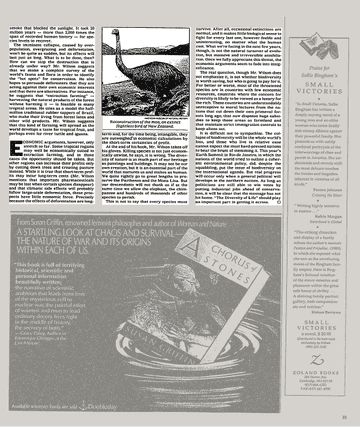
***In the Footsteps of The Dodo***

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Oct. 4, 1992



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THE DIVERSITY OF LIFE By Edward O. Wilson. Illustrated. 424 pp. Cambridge, Mass.: The Belknap Press/ Harvard University Press. $29.95.

IN the Beatles cartoon "Yellow Submarine," there is a creature called the Vacuum Cleaner Monster, which sucks up everything in sight until it is the only thing left, and then it sucks itself up too. In the biological realm, this is a difficult trick to pull off. Most species that start destroying their own habitat simply manage to reduce their food supply, and so shrink in number before they can do further damage. The only species with real destructive powers are those whose adaptability and varied appetites allow them to switch to new food sources when they have exhausted old ones. Our planet does, however, house one species that takes adaptability and varied appetites to perilous extremes.

The central message of Edward O. Wilson's stirring new book, "The Diversity of Life," is that Homo sapiens is in imminent danger of precipitating a biological disaster to rival anything in evolutionary history. Mr. Wilson, the Frank B. Baird Jr. Professor of Science and the curator of entomology at the Museum of Comparative Zoology at Harvard University, is the doyen of American biology. Two decades ago he popularized the term "sociobiology," and generated a small industry of speculation about the biological basis of human nature. In this book he stops asking what biology does to humans, and asks instead what we humans are doing to biology.

The focus of his book is the extinction of species. As Mr. Wilson observes, other kinds of environmental damage can in principle be repaired, but a defunct species is gone forever. Not that the destruction of animal species by humans is a new phenomenon. For those who still believe there was a golden age of ecological harmony before our technological fall, Mr. Wilson produces strong evidence that prehistoric tribes killed off the mammoths, the moas and many other large animals.

Still, the human population explosion of the late 20th century has lifted our destructiveness to altogether new levels. Our hunger for agricultural land and grazing pastures means that we are now wiping out not just individual animals, but whole ecosystems. As we chop down and burn primeval forests, we also suck species into oblivion -- now at the staggering rate, Mr. Wilson estimates, of 27,000 species per year, 74 a day, 3 every hour.

Even at this swift rate, though, it will take hundreds of years to exhaust the stock of species, so diverse are the creations of nature. No one knows exactly how many species currently exist. About 1.4 million are catalogued, of which insects constitute more than half, higher plants 250,000, birds 9,000 and mammals 4,000. But it is anybody's guess how many more species are still lurking in forest canopies and at the bottom of the oceans. Few biologists would put the figure at under 10 million, and some think it may be 10 times that.

"The Diversity of Life" is as much a celebration of this profusion as a warning of its imminent demise. Mr. Wilson, who is also the author of "On Human Nature" and "Sociobiology," writes urgently, as if to capture the kaleidoscope of nature before it breaks up into long-lost fragments. In the Amazon basin, he lists the lives hiding among the fallen trees and rotting branches: "basidiomycete fungi, slime molds, ponerine ants, scolytid beetles, bark lice, earwigs, embiopteran web spinners, zorapterans, entomobryomorph springtails, japygid diplu rans, schizomid arachnids, pseudoscorpions, real scorpions." The green conure parrot of Mexico, he tells us, provides a habitat for 30 species of feather mites, each of which lives on different parts of different feathers. In the forests of Costa Rica, he watches insects that eat the lichen that grows on the small trees that grow on the beds of orchids that grow on the big trees. Mr. Wilson even seems to delight in the cigar-shaped, half-meter-long cookie-cutter shark, whose habits were exposed in 1971: "It thrusts its maw into the bodies" of living porpoises and whales, he writes, and "twists to slice out five-centimeter-wide conical plugs of skin and flesh."

