BOOK REVIEWS

Fungal Spores; their liberation and dispersal. C. T. Ingold. Clarendon Press; Oxford University Press, London. £S4.00.

The author has been an acknowledged contributor of scientific papers and books on spore discharge and dispersal for almost 40 years. In this book he successfully collates present day knowledge with a wealth of his own previously unpublished data, and some of the late Professor A. H. R. Buller, another expert in the field. This new book is a comprehensively updated and well illustrated revision of the author's earlier separate editions of "Dispersal in fungi" and "Spore liberation". The new book avoids repetition wherever possible, as is seen in the references quoted which are heavily drawn from researches during the past ten years. The bryophytes are not considered in this new volume, but otherwise coverage of the subject material is similar in scope to the earlier books.

The take-off mechanisms of fungi from all the major taxonomic groups (Phycomycetes, Ascomycetes, Basidiomycetes, and Fungi Imperfecti) are considered and critically analysed. Attention is also directed specifically to some Mucorales and also such mycological curiosities as the aquatic fungi. Deficiencies in our present knowledge and possibilities for future research are frequently highlighted, as can be done best only by one fully conversant with the field.

There is a particularly interesting chapter discussing the theories of the discharge mechanism of the ballistospore. Other active and passive discharge mechanisms of fungi (blow-off, splash-off, shake-off, drying effects, rounding off of turgid cells, as well as the effect of dispersal by insects, animals, and seeds) are considered in detail. Liberation mechanisms of members within the Ascomycetes are dealt with in some depth.

Factors affecting the periodicity of release of fungal spores are examined, as well as methods for measuring the load of airborne spora. Many experiments are reported in which ingenious trapping and sampling devices have been used to increase scientific knowledge. The studies of Hirst, Gregory, Meredith and others are referred to frequently.

At all times the author gives the reader the feeling he is in complete command of his topic, and frequently he digresses to emphasize the experimental approach, and to elucidate the physiological and biochemical processes underlining many of the phenomena. A chapter devoted to the role of water supply in spore discharge is but one example.

Ingold suggests that the age of the study of mechanisms of dispersal may be ending and that, in future, emphasis could be more on the "quantitative evaluation of dispersal in the overall ecological picture of fungi in field situations". For my part I hope he is not completely correct. Whilst acknowledging that such a trend is evident I hope that this book serves in part to attract worthy successors somewhere in the world to the Bullers and the Ingolds, for without them this environment despoiled world will become an ever less-interesting abode for man. There will always be mechanisms awaiting discovery, and meanwhile there is a great dearth of knowledge of the biochemical bases underlining most, if not all, of these mechanisms. This in itself will keep many researchers busy for a long time.

This book should be recommended to all serious students of the fungi, botanists, mycologists, plant pathologists and even some agriculturists. Undergraduates will find it useful to stimulate their love of the beauty in diversity within the fungi. All research workers in the fields of spore liberation and dispersal will find it a must, while plant pathologists, mycologists, and agriculturalists will find that the book will enable them to better understand how populations of fungi fluctuate as a result of certain environmental factors favouring their dispersal. Also epidemiology of plant diseases will be better understood by those thoroughly familiar with the book's contents.

James B. Corbin

Grassland ecology. C. R. W. Spedding. Clarendon Press; Oxford University Press, London. £S2.00.

This relatively short book (200 pages) consists of an introduction to grasslands, ecology and ecosystems (six pages) and 20 chapters and an appendix on various facets of grassland ecology. Chapters two to eight discuss the plant as an individual, as a part of populations and the efficiency of primary production. Chapters 9-14 deal with the fauna of grassland, grass as a food for ruminant and non-ruminant herbivores, the nutrient cycle and grazing. Various aspects of animal production occupy chapters 15-19 and the final chapter discusses the contribution of grasslands to man in terms of work, clothing, food, etc.

Thus the author covers the field of grassland ecology, diverges briefly into ecology generally, and at greater length on animal production and nutrition, and dips into subjects such as grazing behaviour.

