

BOOK REVIEWS

Biological Science—Processes and Patterns of Life, New Zealand Department of Education, A. R. Shearer, Government Printer, Wellington. \$9.

The introduction of any new standard text for secondary schools is an important event. This production, **Biological Science**, by a small Curriculum Development Unit of the New Zealand Department of Education, under the guidance of an editorial committee headed by Professor G. A. Knox, is an astonishing achievement. To do it justice, this review is a corporate one by several biologists, each covering different parts but paying special attention to the ecological content.

Biological Science is modelled on the American Biological Sciences Curriculum Study, of Boulder, Colorado, and by arrangement reproduces much material from the three B.S.C.S. volumes commonly referred to as the Blue, Yellow and Green Versions. With this completely fresh approach for New Zealand schools, the authors have largely succeeded in overcoming most of the drawbacks of older texts, particularly their dullness. First impressions are of an attractive, modern, informative and very readable book, which it is. But need it have weighed over 1.5 kg. (3½ lb.)? The B.S.C.S. version has twice as many pages for the same thickness, and less transparent paper, and is much more stoutly bound—a short-sighted economy in the New Zealand production. Two separate volumes might have been better than one.

The book contains 11 “sections” (why not parts?) of most unequal lengths: The World of Life (1292pp.); Basic Structure and Function (64 pp.); Diversity of Life (9 pp.); Micro-organisms (28 pp.); Plants (86 pp.); Animals (236 pp.); The Integrated Organism (27 pp.); Genetic Continuity (70 pp.); Evolution (44 pp.); Life in Time and Space (32 pp.); and Man and His Biotic World (28 pp.). Each section is subdivided into 2–14 chapters, and each chapter ends with a summary (except nos. 6 and 38, for no apparent reason), a short list of searching questions to test the student, and in most cases a bibliography.

Some references in the bibliographies are so inadequately listed as to be almost untraceable even by a librarian. So far as overseas journals are concerned, heavy reliance is placed on ‘The Scientific American’ (which offers a ready reprint service), and this certainly facilitates further reading in school or public libraries. The book contains a judicious admixture of New Zealand with overseas (predominantly American) examples and illustrations. The copious and imaginative illustrations are excellent, supporting and embellishing the text and enticing the reader on. But the small cluster of eight coloured plates is disappointing and only marginally worthwhile. Two of them are wrongly captioned—Plate III has ‘left’ and ‘right’ transposed, and the caterpillar in Plate VI is certainly not on whiteywood (*Meliclytus*) as stated, but possibly *Meryta sinclarii*.

For a book of this size and spread, in which the same organism may recur in different chapters on ecology, behaviour, genetics, evolution and so on, a 4½-page author-plus-subject index is grossly inadequate—additionally so when incomplete, inconsistent and at times inaccurate. For example, one of the most detailed

accounts of a mammal (the rabbit) is found not in the chapter on mammals (pp. 465–76) but under ‘The Regulation of Populations’ (pp. 48–58); but the ‘rabbit’ entry in the index is not subdivided. Although predation on rabbits by cats and ferrets is stressed (pp. 57–58), there is no entry at all for ‘predation’, and that for ‘predators’ refers to only two pages, neither of them these. Nematodes are referred to four times in the index, but only one reference contains significant information; yet Figure 4.13, showing the “niches” of several nematodes in the domestic fowl (the only illustrations of nematodes, incidentally), is not referred to. The important protozoan groups Rhizopoda, Mastigophora, Ciliata and Sporozoa, listed and described on p. 317, are not in the index. And a veritable paper-chase is needed to track down the scattered information on native frogs (*Leiopelma*). The index is one of the worst features of the book.

Ecologists are likely to approve the way this book gives the student the broad basis of biology from the very start, unlike previous texts which have often paid only lip service to ecology, relegating it to a small chapter tacked on at the end. Here, instead, the student is immediately confronted by ecological niches, populations, communities and ecosystems; indeed the whole book is permeated with ecology.

This is all very well. Although some of the straight ecology (especially that derived from field studies) is very good indeed (e.g. pp. 427–35), the authors have fallen over backwards trying to slant non-ecological topics ecologically. The constant harping on “ecological niches”, “ecological diversification”, “ecological adaptation”, and so forth, becomes tedious in the extreme; diagrams in chapters 23–28, captioned “Ecological diversity of . . .” (protozoa, platyhelminths, annelid worms, crustacea, and molluscs) actually show adaptive radiation; and the body-shape of seals and whales is called ecological instead of morphological adaptation (p. 415). Other examples are legion.

