

The Zoo that Is Not: Education for Conservation

The conservation of the earth's biotic resources has become a matter of extreme urgency. At the root of our present problems lies our unique capacity to change habitats on a large scale. No other animal can do this. But we did not start off affecting the world profoundly; our capacity for massive environmental effects is strikingly recent in terms of our evolutionary history. We, the naked apes, *Homo sapiens*, were ecologically indistinguishable from any other animal until we domesticated animals and plants. For 99 percent of our species life, as hunter-gatherers, our populations were limited to the natural carrying capacities of unaltered habitats. With the domestication of plants and animals the long period of ecological innocence ended. We fell heavily on the forests and savannas. Our gross alteration of biological systems to increase our food resources created the conditions necessary for civilization, the development of science and technology, and our subsequent and presently phenomenal population growth. Since we took that pivotal step beyond mere subsistence, just 1 percent of our life as a species ago, we have radically altered large areas of the earth's surface. The results of our *terrapernicious* activities are discernable from outer space; we are no longer, ecologically speaking, an animal species. The transformation started slowly and has only accelerated mightily in the last millenium. Even during most of that time, most of our environmental manipulations have been confined to the temperate and Mediterranean regions. The present great transformations in the topics originated principally in the second half of the twentieth century, in the postcolonial period.

In parallel with the destruction has been a modest expansion in biological research in the tropics. From this research it is now abundantly clear that the rain forests, in the broad sense, are home to the overwhelming majority of living species. We know with certainty that as a result of the expanding conversion of tropical forests we now face threats to biodiversity greater than those occurring at any previous stage in the history of human perturbations of the environment. The driving force of these changes is an interlinked system of economic "development" and population growth. This is powered by an intense drive toward the betterment of living standards by tropical peoples. The situation is critical, we are close to passing the point of no return, and some crucial questions inevi-

tably arise. For instance: (1) Is the linkage between development and forest loss inevitable? (2) If the answer is yes, will development proceed to the point where the damage to the environment is irremediable? (3) Are there alternatives to destruction? (4) If so, can they be used in time to save species? (5) If not, are there practicable *ex situ* methods of preserving threatened species? And so on.

These and other questions are not easily answered. This is a field where there is a great deal of rhetoric and very little rigor. The optimists see no ultimate conflict between economic development and sustaining biodiversity. The pessimists are doomsters. I vote with the latter. One widespread assumption of the optimists is that education is the key to a new environmental policy in the Third World. This attitude implicitly (but seldom overtly) assumes that present environmentally harmful policies are the product of ignorance and unenlightened attitudes. In my view this is an idealistic oversimplification. It may simply not be true. Although there is no shortage of political stupidity, both in the developed and less developed worlds, most Third World policies are driven by urgent needs rather than ignorance. Necessity is the paramount motivating force. In the face of poverty and greed, reliance on the ameliorating effects of education is a reflection of the unrealistic *enlightenment fallacy* that assumes the long-term rationality of political decision making. Far-sighted policy making is, in my view, an untenable expectation. Nonetheless public policies may still be subject to public pressures. Our present state of global interconnectedness and the rapid transmission of "news" should mean that education *can* become a political force. My view is that the developed nations can provide the economic solutions to Third World environmental problems, through financial and technical aid. But this will only happen if the fundamentally crucial nature of global interdependence is understood in time. Public opinion within the rich nations must force them into action. In this scenario educating the public of the advanced countries is an essential task. I feel that biology is the important foundation for building a fully educated, humane, and sophisticated electorate in the twentieth and twenty-first centuries. It will play the role once attributed to the study of classical languages and theology in the cultural literacy of medieval society. To promote bioliteracy I have little doubt that bioexhibits in general, and zoos in particular, *must* bear an entirely new and very considerable responsibility. I believe that zoos can fulfill this responsibility. However, they can only do so if they transform themselves from zoological parks into biological parks.

Bioexhibits have a very long history. The origins of zoos and botanic gardens date from at least 3,000 years ago. This is not the place to trace the origins and evolution of the now disparate institutions that exhibit life on earth to the public. They are now ridiculously, perhaps even ludicrously, fragmented. It is easy to document this "feudal" fragmentation: Zoos exhibit living animals and overwhelmingly concentrate on the vertebrate minority; botanic gardens and arboretums exhibit plants, almost exclusively without reference to the vital and multitudinous interfaces between plants and animals; public aquariums exhibit aquatic creatures and emphasize fish life; oceanariums concentrate largely on cetaceans; natural history museums exhibit evidences of life in the past, the structure of plants and animals, and even now are dominated by a didactic classificatory bias; museums of anthropology and ethnology exhibit the human species, and most frequently do this in a biological vacuum, with little reference to the rest of life on earth. How can this separation of gloriously intermingled and interactive elements of the biological "one-world" make sense to any questing mind? We desperately need ho-

lism, not unnatural divisiveness. How can an unholistic approach be genuinely educational? For instance, one cannot understand the evolution of a majority of flowers without understanding the viewpoint of insects; one cannot appreciate a living modern elephant in all its glory without understanding the evidence of its ancestry or how its skeletal mechanics relate to those of mammoths and elephantine extinct reptiles. There is a need to put the microscopic world before people with as much skill and ingenuity as we expend on exhibiting the charismatic megavertebrates. At the subvisible level, the intertwining of plant and animal life is immediately obvious. In our microtheater at the National Zoo the ballet of gliding diatoms makes them as visually exciting as animals like *Stentor*. All this and much more is the broad canvas of the BioPark.

The significance of this for conservationists is surely clear. If zoos give messages about only part of the living world, their impact is inevitably muted and diluted. We urgently need a change of focus. Concern for vertebrates alone is misdirected sentiment. Orchids are as important as tamarins, and grasses play as significant a part in the living matrix as elephants. If all the vertebrates disappeared overnight the consequences would probably not be as significant as the loss of the subvisible organisms and certainly not as important as the loss of the arthropods. And plants are even more crucial to a healthy planet; they are fundamental to the existence of almost all other forms of life. To understand the present we also need a context of past extinctions by which to measure the scale and consequences of our destructiveness. We need to know our evolutionary history to decide about the character of our future. Somewhere in the BioPark we also need to solve the problem of providing a vehicle for contemporaneity in environmental education. Bioexhibits, from museums to bioparks, despite their commitment to expensive permanence in structures, need to have instant response facilities that can highlight current environmental events as they happen. I don't yet know how we can create the equivalent of a "stop press" column, but we all need it. In all this we will be basing a new vehicle for enlightenment on what may well be an atavistic affectional response. This new form of forceful environmental education will capitalize on the fascination that millions feel for interacting with animals and surrounding themselves with plants. It will result in the creation of the once and future zoo, the holistic, multidimensional BioPark.

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