The chapters of the first section, plants, are particularly brief and the ideas introduced are seldom treated in depth. Many words are also expended on ecological aspects of such things as plant structure, growth and

nutrition and photosynthesis which may have been better employed in more detailed accounts of plant populations and grasslands as plant communities.

The second section, animals, provides an outline of secondary production and the processes involved in secondary production, largely from the viewpoint of the agricultural scientist, with some service to the invertebrate fauna.

The book is easy to read and an effort has been made to express ecological concepts simply, but, because of the sometimes extreme brevity of treatment of many subjects, the book appears sketchy. For the same reason the system of referencing falls down; important papers are omitted. For example, the subject of food chains is dismissed in less than 200 words and a single reference. Use of a bibliography may be more appropriate in a book of this kind.

Indexing also leaves something to be desired. The author index includes many entries which cannot be found in the text and most of these turn out to be the editors of works referred to in the text by the author of a particular paper or chapter.

This book can be recommended to ecologists as an insight into the way agricultural science may look at the principles of ecology (particularly the concept of production) and to students of agriculture, but perhaps its title could be altered slightly if this is to be considered its primary purpose.

Ian G. Crook

Marion and Prince Edward Islands: report on the South African biological and geological expedition 1965-66. Edited by E. M. van Zinderen Bakker, J. M. Winterbottom and R. A. Dyer. A. A. Balkema, Cape Town. $25.33.

Marion and Prince Edward Islands are amongst the least well known of all the subantarctic islands so it is a pleasure to see this large volume which goes far towards filling the gap. It is unusual today to find a publication covering almost the whole field of natural history and yet maintaining a high scientific standard. This volume is in the tradition of the reports of the famous European scientific expeditions of almost a century ago and is a welcome companion to Chilton's "Subantarctic Islands of New Zealand" and the recent publications on Antarctica.

Two teams of South African scientists visited and worked on the islands in 1963 and 1965-66 gathering extensive data on the zoology, ornithology, flora and geology, making detailed studies of animal and plant ecology and bird behaviour as well as assembling large collections of specimens. The present volume is a compilation of the results prepared by members of the expedition with the help of 34 specialists from many parts of the world, including New Zealand. It makes no pretence to be a definitive account of the natural history of the islands but should be regarded as a stepping stone to further more detailed and analytical studies.

The volume comprises 427 pages together with 118 excellent photographs of which 25 are in colour. The latter, all taken on bright or sunny days, as must obviously always be the case, do however give a false impression of the islands, especially when statements such as "almost ceaseless rain and wind, and endless quaking bogs and rough lava flows certainly detracted from the joys of field work" appear in the text. The volume contains 37 papers covering climate and geology (6), botany (5), ornithology (5), and zoology (21). The latter are mainly systematic and, apart from one very brief paper on fish, deal exclusively with invertebrates. There are no papers dealing with algae, fungi, lichens or mammals. The ecology of the vascular plants is covered in one extensive paper as is the behaviour of the Gentoo Penguin. There are two other papers dealing with avian ecology and one dealing with the marine avifauna of the antarctic and subantarctic, out of which a number of interesting conclusions emerge. There is also a paper dealing with history of the vegetation based on the analysis of pollen from peat bog cores.

This is a book both for the amateur and specialist. For the amateur it will have interest in the detailed descriptions of plant and bird life, including the behaviour study of the Gentoo Penguin, all of which are illustrated with drawings and excellent photographs, often in colour. For the specialist this book is an essential contribution to our knowledge of subantarctic islands and is an important addition to the library of any institution or laboratory concerned with plants, birds, invertebrates and geology of the antarctic and subantarctic regions.

G. W. Ramsay

Man and the ecosphere—Readings from Scientific American. W. H. Freeman & Co., San Francisco. $US11.00 (clothbound) $5.75 (paperbound).

This collection of papers is virtually "All You Have Wanted To Know About Ecological Crises—And Never Cared To Ask"; in fact about the only one of the most notorious doom-sayers who is missing from the list of authors appears to be Barry Commoner. There are 27 articles and these are grouped in four categories: the first deals with the Good Old Days before anyone had anything much to worry about except where their next meal was coming from and how soon they would be likely to die and by what means; the second describes the plight of Man coming up—at last—against the limitations of his environment; the third deals with pollu-

tion in most of its forms and man becoming the victim of his own technology; and the fourth surveys what might be done to stave off the inevitable and how we might be able to make life worth the living in the meantime.