With such emphasis on ecology it is a shame that the vitally important Section 1, introducing basic ecological concepts, is so badly written. Ecology is not defined at all; and the paragraphs (pp. 16–21) describing higher and lower levels of biological organisation (ecosystems, community, specialisation, adaptation, food relationships, energy flow and nutrient cycles among the former, and species, populations, individuals, etc., among the latter) are a jumble. The rot spreads in Chapter 2, “The Ecological Niche”; a difficult concept, but an important one that others have put across quite clearly before. The word “niche” has been variously used in the past. It would have helped to discuss its usages and then to settle for a simple definition, e.g. the place or role in the community occupied by a species by virtue of its adaptations. Almost unbelievably, no definition at all is proffered here. So the student stumbles on, past “Ecological niche” used in sub-headings three times in six pages, until confronted (p. 28) by Table 2.3: “Ecological niche—a checklist of adaptive features”, which promises to “help you determine the niche of any species”. Without really knowing what to look for and with no further instructions on how to use the table, it is not much use.

The authors themselves seem somewhat confused about niches when they write (p. 468), "The ecological niche of the rabbit overlaps considerably with that of the sheep"; yet they maintain the distinctness of the niches of the three rats (p. 467) and of the three mustelids (p. 469). Niche is frequently confounded with habitat or with food: thus the caption to Figure 27.4 conjures up a distorted view—"Insects which find an ecological niche on nasturtiums". Charles Elton's lucid definition, almost 50 years old, is still worth remembering: "It is therefore convenient to have some term to describe the status of an animal in its community, to indicate what it is *doing* and not merely what it looks like, and the term used is 'niche'".

The same chapter then proceeds to tackle "ecological equivalents" with half-a-dozen pretentious but piffling sentences before happening upon a quite adequate definition in 21 words. To quote from pp. 28-29: "In different parts of the world there may occur similar ecological opportunities which can form part of the niche of widely different species; . . . grasslands . . . can provide the habitat component of the niche of grazers; . . . each species of grazer has evolved its own set of adaptations to match the set of environmental factors that constitute the habitat; the characteristics of a species have allowed it to exploit a new environmental opportunity as it arose". Then, at last and to the point, "Different species which have developed the same mode of life in widely separated environments are commonly referred to as ecological equivalents"; but to cap it, in the very next paragraph, we find as examples such ill-sorted equivalents as "bison and countless rodents". Little wonder that a teacher reported that pupils get bogged down in the ecology section "because it is too subtle to be understood": perhaps there are other reasons, too.

Other chapters on ecological topics, and other whole sections of the book, come off much better, though their coverage and depth of treatment vary enormously. Section 2 on cell biology is perhaps needlessly thorough. That on micro-organisms (Section 4) gives a good realisation of the variety of microbial life, with an admirable selection of New Zealand examples, though the Actinomycetes should not have been ignored in view of their interesting taxonomic affinities to both bacteria and fungi and their special importance to plants and animals; likewise, animal viral diseases such as psittacosis and myxomatosis at least deserve a mention. The higher plants are dealt with succinctly in Section 5, with little or no space given to taxonomy or classification; they get less coverage than do arthropods. More could have been included about ways in which plants adapt leaf, stem, root and flowers for different functions; and about forestry and crop production. Freshwater ecosystems have been curiously neglected, although they are topical and provide potentially excellent teaching material. There is no excuse for dismissing such a large and important group as the nematodes in two short paragraphs (p. 355) largely concerned with the gross comparative anatomy of their alimentary canal.

A glaring omission is a classification of plants and animals, despite the laudable statement (p. 198) that "The value of being able to give the correct classificatory name to a species is that this name opens the door to all recorded knowledge . . .". Students must learn about "Mygalomorph" and "Cribellate" spiders (p. 395), not to mention "cribellum" and "calamistrum", at the

expense of learning "Araneida" for spiders. And "teleost" and "elasmobranch" are not even mentioned. The B.S.C.S. Green Version carries a 30-page illustrated appendix of classification.

