

million years ago, a quite extraordinary fauna was able to develop, marsupials and placentals, huge ungulates and carnivores—all the early carnivores seem to have been marsupials which have vanished. Then, in the Pliocene, came the formation of the Panama isthmus and with it an influx of animals from the north. But always the warm, wet, green forest with its boundless opportunities for mammal, bird, reptile, insect and plant, layer upon living layer, ascending into the vast canopy of the trees.

Dillon Ripley's book is the first chance the non-scientific reader has had of considering South-east Asia as a coherent whole. He has touched upon almost every aspect in which most of us will be interested, and treated it with clarity and brevity. Birds, beasts, and human activities are described, and habitats such as forests—and the mud. In eastern Sumatra alone there are 60,000 square miles of coastal marsh, much of it overgrown with mangrove, itself of great interest, and with tidal flats that are bubbling and crawling with life.

C. L. BOYLE

The Stocks of Whales, by N. A. Mackintosh. Fishing News, 47s. 6d.

A Hundred Years of Modern Whaling, by E. J. Slijper. Nederlandsche Commissie voor Internationale Natuurbescherming. Free from FPS, 8d postage.

In February 1864 the first whale catcher equipped with an efficient harpoon gun left the Norwegian port of Tonsberg and the modern era of whaling began. Whalers could now go after the larger and faster blue and fin whales, rather than the slower right whales or sperm whales which were the quarry of the old whalers, who had succeeded in reducing the northern stocks of right whale to near extinction. The history of the last hundred years has shown that their modern successors have been little more successful in making a rational use of one of the major natural resources.

Both Dr Mackintosh's book and Professor Slijper's article describe the background of that history, starting with a general description of the biology of whales and following through to the recent activities of the International Whaling Commission. Naturally Dr Mackintosh covers rather more ground than was possible in Professor Slijper's shorter and more popular article; in particular he deals quite extensively with the population dynamics of whales. This aspect of whale biology and especially the potential sustainable catch, which is determined by the excess of births over natural deaths, is the immediate central scientific problem in the management of whale stocks. It is therefore particularly welcome to see this subject given Dr Mackintosh's full description especially as it has been largely neglected in previous books on whales, including Professor Slijper's own and otherwise admirable volume. Too much blame for earlier failures to manage the whale stocks properly should not be attached to the industries and governments; as early as 1924 the Discovery Committee was set up by the British Government to provide the necessary scientific advice for proper management. The tragedy has been that it has taken some forty years to show that the interest of whales and whalers are not incompatible, and that, properly managed, whale stocks can sustain large annual catches, and still thrive. Unfortunately, the major stocks in the Antarctic have been so depleted that to build them up will require severe restrictions of catching, which is against the short-term, but not the long-term, interest of the industry. However, the countries concerned have

accepted the need for such restrictions; these are now being introduced in stages which should result in the stocks starting to build up in 1968. If these first steps towards rational conservation can be kept up, future years should see both thriving stocks of whales and continued substantial supplies of oil and other products for a hungry world.

JOHN GULLAND

Whales, Dolphins and Porpoises, edited by **Kenneth S. Norris**.
University of California Press. \$15.00.

The whales can no longer be regarded as the world's least-known mammals. During the last sixty years whaling has become a vast industry of great economic importance, and at last those engaged in whaling have realised that the biology of their quarry must be known if the industry is to survive. To this end they have given facilities, both directly in their ships and shore installations, and indirectly through taxation to finance research, that have put a great store of knowledge at their disposal. It seems incredible that they have ignored the resulting scientific advice, and have destroyed their own once lucrative industry. Today the few firms that remain in whaling are ruthlessly pursuing their victims, in order to recover the enormous capital invested before the stocks of whales are so reduced that it will no longer pay to hunt them. We can, however, expect that the industry will become extinct before the whales, which may, if left alone for a century, recover something of their numbers, so that they can be rationally exploited by posterity if it will but learn the lessons of the past.

This volume contains the papers, and the discussions that they stimulated, given at the First International Symposium on Cetacean Research held at Washington, DC, in August 1963. They form a comprehensive cross-section of the science of cetology at that date, and their contents show how rapidly knowledge is advancing in this branch of zoology.

The smaller cetaceans, dolphins and porpoises, have recently become available for close study by zoologists through the invention of huge aquaria where trained dolphins perform tricks for public amusement. An unintended offshoot of these marine circuses has been the experimental work that scientists have been able to carry out on the inmates, which has revealed a whole range of new facts about the physiology of the cetacea. One of the most striking discoveries is the system of echo-location or sonar, which enables the animals, in turbid water or at night, to locate small prey and other objects at a distance. The biology of the dolphins, now being so intensively studied, will no doubt give information of the utmost use to man in his penetration of the ocean depths, a project which is likely to be much more rewarding than his attempts to penetrate into space.

The papers of this symposium range widely, from systematics, anatomy and physiology to communication, sonar, and behaviour. All by specialists, and most of them highly technical, they form a valuable and stimulating source-book for all who work on problems of cetology. I have sat through many symposia, but I have never attended one so full of originality and intellectual cross-fertilization, or so enjoyable, as was this. The volume is very well produced, printed and illustrated. Cetologists all over the world are greatly indebted to the American Institute of Biological Sciences which organised the symposium and secured financial help for it through the Office of Naval Research.

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