Perhaps if I list the four major divisions of the book in more detail and the contributions that appear under each, you will get a better idea of its contents.

1. *The Ecosphere and Pre-Industrial Man*:
   The Ecosphere, The Agricultural Revolution, Forest Clearance, The Stone Age, The Back Death.
2. *Limits Rarely Perceived*:
   Human Pollution, Water, Lateritic Soils, Human Food Production as a Process in the Biosphere, The Food Resources of the Ocean, The Dimensions of World Poverty, Human Materials, Production as a Process in the Biosphere.
3. *Dimensions of Intervention*:
   Toxic Substances and Ecological Cycles, Air Pollution and Public Health, The Aging Great Lakes, Ionizing Radiation and the Citizen, Thermal Pollution and Aquatic Life, Carbon Dioxide and climate, The Climate of Cities, Infectious Drug Resistance.
4. *On Management and Buying Time*:
   An Assessment of Technology, The Reclamation of a Man-Made Desert, The Rangelands of the Western United States, Chemical Fertilisers, Third Generation Pesticides, The Prospects of Fusion Power, The Urbanisation of Human Populations, Military Technology and National Security.

Then follows a list of biographical notes and suggested reading, given in the typical Scientific American style; and, finally, there is an index.

The articles have appeared as long ago as 1956 and as recently as 1971; and each of the four sections is introduced by a thoughtful commentary. The commentators are Paul Ehrlich, John P. Holdren and Richard W. Holm, and since no commentary is identified with any particular commentator, you can have a lot of fun trying to guess who was (or were) responsible for each. Among the contributors are such well known names as Lamont Cole, Edward Deevey and George Beadle; a fair proportion of the others were not well known to me but this is probably merely a measure of my ignorance or the degree of my specialisation.

There are numerous photographs, graphs and colour plates, but the reproduction of many of these is well below the high standard we have come to expect from *Scientific American*.

Although this collection obviously does not include some of the very important statements that have been made during the last 12 months or so, it is a worthwhile collection nevertheless.

G. R. Williams

The handbook of Australian sea-birds. D. L. Serventy, Vincent Serventy and John Warham. A. H. and A. W. Reed, Sydney and Wellington $6.50.

This book begins with 44 pages of interesting general information on the subjects of the marine environment around Australia; the numbers, distribution, breeding habitats and biology of sea-birds in Australian seas; and conservation problems and research in Australia. There follows a systematic account of all sea-birds known from this region covering 194 pages. Each species is considered under the headings of field characteristics and general habits, measurements, status, migration, voice, display, breeding season, nest, egg, incubation, nestling, enemies and mortality, food and breeding distribution. It is an indication of the dearth of our knowledge about many of these species that information is often lacking on such subjects as migration, voice, display, breeding biology, mortality and food. Some 105 species of sea-birds are described, including 55 species of the Procellariiformes (albatrosses, shearwaters and petrels). Finally, there are 349 references—a full, but not exhaustive, bibliography.

As a handbook, at 10 x 7½ x 1 inches, this publication is larger than could be conveniently taken into the field. Nevertheless, it is a useful addition to the literature for both full-time and part-time ornithologists. The descriptions of species are sufficiently general to make them suitable for field identification, and notes on flight behaviour are a helpful adjunct. However, identifications in the hand of prions and mollymawks may be made confusing by the key to prions and the sketches of mollymawk bills. The characters of the Antarctic prion (*Pachyptila desolata*) are not properly keyed: the terminal hook of the beak is strong, lamellae are always visible at the gape when the bill is closed in at least one race encountered in the Australasian region (*banksi*), and the beak margins are straight only in the race *desolata*. The sketches of mollymawk bills are not perfect either, according to specimens at the Dominion Museum examined by F. C. Kinsky.