The general approach seems to be the attractive one of explaining structure and processes in terms of function. More emphasis is given to function than to structure, though function is still often speculative. Consequently the book is larded with facile explanations later likely to be abandoned, which hardly encourages students to keep an open mind. There are also frequent contradictory statements, for instance about predation: compare "Predators . . . exploit other species and harmfully affect the growth and survival of those populations" (p. 50), with "Careful investigations have shown that . . . predators seldom cause heavy mortality among wild animals" (p. 56); the latter conflicts with an example discussed at length on page 58 and with a later statement (p. 447) that "birds may be of great significance in regulating the abundance of invertebrates" (though, equally, they may not be, so far as is known).

The penultimate section, 10—"Life in Time and Space"—is good, giving depth to biology and justifying its study. This and the final section, "Man and His Biotic World", tie biology to geography, medicine and agriculture, and introduce the student, albeit superficially, to modern environmental problems. The intention is good, but it would have helped (here or elsewhere) to point more frequently to practical applications of biology to agriculture, forestry, fisheries and the conservation of natural resources; and one might have hoped for more than three short and rather general paragraphs (p. 745) devoted to pesticides and herbicides—substances very much in the public eye and which many readers will handle whether or not they become professional biologists.

The book is marred by more than the usual rash of erroneous statements and inconsistencies, rather than by typographical mistakes, which cannot possibly be enumerated here. Instead, we propose sending details to the Editorial Committee in the hope that a second and revised edition will follow in the not too distant future. In the meantime, it would avoid embarrassment if a list of essential corrections could be supplied with the Teachers' Guide that is to accompany the textbook.

Despite these criticisms, **Biological Science** represents a big step in the right direction. Without doubt, it should attract and retain the interest of students in biology, and especially in ecology, in a way that previous texts never did; and New Zealand needs biologists today as never before. Yet, regrettably, in replacing the older books some of their virtues have been lost, not least their staid reliability and meticulous exposition.

J.A.G. J.E.C.F.
P.C.B. R.H.S.McC.
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Mushrooms and Toadstools in New Zealand, Marie Taylor, A. H. & A. W. Reed, Wellington. \$4.50.

In many parts of the world collecting and naming fungi is as popular a hobby as birdwatching, shell-collecting and butterfly-hunting. In New Zealand few amateur naturalists notice fungi in our forests and

pastures. This is due to the lack of a simple text about fungi. In **Mushrooms and Toadstools** Marie Taylor illustrates in colour more than 50 species and at least another 20 in small black and white sketches. The term 'mushrooms and toadstools' has been applied in the broadest sense, for out of the 12 plates published in the text only five deal with gill fungi (another excellent plate on gill fungi is produced as the back wrapper) the true 'toadstools and mushrooms'. The rest are larger fungi belonging to puff-balls, polypores, cup fungi, pyrenomycetes, and even an orchid.

To be an introduction to New Zealand fungi some elementary systematic guidance in identification should have been included in the text. A few well labelled diagrams would have easily explained terms such as volva, veil, gills and tubes. The localities after each species name refer no doubt to where the specimen illustrated was collected, but it is a pity the lists were not enlarged to indicate habitat and likely distribution in New Zealand.

When using this book please remember that these illustrations represent a few New Zealand fungi — not all the most common ones are mentioned. There are many more papers on New Zealand fungi than those mentioned in 'Books for further reading'. Although some of the species listed have not been named, for some larger groups of gill fungi have yet to be studied, nowadays it would be easy to name at least 50 true gill fungi common in our pastures and forest and very many more of our larger fungi.

This pleasant publication will no doubt give pleasure to numbers of people, both young and old, and perhaps will encourage the keen amateur to penetrate a little deeper into the subject.

J. M. DINGLEY.

Population, Resources, Environment: Issues in Human Ecology. Paul R. Ehrlich and Anne M. Ehrlich, W. H. Freeman & Co., San Francisco. \$U.S.8.95.

The Ehrlichs' book forcefully supports the thesis that the recent rapid growth of human population has resulted in resource shortages and a deteriorating social and physical environment which may eventually limit the rate of population growth and perhaps lead to a decline in total population. Further than this, the human population explosion is vividly described as "the most significant terrestrial event of the past million millenia", the opening statement of a prophetically significant book.

From a review of recent predictions of world population increase, it is estimated that from 1970, population will double in 35 to 37 years. The effects that this increase may have on food supply, on renewable and unrenovable resources and on environmental quality are presented by a broad coverage of many topics that are now familiar as a result of the pollution crises of the past several years. A cogent discussion of the social and ecologic effects of thermonuclear war highlights the potentially gravest of environmental problems.

