

REVIEW

Biodiversity, edited by Edward O. Wilson and Frances M. Peter. National Academy Press, Washington, D.C. xiv + 521 p. (1987). Softcover, U.S.\$19.50.

As I prepare this review the annual meeting of the 151-nation World Bank is getting underway in Washington and attention focuses on the Third World's \$50 billion annual interest payments. As if that is not enough, finance ministers will also have to cope with the presence of environmentalists from 70 countries who will urge them to pay far more than lip service to the impact of their activities on the greenhouse effect and the biodiversity crisis.

Biodiversity is an umbrella term for nature's variety—communities of interacting organisms and their component species, populations and genes. Today's biodiversity is the product of 3.5 billion years of evolution and is responsible for maintaining the habitability of the planet for our own species. Ongoing rates of habitat destruction are causing species to go extinct at unprecedented rates. With the disappearance of the tropical forests in the next few decades perhaps half the species in the world are doomed to extinction.

Effective systems of management of biodiversity provide a foundation for sustainable development, for the long-term well-being of human populations, and for the stability of national economies. Such environmental management systems are not derived easily, however, from contemporary human practices. Instead they require the collective awakening of a national and international environmental consciousness. This important book is another hopeful sign that the appropriate shift in the conduct of human affairs has begun. The recent greening of the political leadership in parts of Europe and North America suggests that the future can be saved and that readers of this *Bulletin*, natural historians, environmental scientists and educators, have a real opportunity to help shape that future.

This volume describes the nature of the biodiversity crisis and discusses what can be done to alleviate the threats. The biosphere, on whose functioning we are ultimately dependent, is being destroyed and damaged at unprecedented rates. Humans, one species among more than 5 million species alive today, use or waste 40% of the global land net primary productivity annually. Such consumption is completely unsustainable. Ongoing environmental mismanagement now threatens not just local populations but the human species as a whole. Carbon dioxide released by fossil fuel use and deforestation will probably raise the earth's average surface temperatures 3-5°C and sea levels by 2–3 meters during the next hundred years. The fossil record reveals that the foreseeable rate of species extinction will be 10,000 times higher than the background rate and that recovery from extinction spasms of this magnitude take over 10 million years. With direct and concerted intervention into the environmental aspects of human affairs some of the worst scenarios can be avoided. This volume describes the nature of the biodiversity crisis and discusses what can be

done to alleviate the threats.

The source of this book is the National Forum on BioDiversity, held in Washington, D.C., in September 1989, under the auspices of the U.S. National Academy of Sciences and Smithsonian Institution. The forum was notable for its large size and the very wide publicity it received. The 57 chapters prepared by 61 leading biologists, economists, agricultural experts, philosophers, and representatives of assistance and lending agencies are grouped into 12 parts: challenges to the preservation of biodiversity, human dependence on biological diversity, diversity at risk—tropical forests and the global perspective, the value of biodiversity, how is biodiversity monitored and protected, science and technology—how can they help?, restoration ecology—can we recover lost ground?, alternatives to destruction, policies to protect diversity, present problems and future prospects, and ways of seeing the biosphere. The individual chapters are generally short personal essays; collectively, they provide a comprehensive and well-referenced review of the present situation and its significance.

Although this is very much an American volume there is plenty to interest the Thai reader. As elsewhere, the habitats of greatest biological diversity in the Kingdom, the rain forests, the coastal wetlands, and coral reefs, are being damaged or destroyed at unprecedented rates, In Thailand, as in most other tropical countries, it is suprising how little we actually know about local biodiversity and the rates at which it is being lost. However, given historical losses of native forest, mangrove and wetland habitats, it would not suprise me if we have already lost several hundred species of vascular plants and invertebrates this century. Most of these extinctions probably involved species that were still unknown to science. Today, as habitat loss and fragmentation proceed at growing rates, perhaps 2–3 species are lost forever each week. This collection of essays provides one of the best surveys of why we should care about the loss of even obscure and undescribed species. Living organisms contain enormous libraries of genes that have already been tested by nature for their contribution to the fitness of the individual bearer. These genes, from even the most obscure fungi, grasses and mites, are increasingly available for human use in improved food, fertilizers, pharmaceuticals, pesticides, fuels and fibers. My favorite example in this volume is Dr. Hugh Iltis' collection of a previously unknown, wild and weedy tomato plant (at a cost of about \$21); twenty years later the germplasm of this stock is worth over \$8 million per year. The important point here is that it is pointless to try to "prove" the future "value" of biodiversity; it will be gone before hard numbers can be established. Instead, those who destroy or propose destroying biodiversity should be asked to prove that their actions have acceptable ecological costs before they can expect to obtain societal approval. As in more developed countries, the failure of businesses and government agencies to prepare Environmental Impact Assessments for timely public scrutiny are proving increasingly unacceptable; recent examples in Thailand include the tantalum riot, the Doi Suthep cable-car controversy and the Nam Choan Dam proposed in the

Kingdom's largest wildlife reserve.

Almost every contributor to this volume has suggestions as to what needs to be done. Before reviewing a few of these that seem relevant to Thailand let me note two recurring generalizations. The first is that in most countries local knowledge of biotic conservation needs and priorities far exceeds the ability of governments to implement conservation action plans. In view of the very serious implications of the biodiversity crisis further steps must be taken to bring available expertise into corporate and political policy making processes. The second point is that conservationists are dissipating their energies by talking to one another; they must devote themselves more to the education of a much broader public.

What can be done in Thailand? Clearly, one should support efforts to study and catalog the country's remaining biodiversity. This in turn involves strengthening appropriate institutions (university departments, government agencies, zoos and propagation centers, botanical gardens, herbaria, museums, research centers and natural history organizations). Second, one should support efforts to not merely educate children and citizens but also to motivate them to act constructively.

Knowledge is useless unless used and we still ignore the difficulties of translating conservation's "noble goals" into actions that will appeal to ordinary people. Ariel Lugo, a tropical forest specialist based in Puerto Rico, writes (p. 68) "I know of no reason why sensible land management in tropical areas cannot lead to the success that is usually associated with temperate zones. The obstacles to progress are social and rooted in poor training and education programs, lack of facilities and infrastructure, weak institutions, misguided foreign aid programs, lack of commitment to (natural resources) research and to enforcement of regulations, and the absence of a land conservation ethic." As more people recognize that our problems are basically biological (overpopulation, habitat destruction, soil loss, water and air pollution, malnutrition and disease) then the link between conservation of biodiversity and sustainable economic development will become clearer.

David S. Woodruff
Department of Biology
University of California San Diego
La Jolla, CA 92093, U.S.A.

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