A large amount of information has been incorporated in this book. Naturally the species which the authors have studied personally are dealt with more fully than most others; but much information comes from the work of others, It would have greatly assisted those wishing to pursue further studies if references and acknowledgments were made less haphazardly. A full list of references concluding each species account, or each section within the species account, seems very desirable.

There are sufficient irregularities among accounts of some species with which I am familiar to indicate that there is a frequent need to refer to the original source of information. For instance Cook's petrel breeds on Codfish Island as well as Little Barrier Island and has not, as far as I know, been sighted along the coasts of eastern America. The statement about black petrels that "many are washed ashore in New Zealand during May and in early June" is definitely optimistic

The black and white illustrations are very good, especially some showing birds in flight viewed from below.

M. J. Imber

Resources and man. Committee on Resources and Man, National Academy of Sciences, National Research Council. W. H. Freeman and Co. California, U.S.A. $US5.95 (clothbound) $2.95 (paperbound).

As there are fashions in words there are certainly fashions in books and this is another of those dealing with population, resources, production and the environment. However, at this point the simile breaks down; words may only be used, but in a book even the most fashionable subject can be treated in almost an infinite number of ways.

This particular one almost revels in being crisp, factual and fascinating reading matter. It contains a great deal of data, many of which are in easily interpreted text figures, but it hardly ever sacrifices its non-technical status. It remains immensely readable from beginning to end.

Following an introduction, which is really a synopsis of what is to come coupled with recommendations specifically referring to the U.S.A., there are eight chapters written by different authors.

The first of these ("The human ecosystem"—Marston Bates) covers the history of man and the main turning points in his relationships with his environment. Due reference is given to key figures of recent history, such as Malthus, and to relevant ecological concepts such as food chains, trophic levels, carrying capacity and ecological diversity. Perhaps realising that readers may have "heard it all before" this chapter occupies only nine pages but loses nothing through being so brief.

The second chapter ("Interactions between man and his resources"—John D. Chapman) introduces the ideas of resource requirements (the dogma of expand or die), the relationship between this dogma and resource availability, complications introduced by time, space and technology and the several approaches to the problems of limited availability and increasing demand (Malthus, conservation, the ecological approach and technology—the universal specific). The key to this chapter undoubtedly lies in the conclusion. Having discussed the conflicting ideologies the author dismisses them, and their proponents, as confusing and troublesome and suggests that the most helpful way of examining the dilemma and avoiding conflicting claims would be ". . . for students of the problem to agree on a few models in time, space, population density and the level of living that would become frames of reference for the unambiguous evaluation of resource sufficiency".

Having introduced the subject and cemented its conceptual foundations in place in a mere 42 pages, Nathan Keyfitz kicks off with an examination of populations in which all the usual predictions are made but with detailed reference to the main problems faced by the demographers in making them. The treatment is cautious and thorough. The second part of this chapter (urban growth and the quality of life) is a little more conversational in style.

The remainder of the book deals with specific resources in terms of their availabilities, futures and alternatives —"Food from the land" (Sterling B. Hendricks), "Food from the sea" (William E. Ricker), "Mineral resources from the land" (Thomas S. Lovering), "Mineral resources from the sea" (Preston Cloud) and "Energy resources" (M. King Hubbert). Of these the longest is the chapter on energy resources, perhaps because the problems posed by energy resources are likely to be the most immediately critical in the U.S.A. The account is exhaustive and deals with the growth of energy consumption, future outlook for the production of fossil fuels and the future of alternative sources of energy. In this latter section solar energy, tidal power, water power and geothermal energy are all examined and discarded as not being of much general use. Nuclear energy (from both fission and fusion reactions) is then discussed in detail and held out as our most likely alternative to burning fossil fuels. With this in mind the author then describes in precise terms the ultimate folly of continuing to burn Uranium-235 in light water reactors (one gets the impression that we are using up all our matches instead of lighting a candle with one), and the problems of disposing of radioactive wastes.

The main drawbacks of this book are that it was published in 1969 and, for New Zealand readers, that it refers specifically to the situation in the United States. These factors are hardly criticisms, but considering that "Population, Resources, Environment" (Paul R. Ehrlich and Anne H. Ehrlich) was first published in 1970 and has recently been revised in a second edition suggests that a revision of **Man and Resources** may also be possible.