There is a thorough study of mechanical and pharmaceutical birth control techniques and a review of population control throughout the world. What is noteworthy is that when the need for a low birth-rate is realised,

it is attained, regardless of the availability of contraception (as in western Europe where "sub rosa" methods are widespread, or in China, where late marriage and a two-child family are strongly promoted).

The chapter on socio-economic change is concerned mainly with conditions in the U.S.A. A chilling discussion of a military concept, "triage" illustrates the thinking which may be adopted to handle emergency situations where the need for food and resources exceeds the available aid. There is a thoughtful review of some problems of war and the illogicality of the "balance of terror". The cost of the "cold war" has been the greatest single drain that world resources have ever experienced, and it is an absolute necessity that the money now wasted on armaments be spent on solving the population-environment crisis.

In spite of the urgency of its topic and the richness of its content, **Population, Resources, Environment** is only partly effective in achieving its aims. It is an elementary university text, a book for the general public and a socio-ecologic polemic. These parts do not always blend and together with some errors in tables and in figure references indicate a hasty production. The writing is logically flabby and discursive in places and some chapters are a series of separate items which are not well connected.

The main difficulty with the Ehrlichs' book is the lack of a sound argument as to what constitutes overpopulation. It is stated that at present population levels, the earth is overpopulated and that a population of 1,000,000,000 may be all the earth can support at a U.S.A. level of consumption. But the U.S.A. level is the product of a wasteful economy which has made profit the only criterion of worth and has produced disposable, unrepairable, often unneeded goods that become obsolete as fast as a gullible public permits. An economy which produced durable, repairable goods that did not require the wasteful advertising and packaging of the U.S.A. system would use much less resources.

From the Ehrlichs' discussion it seems to me that some reasonably workable population criteria can be established. Any country is overpopulated which:

1. contributes harmful pollution to the world ecosystem;
2. aggresses against other countries by military and economic means; and
3. requires more than occasional assistance from the rest of humanity in case of famine.

In addition, on behalf of all of life, let us add another criterion: any country which allows a plant or animal species to become extinct may not be overpopulated, but it should earn the disapproval of all inhabitants of "spaceship" Earth. Any criteria relating to the quality of life and the "pursuit of happiness" are the concern of each cultural unit and are nobody else's business.

By the above criteria all the overdeveloped countries are overpopulated because of criteria 1 and often 2, and most of the less developed countries are overpopulated by criterion 3. The U.S.A. is the most overpopulated country on earth because of its rampant pollution of the biosphere and its economic and armed aggression to supply the resources to secure its vaunted "standard of living". The U.S.S.R. is overpopulated by similar criteria and its invasion of Czechoslovakia had at least a partly economic imperialist motive. China

is one of the least overpopulated countries; it contributes little world pollution, it has fed itself without charity for 20 years and it does not carry out economic imperialism. A China which becomes industrialised may be a different matter.

Lacking a meterstick to measure overpopulation, the Ehrlichs sometimes allow an intrusion of political bias. This is the case when China is described as grossly overpopulated and it is stated that population growth will force China to starve or expand. The annexation of Tibet by Chinese forces was ascribed by the Ehrlichs to overpopulation, but both the Peking and Formosa governments regarded this as a restoration of the rightful, historical Chinese boundary; it was certainly not done to relieve overpopulation. The role of economic systems in determining population growth rates is avoided, though the contrast between socialist China, with a population growth rate of 1.4%, and capitalist India, with a growth rate of 2.5%, should be noted. As each country achieves its social revolution the chances that it will need famine relief declines; though it may require capital, it less and less requires charity. Aid programs usually perpetuate inept governments with exploitative economic systems.

The last section of the Ehrlichs' book deals with a "positive program" and applies mainly to the U.S.A. A plea to restore environmental quality is underlined by the need to de-develop the U.S.A., after which attention can be given to world de-development of the overdeveloped and an ecologically feasible development of the less industrialised countries. The Ehrlichs feel that there is not time for a social revolution in the U.S.A.; present institutions must be bent to face the population crisis. It could be argued that unless there is an effective social change which recognises the need for a population optimum, and for resource and environmental conservation, there is no possibility of solving the crisis.

J. R. BRAY.

Wilderness and Plenty. Frank Fraser Darling. Oxford University Press, London. £0.90.