Interleaved with this catalogue of marvels is an introduction to macroevolutionary theory. In sharp contrast to the pleasingly simple laws that dictate developments within existing species, the forces that govern the proliferation of new species are complex and ill understood. Mr. Wilson is an excellent guide to the broad movements of evolution. He explains how each geographical setting has room for only a limited number of species, and how accidents of migration often determine which new species will take root. A species that arrives at an empty place, like the first finches on the Galapagos Islands, radiates into different niches and eventually divides into different species. This process, Mr. Wilson explains, has yielded a steady increase in the diversity of species since evolution began, an increase that has accelerated over the last 100 million years.

Some of this acceleration is the result of the continents having split into separate landmasses; with the formation of new, smaller continents, the number of sites where species could form multiplied. Equally important has been the proliferation of tropical forests, places that contain many isolated habitats whose boundaries are created by differences in climate and altitude. This womb of biodiversity at present houses about half the species on earth.

But now the trend has reversed; the number of species is decreasing. Mr. Wilson suggests that at the current rates, 20 percent of existing species will become extinct in the next 30 years. The last comparable evolutionary disaster was the disappearance of the dinosaurs 65 million years ago. Many paleontologists now think this was caused by a meteorite six miles in diameter colliding with the earth and sending up a huge cloud of dust and smoke that blocked the sunlight. It took 20 million years -- more than 2,000 times the span of recorded human history -- for species levels to recover.

The imminent collapse, caused by overpopulation, overgrazing and deforestation, won't be quite as sudden, but its effects will last just as long. What is to be done, then? How can we stop the destruction that is already under way? Mr. Wilson suggests that we make a complete survey of the world's fauna and flora in order to identify the "hot spots" for conservation. He also hopes to persuade deforesters that they are acting against their own economic interests and that there are alternatives. For instance, he suggests that "extraction farming" -- harvesting the natural products of the forest without harming it -- is feasible in many tropical areas. He cites as a model the half-million traditional rubber tappers of Brazil, who make their living from forest latex and other wild products. Mr. Wilson suggests that this kind of farming will spread as the world develops a taste for tropical fruit, and perhaps even for river turtle and iguana.

Economic arguments, however, only stretch so far. Some tropical regions may well be economically suited to extraction farming, and in those cases the opportunity should be taken. But other regions can increase their profits only by cutting down trees and creating pasture instead. While it is true that short-term profits may incur long-term costs (Mr. Wilson mentions that important pharmaceuticals may be lost when certain species disappear) and that climatic side effects will probably follow large-scale deforestation, these prospects have little economic force. Precisely because the effects of deforestation are long-term and, for the time being, intangible, they are outweighed in economic calculations by the short-term certainties of profit.

At the end of his book, Mr. Wilson takes off his gloves. Killing species is not just economically unwise, he says, it is wrong. The diversity of nature is as much part of our heritage as paintings and buildings. It may not be our own creation, but it is an essential part of the world that nurtures us and makes us human. We quite rightly go to great lengths to preserve the Parthenon and the Mona Lisa. But our descendants will not thank us if at the same time we allow the elephant, the chimpanzee and hundreds of thousands of other species to perish.

This is not to say that every species must survive. After all, occasional extinctions are normal, and it makes little biological sense to fight for every last one, however feeble and uninteresting, no matter what the human cost. What we're facing in the next few years, though, is not the natural turnover of evolution, but massive and irreversible annihilation. Once we fully appreciate this threat, the economic arguments seem to fade into insignificance.

The real question, though Mr. Wilson does not emphasize it, is not whether biodiversity is worth saving, but who is going to pay for it. For better or worse, most of the threatened species are in countries with few economic resources, countries where the concern for diversity is likely to be viewed as a luxury for the rich. These countries are understandably unreceptive to moral lectures from the nations that cut down their own primeval forests long ago, and now dispense huge subsidies to keep those areas as farmland and that maintain strict immigration controls to keep aliens out.

It is difficult not to sympathize. The collapse of biodiversity will be the whole world's loss, and those who live in relative ease cannot expect the most hard-pressed nations to bear the brunt of stemming it. This year's Earth Summit in Rio de Janeiro, in which the nations of the world tried to outline a coherent environmental policy, did, despite the squabbling, put the issue of biodiversity on the international agenda. But real progress will occur only when a general political will develops in the northern nations. As long as politicians are still able to win votes by putting industrial jobs ahead of conservation, it will be clear that the message has not hit home. "The Diversity of Life" should play an important part in getting it across.