Rainforest Assessments

Australian Tropical Rainforests. Science—Values—Meaning. L. J. WEBB and J. KIKKAWA, Eds. CSIRO, East Melbourne, Australia, 1990 (U.S. distributor, International Specialized Book Services, Portland, OR). x, 185 pp., illus. $70. From a symposium, Townsville, Australia, Aug. 1987.

For biologists and non-biologists alike, tropical rainforests symbolize the pinnacle of biological complexity that unfettered nature can attain. Elaborate examples of mimicry, highly evolved specializations, and intricate interspecific associations all somehow perpetuated in ancient forests on some of the world's poorest soils contribute to the impression that rainforest ecosystems are not only complexly balanced but extremely fragile.

Building on a long tradition of tropical field study, results now emerging from studies of the Australian tropical rainforest are helping to revise our view of the structure and balance of rainforest communities. At the same time Australians are engaged in a heated debate over the future of those forests. In northeastern Queensland scientists and forest managers argue whether we now know enough to manage the remaining stands of old-growth forest and whether the scientific justification for the preservation of wild laboratories overrides the short-term social and economic benefits of continued exploitation. If Australian society cannot agree on priorities for keeping the remaining forests intact, how is it to be done in other countries with greater human pressures, fewer resources, and smaller political infrastructures? *Australian Tropical Rainforests* is as much a statement about public ethics and respect for biotic and cultural diversity as it is an introduction to the biology of the forest.

These collected papers, proceedings from the 57th Congress of the Australia New Zealand Association for the Advancement of Science, attempt to pull together two related but disparate themes: they provide an introduction to the evolutionary and ecological history of one of the world's most intensely studied rainforests, and they examine the role of tropical rainforest in the collective human consciousness. Following an introduction by Webb, the book is organized into four sections: The Depths of Time, Natural Processes, Values and Meaning, and Perspectives for the Future. The contributors are largely Australian biologists, natural resource managers, and sociologists in academic and government posts with a sprinkling of philosophers from abroad.

To their credit, the authors largely avoid the common temptation to offer a smorgasbord of natural history curiosities as evidence of unique evolutionary processes in tropical rainforests. These discussions consider organizing questions (Are rainforest species more highly specialized than those of other ecosystems?) in the light of available data and multiple hypotheses. They treat topics in forest history, impacts of aboriginal people, effects of disturbance on plants and vertebrates, ecological specializations, plant-animal interactions, decomposer communities, and nutrient cycles. They are not in-depth reviews for the specialist but carefully worked introductions to rainforest ecology for the nonprofessional reader. As such they are scantily illustrated, but they are well referenced and present many useful insights.

As a case in point, consider whether a tropical rainforest is in fact a complexly balanced, fragile ecosystem. Three chapters by E. M. Truswell, by D. Walker, and by N. Horsfall and J. Hall describe a historically fluid forest community. They document sporadic biological exchanges with northern regions, a continual shuffling of species assemblages under changing climatic regimes and the impacts of aboriginal people, and the recent (10,000 years ago) reestablishment and subsequent fragmentation of rainforest into the areas it now occupies. In the light of this paleobotanical evidence (some of the best available for any tropical rainforest), the model of tropical forest as an ancient, stable configuration of species whose interactions have been fine-tuned by millions of years of coevolution warrants reexamination.

Fully a third of the book wrestles with the philosophical, social, and political significance of rainforests. The chapter by Webb, an eminent student of Australian vegetation, is a statement, achieved as much through poetry as through argument, of "the cultural function of science to explain what this mysterious world really is and means" (p. 115). Some chapters, however, are philosophical discourses for which the Australian rainforest is but an example.

I found the chapter by J. R. Engel particularly intriguing. Engel argues for a public ethic based on a metaphor of community that encompasses at once the natural and the human worlds. He traces the metaphor to ecological and social movements in the (U.S.) upper Midwest early this century and expressed in Cowles's studies of plant community succession on the Indiana dunes and in the political ideals of social democracy that found voice in Chicago at the same time. The principles that ought to govern human interactions, freedom, equality, and unity in diversity, should inform our treatment of the nonhuman world as well. Only when the legitimacy of that metaphor becomes widely accepted does Engel see hope for the real preservation of the natural world.

Although *Australian Tropical Rainforests* is plagued with the unevenness of symposium volumes, Webb and Kikkawa's goal of melding science and philosophy to consider the history and future of rainforests is often successful and generally stimulating. It is an attempt that should be welcomed by both students of ecology and students of environmental politics.

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Primitive Systems

Evolution of the First Nervous Systems. PETER A. V. ANDERSON, Ed. Plenum, New York, 1990. xxiv, 423 pp., illus. $95. NATO Advanced Science Institute Series, vol. 188. From a workshop, St. Andrew's, Scotland, July 1989.

Though some "nervous system" features are broadly distributed among living organisms, the possession of a complete nervous system seems to be restricted to the various bilateral animal phyla (including the echinoderms) and to the two widely separated radiate phyla, the Ctenophora and the Coelenterata (Cnidaria). Even within the latter phylum, there are such significant differences in the nervous organization and physiology of the different classes that convergence rather than homology must be considered. And part of any definition of a nervous system must recognize and somehow quantify its primary role in the biology of the animal: the integration of the various cells and tissues into a single entity. Giant fibers can provide quick escape reflexes, motor systems control effectors, and sensory units and organs gather information. The nervous system as a totality puts it all together and lets the organism function as a