Wilderness and Plenty, a transcript of the six Reith lectures given by Sir Frank Fraser Darling in 1969, is a concise but evocative account of the history and possible future of "... population, pollution and the planet's generosity ...". Each lecture is about 4,000 words long and, within these limits, the author manages to convey pictures of the growth of human population and its consequences to the people themselves, the impact of this growth on the environment, the exponential growth of technology, resulting changes in the whole environment, the future of the conservation idea and how conservation may be practised.

There is nothing startlingly new or original in the book, and this has been the basis of some criticism, but a man who helped build the wagon can hardly be criticised for wanting to use it. There is a continuing need to re-state the ideas expressed in this book, especially when it can be done clearly and with the aim of reaching an audience wider than that of professionals who have heard it all before. Perhaps because the author links the science of ecology with "... a delight in knowing how nature works and a love of beauty which may or may not be conscious ..." some scientists may feel irritated; their objectivity is being assailed. There is

a warning for the ecologist, too—"... There are fashions in words, and ecology is one of these, much newer than economics, but it is being bandied about until people are growing sick of it before they know what it means ...". Fraser Darling seems to be suggesting, albeit quietly, and in the knowledge that in Britain at least the right to pursue knowledge for its own sake is being questioned, that the present-day ecologist cannot afford to be detached, either from people or environment. He sees the value of ecology in its application to conservation "... a synthesising applied social science crossing the boundaries of all branches of culture, not least the arts, in its observational study of communities ...".

Wilderness and Plenty was written by a man who acknowledges that watching animals is his first choice as a recreation. The ideas of love, involvement and responsibility permeate the entire work as essential foundations of a wider conservation based on a wider ecology. A cursory glance may be unrewarding to those who have heard it all before, but the book is neither long nor expensive; it deserves a close examination.

IAN G. CROOK.

Flora of New Zealand. Vol. 2: Indigenous Tracheophyta: Monocotyledons except Gramineae. Text: Lucy B. Moore and Elizabeth Edgar; illustrations: N. M. Adams and J. B. Irwin. Government Printer, Wellington. \$4.50.

It is a great satisfaction to the biologist and naturalist to have in this neat and attractive volume the means of identifying the indigenous monocotyledons (excluding the grasses) and a source of reference to many aspects of them. This section of the flora includes plants which make up a large part of our vegetation in moist habitats, and some of considerable horticultural interest. It is fitting to see them in an independent volume rather than a small end section of a complete Flora. This volume is a continuation of the text of Volume 1 by Dr. H. H. Allan, 1961, to which we refer for the account of the N.Z. botanical region, the annuals of taxonomic research up to 1958, authors' names and Maori names of plants. It is independent in keys, glossary, abbreviations and index, and contains the corrigenda for Volume 1.

The descriptions are ample, and give extremes of size range, and chromosome numbers if known. General distributions are given with habitats, range of altitude and flowering and fruiting periods. Type localities are given, with the location of the types and their particulars. Full references are given to places of original publication, and to synonymous names. Many taxonomic synonyms are discussed in small print following the citation of type. Also in 6-point print we find frequent discussion of variation of the species, with citation of herbarium specimens.

Those who are familiar with Cheeseman's Manual 1925, will find many new names in the Flora. *Xeronema*, *Spirodela*, *Wolffia*, and *Yoania* were first recorded in New Zealand in 1925, 1930, 1950 and 1963 respectively. *Collospermum* was described in 1934 to contain three species previously known as *Astelia*. *Sarcochilus adversus* has recently been transferred to *Drymoanthus*, described in 1943 to accommodate a new Australian

species. Otherwise the generic changes are due either to the use of combinations which were available to Cheeseman, but not taken up by him, i.e. *Sporodanthus traversii* (F. Muell.), *Calorophus minor* Hook.f. for *Hypolaena*, *Desmoschoenus spiralis* for pingao; or to species having been transferred, since the date of Cheeseman, to older genera in order to more precisely circumscribe our plants, i.e. *Beaumea* now contains all but two species of *Cladium*, one of which becomes *Machaerina sinclairii*, the other *Tetraria capillaris*. The small *Gahnia gahniaeformis* becomes *Morelotia affinis*. *Corybas* 1805 replaces *Corysanthus* 1810 on grounds of priority.

