

great clarity and judgment, are in keeping with the text. Along with the author's own delineations it is a pleasure to see the retention of some of the historic figures of Jenkinson. To read this book, too, is to realize how much we owe to Goodrich, to whose work and personal influence Dr. de Beer gives full acknowledgment.

Certain chapters, notably those dealing with the brain and comparative behaviour, the special senses, the endocrine organs and the alimentary and other systems, must arouse that contentious subject: How much physiology should we include with our morphology in text-books of this kind? There are many who still believe that a "Vertebrate Zoology", inevitably with an essentially morphological approach, should ignore function or at least keep a consideration of it to a minimum. The present reviewer does not belong to this school and feels that Dr. de Beer has missed in the new edition a great opportunity to lay a little greater stress on what happens within the organs and organisms that he so admirably describes and depicts. A statement such as "little is known of the functions of the [adrenal] gland" rings a little odd in 1952 despite the exigencies of space and the present high cost of the materials of book-making.

However, that is merely a point of view and one which it would be impertinent to stress in view of the sub-title of the work in question. It is a great personal pleasure to have, in improved type, the new edition of a work that one consulted with enjoyment and profit when a student at the other side of the world.

A. J. MARSHALL

WILD-LIFE PROBLEMS IN NEW ZEALAND

Introduced Mammals of New Zealand

An Ecological and Economic Survey. By K. A. Wodzicki. (Department of Scientific and Industrial Research, Bulletin No. 98.) Pp. x+255+14 plates. (Wellington, N.Z.: Department of Scientific and Industrial Research, 1950.) 12s. 6d.

IN primitive lands wild animals reach a sort of long-term agreement with their surroundings, which is violently upset in many ways by the intrusions of civilization. Into the native and unique island fauna of New Zealand, with its absence of mammals, there have been set free at various times and for various reasons fifty-three species of foreign mammals and a hundred and twenty-five bird species, and these have found conditions of existence and of untried competition so easy that thirty-four mammals and thirty-one birds have become more-or-less permanent residents in the new country. They have set up a series of vegetational, faunal, and economic reactions which are by no means at an end and which pose the problems discussed, so far as mammals are concerned, in this book.

The introductions themselves show how slowly the idea dawned that problems were being created. Neither the native dog and Fiji rat, brought by the Maoris, nor Capt. Cook's domestic animals, set free as a potential food supply, suggested moderation, since they remained localized. So white settlers and their acclimatization societies, for reasons first of food supply, sentiment and amenity, and later for sport or profit, sought particularly in the years

between 1860 and 1880 to transform the New Zealand scene into a sort of replica of the 'old country', and brought from Britain more than half the animals which succeeded in establishing themselves. Yet it was not until 1895 that the introduction of "any animal or bird whatsoever" was prohibited except with the written consent of the Minister of Agriculture; and since impacts upon different human interests were recognized at different times, control of wild life in New Zealand is now dispersed between seven government departments, twenty-seven acclimatization societies (originally formed to encourage importations), park and domain boards, and rabbit boards.

The intricacy of the ecological problems set in motion is still far from being understood, but a series of dates concerning the weasel family illustrates the realization that the problems were not so simple as they seemed. The Rabbit Act of 1881 protected natural enemies of the rabbit; 1882, introduction of mustelids began; 1883-86, 4,822 ferrets, weasels and stoats were liberated by Government officials; 1888, the Government advertised for thirty thousand ferrets; 1893, ferret breeding in full swing. Then came the period of doubt: 1897, liberations ceased, since "no noticeable decrease in rabbits had been observed" and other harmful repercussions on the native fauna had become insistent; as a result, in 1936 all protection was removed from mustelids; and from 1939 a bonus of 2s. a tail was offered. This, along with the value of the skins, resulted in the destruction of well over two hundred thousand in the years 1944-48; yet the tables from which this number has been taken do not suggest that over all there is any serious falling-off in the mustelid population. Moreover, the author states that "no information is available as to whether the existing control measures have in the period under consideration, resulted in an improvement in the status of game and other birds, or alternatively whether there was a noticeable deterioration in rabbit control" (p. 81). Elsewhere, he remarks that rabbit control is "no nearer solution than it was seventy-five years ago when the rabbit was first considered a pest" (p. 127).

I mention these facts because the first purpose of this book, with its careful accumulation of facts concerning each of some twenty-nine introduced mammals—the past and present distribution, the reactions upon vegetational and faunal environments, the assessment of economic status, and methods of control—is to bring the record up to date. Its second and insistent purpose is to show that empirical attempts at control have never been successful, and that the method of gathering information from questionnaires cannot give standardized or strictly comparable answers. The only way of laying a firm foundation for the assessment of the 'value' of an established introduction, and so for judging the need for and the methods of control, is by field observations, carried out by trained scientific workers, associated with carefully designed and controlled ecological research, and all co-ordinated with the knowledge of the practical men of the farm, the forest and the game reserve.

This is a sound and interesting book, suggesting many ecological comparisons of similarity and difference with conditions in Britain. The author recognizes the difficulties of the problems involved, and rightly places his faith in long-term research in place of snap judgments and crude empiricism.

JAMES RITCHIE