

selected groups of fish; indeed, for some of them, especially the herring, his treatment goes much further than the description of migration in giving a very useful account of their general distribution and life history. Perhaps the most impressive and important feature of the book, however, is the author's critical, yet objective, review of the evidence relating to various aspects of the total migration processes in the species of fish he has chosen for detailed treatment. His treatment of the "home stream theory" for salmon and trout, the general problem of "homing" and the question of eel migration are but three important examples.

The book is superbly illustrated, with eighty-six text figures, many of which are originals, and it contains a comprehensive list of references and an author index.

B. B. PARRISH

EMPTYING THE ARK

Vanishing Wild Animals of the World

By Richard Fitter. Illustrated by John Leigh-Pemberton. Pp. 144+43 plates. (Published by Midland Bank in Association with Kaye and Ward: London, October 1968.) 30s.

THE sort of emotional waffle that tends to be spoken about extinct and vanishing species is hardly likely to invoke feelings of distress in those practical cynics who consider that their lives will be little different if they never again see a herd of antelope galloping across the African plain. But, when it comes to facts, they may ponder over the realization that one mammal is now reckoned to become extinct each year, with between 250 and 300 dwindling in numbers so fast that they are in danger of extinction at almost any time. This book clearly sets out the precarious position of many mammals in the various zoogeographical regions of the world, with information drawn chiefly from the edition of June 1967 of the *Red Data Book* of the International Union for Conservation of Nature. This is a list of animal species in danger of extinction; a list which has constantly to be brought up to date.

Thus the reader learns that all five species of rhinoceros are now considered to be in danger, especially the three Asian species which are widely killed for their horns, considered to have aphrodisiac properties. Only two dozen of the Javan rhinoceros (*Rhinoceros sondaicus*) are known for certain, in a reserve in western Java. In Africa twelve species of antelope are in danger of being hastened to extinction, principally by man—oil surveyors, soldiers, tribesmen and sportsmen. The polar bear (*Thalarctos maritimus*) is another species threatened by the gun. At the moment they range all round the Arctic region, but despite restrictions are being hunted to excess, especially by wealthy Americans who pursue the bears from the air. Three other bears are also threatened in North America—there is only one small population of the Mexican grizzly bear (*Ursus arctos nelsoni*), in grave danger from the poison used against predators by the local population.

In Australasia, at least thirteen wallabies and rat kangaroos are in danger and in all between 15 and 23 per cent of marsupials are listed in the *Red Data Book*. This is the highest proportion of endangered species of any continent. But Australia has, too, the classic example of an animal saved from extinction at the last moment. In 1939 the koala (*Phascolarctos cinereus*) had been exploited commercially to the extent that there were only about 1,000 in Victoria and 10,000 in Queensland, where 100 years ago there were perhaps a million. Now there are more than 40,000 koalas; however, numbers have not yet built up sufficiently for commercial utilization to be possible again. There are various other stories of conservation triumphant, including the cases of the American bison, which was all but exterminated by the European

settlers, and the Pribilof fur seal (*Collorhinus ursinus*) now protected from the ravages of Japanese and Canadian hunters.

Vanishing Wild Animals of the World recounts all the stories of success, and explains just what can and is being done to save all the mammals still threatened. It is a book that deserves to be read, and it seems a pity that the full colour illustrations, originally Midland Bank posters, are so much less satisfying than photographs. But for such a lavishly illustrated book this is not expensive—thanks again to the Midland Bank—and, with a foreword by the Duke of Edinburgh and an introduction by Peter Scott, the World Wildlife Fund can hope to benefit from the royalties which it is to receive.

MARY LINDLEY

ENERGY FLOW AND PRODUCTION

Secondary Productivity of Terrestrial Ecosystems

(Principles and Methods.) Edited by K. Petruszewicz. Vol. 1: Pp. 1-380. Vol. 2: Pp. 381-879. (Institute of Ecology, Polish Academy of Sciences.) (Panstwowe Wydawnictwo Naukowe: Warszawa, 1967.) n.p.

THIS two volume work reports on a symposium at which the Polish Academy of Sciences acted as hosts to participants from many parts of the world. The first volume is concerned with general principles of secondary production studies and with their application to vertebrate animals, both at the general level and in relation to particular populations. The second volume covers the same ground for invertebrate animals and also contains a section concerned with particular types of terrestrial ecosystem.

It is to the great credit of the editor that this sizable work, containing no fewer than fifty-four papers, appeared within a year of the symposium on which it reports. No doubt the editorial device of asking participants to referee each other's papers has much to commend it as a means of speeding such a large volume to the printing press.

The papers presented are of diverse emphasis, ranging in content through elucidation of the general principles of production studies at both the conceptual and methodological levels, reviews of past work and presentation of new research material. In a rapidly developing subject such as production ecology of terrestrial animals, all these aspects are relevant and valuable components of a symposium volume. The general impression is one of vitality and enthusiasm for this relatively recent sphere of ecological research. There is no doubt that these volumes will provide an invaluable source of reference and inspiration to all those engaged in production ecology. A particularly valuable aspect of the symposium is that it renders a great deal of excellent Polish work readily available to English speaking scientists.

In the light of these virtues, criticism of linguistic and typographical errors (which are by no means few) and of some overlap of content between papers seems rather petty. The inconsistency of terminology among authors is rather more disturbing: it is somewhat alarming to find the symbol *I* used to indicate the rate of food consumption by a population, and the input of farmyard manure to a pasture, in papers separated by only a few pages. If the reader has a copy of *IBP News*, No. 10, at hand, however, he can translate the terminology for himself.

In July 1967 the International Biological Programme moved from phase one, concerned largely with feasibility studies, into its second operational phase. It is apparent from the wealth of material presented at this symposium that the section of IBP concerned with the productivity of terrestrial communities is off to a good start. The