Revisions of the three largest genera, *Carex*, *Uncinia* and *Scirpus* have resulted in considerable increases in numbers of species since Cheeseman's Manual. These are given as 73:55; 32:14; 23:13 respectively. New species and varieties of *Bulbinella*, *Astelia*, *Xeronema*, *Juncus*, *Luzula*, *Thelymitra*, *Pterostylis*, *Microtis*, *Scirpus*, recognised during revision for the Flora, were published in precursory papers. New specific names are brought into use for three familiar plants: turutu, raupo and mountain flax. New Zealand plants of *Dianella* are distinct from the Norfolk Island *D. intermedia*, and the earliest available name for them is *D. nigra* Colenso. The name *Typha angustifolia* has been shown to belong to a north temperate species, the New Zealand plants to belong to *T. orientalis* which occurs in the Philippines, Malesia and Australia. *Phormium cookianum* Le Jolis is the earliest validly published name for the mountain flax. Two new species have been described for the New Zealand plants of *Ruppia* which were previously placed in a northern hemisphere species.

Ample references are given to the literature concerning these name changes which are upheld in this Flora.

For identification, dichotomous keys are provided to families; to genera, both independently of their families and within the family; and to species within the genus. The glossary includes references to many text figures illustrating organs or characters in particular genera. The genera are keyed, principally on vegetative features, to seven groups each of no more than 20 alternative pairs of characters. These keys work well; they avoid the difficulty of getting lost in a long key, and give rapid access to the keys to species within the genera. However, there is difficulty in recognising distichous glumes in *Baumea* and *Machaerina* (Groups D and F). In the descriptions of these genera it is stated that the glumes are obscurely distichous to spiral.

Where the authors have foreseen difficulties in interpretation, notes are provided, in small type preceding the keys, which should be read carefully, for example in *Ruppia*, *Astelia* and *Pterostylis*. Another helpful feature is the special mention, following the species description, of those characters which distinguish the species from its neighbours, particularly in *Luzula* and *Carex*. The problems that arise in keying out specimens of a genus with naturalised as well as indigenous species in New Zealand has been anticipated by the authors. For example, in *Potamogeton*, *Scirpus*, *Luzula*, *Juncus* and *Carex*, notes are given on the naturalised species either preceding or following the keys, or following the description of the species with which they may be confused.

This volume is provided with four times the number of text figures, relative to the number of pages, as Volume 1. They are designed to clarify diagnostic

features and are always placed alongside the keys of which they are often an essential part.

Of the 339 species treated in this volume at least 95 are common to Australia, and in at least a number of genera, the species of both countries have been reviewed by a single author, for example *Typha* 1968, *Astelia* 1966, *Sarcanthinae* 1967. Evidently there was close collaboration with H. Nordenskiöld, who has revised the Australian species of *Luzula* and determined the chromosome numbers of the New Zealand species, and with L. A. S. Johnson who worked concurrently on the Australian species of *Juncus*.

Much interest is found in the frequent references to features of the plants which are usually reserved for a biological flora. Some examples are: observations on seed setting in *Astelia*, flowering times and flower scent in *Collospermum*, growth pattern of *Luzuriaga* and *Cordyline*, seasonal behaviour in *Iphigenia*, *Hypoxis* and *Wolffia*, hybridism in *Juncus*, capsule dehiscence in *Libertia*, pollination in Orchidaceae, smut infection in *Lepidosperma*, floral biology and hybridism in *Uncinia*.

The Annals of Taxonomic Research 1959-68 are a continuation of those of 1769-1958 in Volume 1, together with some not listed for that period. This section is an extremely valuable source of reference to papers concerning the taxonomy, floristics, genetics, anatomy and morphology of New Zealand plants, and enables us also to keep up-to-date with name changes affecting the first volume. Volume 2 is provided with a family subject index to the titles for 1959-68. It is only regretted that this could not have been enlarged to index titles from Volume 1, so giving a complete bibliography for monocotyledons in Volume 2. The summaries of the papers of Hatch given in the introduction to the Orchidaceae and those of Hamlin in *Carex* help to overcome this need.

A 28-page section listing with authorities the known chromosome numbers in Gymnosperms, Dicotyledons and Monocotyledons, shows that of the 357 taxa described in this volume, 81 have been investigated cytologically, the majority in New Zealand.

