 7 the Ehrlichs enumerate and analyze the reasons why we must make a massive effort at conservation. The moral and aesthetic values of preserving the diversity of life may not be compelling to those who are insensitive to nature, but the Ehrlichs present good reasons why every loss

of a species or habitat and every destruction of an ecosystem may endanger our own survival. A world ethic that places immediate profit and current well-being above all moral obligations to future generations and to other organisms with whom we share this globe can only lead to ultimate disaster. Until deeper ethical values that recognize the aesthetic values of organic diversity and the right to life of other organisms become prevalent, conservation must be promoted as an issue of human well being and, in the long run, survival.

It is now evident that the conservation measures of 50 years ago are no longer sufficient in our age. To declare a species as "protected" is futile if its habitat is being destroyed. To "save" a lake or a swamp is lost effort if acid rain makes it sterile. The most beautiful coral reef will die if it is not protected against silting and pollution. There is little hope for this world until a steady-state economy has replaced the ideal of a growth economy and a steady world population has terminated the population explosion. Thus, it is clear that the protection of threatened species and the setting aside of parks and sanctuaries are only temporary remedies.

I wish this volume the widest possible distribution. Our generation has an awesome responsibility toward future generations.

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## ASPECTS OF EVOLUTION

**The Evolving Biosphere: Chance, Change, and Challenge**, edited by P. L. Forey. Cambridge University Press, New York, 1981, 311 p., illus., \$79.50. (cloth) \$24.95 (paper).

This is the second volume produced by the British Museum (Natural History) in celebration of its centennial last year; the first volume, *The Evolving Earth*, was concerned with a summary of earth history, whereas the book reviewed here focuses on various aspects of biotic evolution. With 21 chapters allocated to three sections—species and speciation, coexistence and coevolution, and biogeography—*The Evolving Biosphere* attempts to cover fields of study often considered of importance to museum research programs.

Multiauthored compilations usually are more successful on one level, but not others, and this book is no exception. Each author presents a clearly written, beautifully presented, general summary of his individual topic, providing not only basic introductory material, but occasionally delving more deeply into contemporary controversies. As such, the book will be most useful at the introductory to advanced undergraduate levels. The book is not designed for specialists, most chapters merely summarizing material already avail-

able elsewhere, but still, there are intellectually stimulating parts all through the text.

The eight chapters on species and speciation, although a competent summary of present thinking, break no new ground theoretically or methodologically. In particular, I was astonished to discover that none of the authors stressed the necessity for phylogenetic or biogeographic analysis in study of speciation modes or the historical patterns of taxonomic differentiation. Attention to those methods would have clarified the patterns needed to postulate parapatric and sympatric speciation and probably would have resulted in the conclusion that there is far less evidence for them than their proponents so often imply.

The editors chose to include no less than 10 chapters on the question of coexistence and coevolution. Unfortunately, most of these chapters are full of the scenario-adaptationist thinking one has come to expect of the neo-Darwinian approach to ecology. There is much discussion of coevolution, for example, but most of the cases cited merely illustrate the age-old observation that there is much apparent design in nature. This "design" is almost always assumed to be the result of natural selection, but little evidence for this is presented. What is the evidence that the different systems being examined—predator-prey, parasite-host, competition—include

taxa that have actually had congruent evolutionary histories? Sometime soon it will be necessary for ecologists to admit that the problem of coevolution is primarily a question of systematics, not ecology. Once we have information about the phylogenetic histories of these taxa, I suspect that much of the perceived coevolution, which is easy to invent within the framework of adaptationist thinking, will disappear.

One paper in this section—on the causes of tropical high diversity by B. R. Rosen—should be read by all interested in biotic diversity. Rosen rightly chastizes most ecological theories of diversity because they cannot account for the origin of species. Latitudinal gradients are seen to be primarily the result of relatively less extinction in the tropics.

The final section on biogeography consists of three papers, one an apologia for dispersalism and two real-world case studies of the power of vicariance biogeography. Colin Patterson's paper on the North American fish fauna and C. J. Humphries' discussion of the history of southern beeches (*Nothofagus*) are important original contributions.

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