

of the various deer species emphasize the critical differences of outline and appearance that are all the casual spotter may have time to notice. Several of the photos give striking examples of the wilder parts of New Zealand, and the colour photos on pages 85 and 103 are outstanding. Nor is there lack of humour; for example, the cavorting goats on page 93 and the misanthropic boar on page 101.

There are many who will want to own this book, and they will certainly get pleasure from it, as well as a good deal of factual information.

J. R. PUREY-CUST

MAN AGAINST NATURE. R. M. Lockley. A. H. & A. W. Reed, Wellington, 1970.

Man against Nature is one of a series of "Survival Books" associated with Anglia Television, and though published by Reed and dealing with New Zealand wildlife, is addressed to a wider public. Its appearance is timely; the Manapouri issue has shown that National Parks are not immune to retrospective legislation; exploitation and pollution have become vogue words; and the ecologist is assuming the role of witch-doctor.

It is only reasonable for those whose livelihood or whose concern makes them aware of the complexity of the inter-relations between plants and animals to approach with suspicion what must inevitably be a simplified presentation. Much of the book necessarily covers what is becoming familiar ground but at the same time there is enough meat in it to supply an overall picture of how our situation looks to someone outside our immediate problems. Not that Mr Lockley can be ranked an outsider, for his family links with both islands ensure that his personal observations are frequently spot on — in particular those glimpses of hill farming in Marlborough and of the stages of bringing in a bush farm in the Bay of Plenty. Outside his personal experience he has gone to authoritative sources of information; and though a list of references may not be considered necessary in a popular work, the list of individuals thanked in "Acknowledgements", many of whom he has accompanied in the field, is a guarantee of the range of his enquiries.

He makes the purpose of the book clear in the first couple of pages. This is how he sees us: "New Zealand is an uncrowded country of heedless people moving all the same with blind headlong eagerness to keep up with the worldly Joneses and cover the land with get-rich-quick settlers, modern concrete and metal clutter". (He could have added here perhaps that even those who clamour for the preservation of the natural beauties of the country can equally demand the full benefits of cheap power and similar amenities which cannot be supplied without the reorganization of the environment on a massive scale.) His final words make his own position clear: "... Another said 'It seems strange, coming from you, a resident of a run-down, worn-out country like Britain. What about your own ugly little black towns, open mines and indus-

trial squalour?' I could not agree more; that is what this book is trying to warn New Zealand about".

The framework of the book is an orthodox survey of the history of human occupation, without much indication of matters of doubt or of controversy; but the balance and emphasis of the outline are clearly determined by the author's personal interests and interpretations. What immediately catches the reader's eye is that more than half of the excellent illustrations are of birds, and the text confirms that the writer's special interest is in the survival of birdlife.

A large part of the book, about the first third, is devoted to setting the scene before coming to the survival problems which are the core of the book. After describing prehistoric New Zealand, a chapter is given to the arrival of the Maori. A third chapter covers the meeting of Maori and Pakeha up to the time of the signing of the Treaty of Waitangi. This may be considered a reasonable proportion to devote to introduction for readers unfamiliar with the country, but is rather much for local consumption. These introductory chapters paint an idealized picture of the country and of its pre-European inhabitants. The "Sleeping Beauty" flavour dramatically contrasts with the chapter title "Pakeha Poison", to which they lead up, and which fairly enough becomes the main theme of the book. But this treatment involves a disregard of two important factors. In the first place, the primeval environment was not a static one but had in the geologically recent past been subject to drastic changes affecting both plant and animal life; secondly, the Maori effect on the country, over several hundred years, cannot be dismissed as a minor one. The author makes the point that the Maori, being far more dependent on their environment than the Pakeha, were of necessity much more respectful towards it, but he goes beyond his brief in overstressing the contrast. It is beside the point to describe the treatment by white settlers of Australian and Tasmanian aborigines as though the conditions could be paralleled on the opposite side of the Tasman Sea; and his description of the Maori wars as forty years of continuous hostilities is a misleading simplification. These statements are in any case irrelevant, but not so his claim that the Maori was an expert in controlling burning. This is contradicted by several lines of evidence; the legendary Fires of Tane in Canterbury, and their North Island equivalents in Hawke's Bay are supported by results of carbon dating; large fires were noted by Cook and Banks on their initial passage down the East Coast; the failure, as early as 1820, of the naval visit in search of spars to find suitable timber within reach of the Bay of Islands, as the surrounding area was in cultivation, fern or second growth; and the numerous references to burns in Colenso's bush journals; all testify to the fact of a good deal of indiscriminate burning.

While the potted history of these chapters may give a somewhat slanted approach, and the occasionally shrunken item of information such as the trade in fist-sized shrunken heads, the "poor whites" of the gumfields, and the "fine-wooled" Romneys that supplanted the Merinos, take one aback, these

are side issues. European exploitation is the main threat to wildlife and once the book comes to deal with the practices of settlement it holds together reasonably well. Tussock burning and bush clearing are combined with the introduction of foreign birds and animals whose acclimatization has unexpected repercussions, some of them serious. The growing awareness of erosion and soil deterioration, the optimistic policy of "extermination" of noxious plants and animals, followed by the sobering realization of its fantasy, this is becoming a familiar story.

The whole theme of the book is in effect a warning against the arrogance that confidently throws a spanner into an intricate ecosystem.

N. L. ELDER

FORM AND DEVELOPMENT OF CONIFER ROOT SYSTEMS.

R. F. Sutton. *Technical Communication No. 7*, Commonwealth Forestry Bureau, Oxford. Published by Commonwealth Agricultural Bureaux, Farnham, England, 1969.

This publication can best be regarded as a digest of information on tree roots and root systems written for field foresters rather than for specialist tree physiologists (if such a breed of scientist exists). The book is in three sections: the first deals with the structure of root systems (27 pages), the second with root development (21 pages), and the last with major influences on root development (44 pages). The first section is possibly the most useful. Here the author discounts attempts by others to characterize root systems on any basis of species or genera and accentuates, instead, the great natural variability that one finds in root form. Depth of rooting and the form of the root system of any tree is mainly determined by the environment in which the tree grows, but different species do react in different ways to the same environment. Similarly, he suggests that damage from windthrow depends more upon site and silviculture than on species.

The second section of the book is a mixed bag. The first part of it provides a useful review that should be read by anyone who is planning an investigation of root systems or who is already involved in such work. It deals with methods of study and introduces the reader to the variety of techniques that have been developed, so should suffice to make him aware of the difficulties that can be encountered — no doubt one reason why comparatively little is known about root development. However, one finds few references to *Pinus radiata*, or indeed to conifers in general; to provide a reasonably comprehensive coverage of the subject, the author has made rather arbitrary selections from the literature on root development in non-coniferous and non-forest trees. This continues throughout the remainder of the book and references to such plants as corn, barley and peas rather belies the title selected. Any other writer attempting to cover the same subject would encounter similar difficulties. Far too many of the theories on tree growth have been gleaned from horticultural or agricul-