

TOWARDS AN ECOLOGICAL CONSCIENCE

THE FOREST AND THE SEA: A LOOK AT THE ECONOMY OF NATURE AND THE ECOLOGY OF MAN, by Marston Bates. Museum Press, English price 35/-. THE BIOLOGY OF THE LIVING LANDSCAPE: AN INTRODUCTION TO ECOLOGY, by Paul B. Sears. George Allen and Unwin. English price 21/-.

Each of these books represents an attempt by a University Professor to write a book for the discerning general reader, demonstrating the significance of the ecological viewpoint. Both are successful, though in very different ways. Ecological textbooks, of variable quality, now abound, but for the non-specialist there has been practically nothing. For this reason the two books noticed here are especially welcome. They are clearly and precisely written and are largely free of technical terms. The authors have avoided speaking down to their audience—have avoided making their books “popular” in the worst sense of that word. The Ettinger Foundation awarded its first medal for good writing in the sciences to Sears “who, these many years, has stood against the current of science-for-scientists and given the general reader so many excellent books to read.”

Bates argues persuasively that the most significant and general unit in life is not the cell, but the individual. “Skin-out” biology, as he calls ecology, “starts with the individual and is concerned with its relations to other individuals and to the varied aspects of the physical environment.” He would like to see botany and zoology, as separate disciplines, abolished because, by any such separation, “the interrelations within the biological community get lost.” Bates was first deeply impressed by the unity of the natural world while working in the rain forest at the headwaters of the Orinoco River in South America. “We had everything in Villavicencio”, he writes, “except the sea. The sea was far away . . . but curiously I spent a deal of time there thinking about it, reading about it. . . . There I first began to realise the essential similarities in plan and function among all the diverse living landscapes and seascapes of our planetary surface—the essential unity of the living world.”

After comparing, in an enlightening chapter, the forest and the sea, he looks at the biosphere and its three basic subdivisions, the seas, the land and fresh water. In succeeding chapters he discusses breeding populations, the biological community, animal be-

haviour and animal social life. The last three chapters, the best in the book, consider man and his place in nature. His conclusions are "that for man to flourish in nature he must learn to do so alongside . . . and in co-operation with the other occupants of his biological environment. To claim an ever-larger share of nature for himself—no matter what its short-term advantages may seem—will . . . end by disturbing the biosphere to the point where mankind will find it uninhabitable."

Bates acknowledges that "the whole idea of trying to look at man's relations with nature in terms of ethics, esthetics and utility comes from Charles Elton, *The Ecology of Invasions by Animals and Plants*." About the development of an "ecological conscience"—the words come from Aldo Leopold, *A Sand County Almanac*—Bates has this to say in the concluding pages of his book: "Just as health in a nation is, in the long run, promoted by a diversified economy, so is the health of the biosphere promoted by a diversified ecology. The single crop system is always in precarious equilibrium. . . . Epidemic catastrophe becomes an ever present threat. This is one of the dangers inherent in man's mad spree of population growth—he is being forced into an ever more arbitrary, more artificial, more precarious relation with the resources of the planet. . . . Long run efficiency would seem to require certain compromises with nature—hedgerows and woodlots along with orchards and fields, the development of a variegated landscape, leaving some leeway for the checks and balances and diversity of the system of nature. Ethical, esthetic and utilitarian reasons thus all support the attempt to conserve the diversity of nature. It is morally the right thing to do; it will provide, for future generations, a richer and more satisfying experience than would otherwise be possible; and it provides a much needed insurance against ecological catastrophe."

Sears's plan of presentation is very different from Bates's but the conclusions of the two authors are remarkably similar. (Incidentally, I feel sure Sears did not see Bates's book while writing his own—the books are such individual creations.) After a couple of introductory chapters Sears writes of the fitness of earth, and of science in general. In the following chapters he gets to grips with his subject, giving a history of ecology and discussing energy, the variety of life, and the significance of the individual. "One may feel . . . that the individual living organism is a fairly insignificant thing. Yet the individual is the effective unity in all biological process. Whatever happens in the living world is the resultant of the interactions of individuals with each other and with the physical environment. Upon their ability to survive and function rests the pattern of which we are part." From the study of the individual and the population "the ecologist moves into the study of the living communities and the non-living world of earth, air and water. . . . We . . . think of the plants and animals of any living community not as mere occu-

pants but as members of the household. . . . And the word 'household' takes us back to the original meaning of ecology—from *oikos*, household and *logos*, the wisdom or system of it."

"It is a basic principle of ecology that life and environment form an inseparable system. It is also true that this system is one of almost infinite complexity. . . . Here, as in all fields of science, we must take apart or analyse, so that we may later reconstruct, or synthesize." So runs the author's argument in discussing air, water, rock and soil in the next part of his book. After giving a brief history of western civilisation in relation to land use, he ends with a plea that we learn to "read the landscape". "Most of us, without knowing it", he says, "are afflicted with a kind of blindness which vastly decreases both the joy of living and our effectiveness as responsible citizens. We do not see, let alone comprehend, the living landscape through which more of us, each year, move along through ever greater distances."

Like Bates, Sears is emphatic that ecology must embrace all organisms, including our own species. He writes: "We have some impressive calculations to show that Earth could sustain many more people than it does today. . . . This assurance seems to satisfy many who forget that, beyond a critical point, freedom diminishes as numbers increase within a finite space. . . . Even granting that starvation and disease can be averted, the real issue is not how many can possibly survive but what kind of existence will be possible if they do."

A.P.D.

ECOLOGY, by Peter Farb and the editors of *Life*. Time-life International (Nederland), 42/-.

In common with other volumes in the Life Nature Library, *Ecology* is rich in magnificent photographs and informative line drawings. With these goes a clearly written and interesting text that covers most of the basic concepts of ecology: factors affecting plant and animal distribution, population, community, niche, food chains and pyramid of numbers, succession and "climax", adaptation and adaptive radiation, invasions and ecological explosions, rhythms and cycles, parasitism and symbiosis, and man's relation to nature. There is an excellent bibliography that includes most of the important books on ecology published during the last 20 years.

The main criticism of this book is that in spite of its title, the great majority of examples relate to animals so that the ecology of plants does not receive a balanced treatment. There is a section on inter-tidal communities but practically nothing on those of fresh water. In general the book seems factually sound but some errors have crept in concerning New Zealand. Our unhappy history of introduced animals is quoted and here it is stated that the Poly-

nesian rat (*Rattus exulans*) is not predacious on the native fauna. Current work shows that this is not true even though the effects of this animal do not appear as extreme as those resulting from ship rats (*Rattus rattus*). The text also implies that many introduced plants have disrupted the native vegetation and that much of New Zealand's grassland is worthless—statements that cannot be supported by facts.

Man's relationship to nature is the subject of the final chapter which discusses problems of species extinction, indiscriminate use of insecticides, pollution of water and atmosphere by industrial wastes and radioactivity, human disease, and the problem of the world's exploding population. Ecology by itself may not contain the answers to these problems but at least it is now clear that an understanding of ecological principles must be a prerequisite for tackling such problems. With its superb illustrations this volume is complementary to the books reviewed above and will do much towards developing the "ecological conscience" man so urgently needs.

I.A.E.A.

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