Ian G. Crook

Common insects in New Zealand. David Miller. A. H. and A. W. Reed, Wellington. $6.50.

From a little after the turn of the century there has appeared on the market the occasional hand book on New Zealand insects but it is only in the last few years that we have seen the emergence of more substantial works of a non-technical nature on this subject. Such a work is David Miller's **Common Insects of New Zealand** with a central block of nine coloured plates, 456 text figures and 178 pages, including an appendix on insect structure,

development and classification, a very brief glossary, a substantial index, and a list of principal, general works on this subject.

For purposes of review it is useful to consider the book in terms of the author's stated intention but in this case it is equally important to consider it as a work of reference, because inevitably this is the way many readers will use it.

The former can be gauged from the book's introduction whose opening sentence reads:

> "This book is an ambitious attempt, by using common insects in demonstration, to present a popular and general picture of both native and exotic insects in New Zealand . . ."

This general picture has been presented in 23 chapters which effectively divide the common insects into manageable groups. Sometimes these groups are systematic units such a Butterflies, Ants, Aphids and Hover flies, while in other instances an ecological unit or economic association has been used. Examples of these chapters are Aquatic insects, *Phormium* insects, *Eucalyptus* insects, some Insects of Exotic Conifers, Timber Borers, Predators, Parasites and Biological control, Weeds and Insects, and Parasites of Mammals and Birds.

Generally speaking these chapter headings reflect the experience and interests of the author which fortunately are exceptionally wide, and collectively these chapters give a clear cross-section of New Zealand insect life. Many of them will be of direct interest to the teaching profession because they coincide with parts of the secondary school syllabus.

The introduction also helps the reader to understand, to some extent, why relatively obscure insects such as the Takahe feather-louse and the D'Urville Island weevil are included in a book on common insects. Similarly the title would not lead one to expect tracts of Maori mythology.

The text figures depart from the current tendency to use completely new illustrations, and those working in entomology will encounter some old friends amongst them.

As a reference work this book should prove very reliable, for the author's wide experience has saved him from the temptation to go it alone, and he has consulted many authors and current researchers. The book contains few technical errors. While having the advantage of avoiding monotony the varied approach from chapter to chapter places a heavy reliance on the index as a means of locating the principal entry for a given species and members of the public will have quite a hunt when they try to identify an insect from the text. It is quite clear that the author is not writing an identification handbook and readers will be better served if they treat the book as a source of information. It is equally clear, however, that such a large work will be used as a means of identification. We know that people have patiently attempted to identify New Zealand insects from encyclopaedias based largely on United Kingdom examples. We may be sure that they, as well as those of us with more specialised interests, will gain much from this work.

R. G. Ordish

Also received:

Population, Resources, Environment: Issues in human ecology, 2nd Edition. Paul R. Ehrlich and Anne H. Ehrlich. W. H. Freeman and Company, San Francisco, U.S.A.

Energy flow through small mammal populations. Editors: K. Petrusewicz, L. Ryszkowski. PWN Polish Scientific Publishers, Warszawa, Poland.

CONFERENCE 1971

The 20th Annual Conference was held at Victoria University, Wellington over the weekend of 20-23 August 1971. Eighty members registered for the Conference and one-day visitors increased the attendance at some sessions, notably the symposium, to 125. Displays by members of the Society and by local suppliers of scientific equipment were on view.

On Saturday (21 August) the symposium, "Engineering and Ecology", was held under the general chairmanship of Dr G. R. Williams. Papers were presented on the themes of how Industrial Engineering, Facility Engineering and Development Engineering variously affected the environment.

In the evening Dr P. Wardle delivered the Presidential Address on the subject of the ecologist's role in practical environmental affairs. This was followed by the A.G.M.

Monday, 23 August, was devoted to contributed papers. Subjects included the effects of fluctuating lake levels on shore vegetation, the impact of drought on forest, water run off from high country, catchment management and the ecology of opossums, goats, and micro-organisms.