Volume 2 is printed on strong opaque paper resulting in a book matching Volume 1 in size, although 1½ oz. lighter. The choice of type and spacing allows very easy reading and rapid reference. The dust-jacket illustrates species of *Libertia*, *Dianella*, *Astelia*, *Corybas*, *Thelymitra*, *Pterostylis*, *Luzuriaga*, *Bulbinella* and *Herpolirion* in tones of blue, gold, grey-green and white.

The frequent indications where further study is needed found in Volume 1 are absent from this volume, as a detailed revision has recently been made of every genus. One can predict a taxonomically stable post-flora period but also renewed interest in and understanding of the monocotyledons.

B. H. MACMILLAN.

Annotated Checklist of the Birds of New Zealand. The checklist Committee (F. C. Kinsky, Convener), Ornithological Society of New Zealand, Inc. A. H. & A. W. Reed, Wellington, 1970. \$4.95.

This slim book of 96 pages fills a longstanding need. Such was the demand for the first **Checklist of New Zealand Birds** published by the Ornithological Society of New Zealand in 1953 that it was out of print within

a few years. The many ornithologists who have expectantly awaited publication of the present revised version, and ecologists, who are often not taxonomists, can rely on a checklist prepared by a committee of this calibre.

The scope, arrangement and format of the new **Annotated Checklist** closely follow the original and deal with the birds of the New Zealand geographic region, comprising the three main islands and the outlying Kermadec, Chatham, Snares, Antipodes, Bounty, Auckland, Campbell and Macquarie Islands. The birds of the Ross Dependency, Antarctica, now included in the main list, might have been better treated as an appendix as are the fossil and subfossil birds. There is also a short suspense list of insufficiently substantiated sight records. Exactly what credentials a bird needs to get onto the New Zealand list are nowhere defined. Native birds still extant and those that have become extinct since European settlement are included, as are migrants and event single stragglers from other lands. Apparently, introduced birds are admitted only if they are currently breeding in the wild (except for the Red-vented Bulbul which is believed to have been exterminated in 1955).

As in the previous Checklist, orders, suborders, families, and subfamilies are quoted as headings. The following information is given for each bird: a serial number; scientific name, author and date; vernacular (and sometimes Maori) name; distribution in New Zealand and elsewhere; chief published references; and reference to a coloured plate.

As the **Introduction** points out there are now 248 birds (species and subspecies) breeding or known to have bred in New Zealand since European contact, and ten species breeding in the Ross Dependency. Thirty-four of the New Zealand breeding birds were introduced by man. Forty-two other birds have been recorded as regular migrants or sporadic visitors and 57 are listed as rare stragglers. Apart from the 50 birds known only as fossils or subfossils, there are now 285 species on the New Zealand List and 15 on the suspense list. The 1953 Checklist stated that from 1930 to 1953 "some 25 species, chiefly oceanic seabirds, migrant waders and stragglers from other lands have been added to the list", and it is interesting that the new Checklist has been able to add 32 more from the same groups in a slightly shorter period.

The main changes from the 1953 list are in classification, and in the numbering system where numbers are now allotted to full species only and letters to subspecies. Subspecies are listed in geographical order from north to south (the harriers appear to be an exception).

A major irritation is that there is no list or summary of the changes that have been made from the 1953 Checklist, and few reasons for the changes are given. For example, the Song Thrush reverts to *Turdus philomelos* from *T. ericetorum* with no explanation that this follows a ruling by the International Committee on Zoological Nomenclature made in 1956. More confusing is the Australian Pratincole (*Stiltia isabella*), now listed as the Oriental Pratincole (*Glareola maldivarum*) with two new records — a note that this is a change in identification rather than in taxonomy would have been helpful.

The main differences from the 1953 Checklist that we found are as follows:—

1. New species: Emperor, Adelie and Chinstrap Penguins, Australian Little Grebe, Soft-plumaged Petrel, Chatham Island Taiko, Stejneger's Petrel, Cattle Egret, Northern Shoveler, Grey Partridge, Brolga, Dusky Moorhen, Mongolian and Black-fronted Dotterels, Bristle-thighed Curlew, Asiatic Black-tailed Godwit, Upland Plover, Lesser Yellowlegs, Marsh and Common Sandpipers, Great Knot, Western and Broad-billed Sandpipers, Oriental Pratincole, Long-tailed Skua, Gull-billed and Eastern Little Terns, Crimson Rosella, Fan-tailed Cuckoo, White-winged Triller, Red-vented Bulbul, Satin Flycatcher.
2. New subspecies: Macaroni Penguin, "Hawaiian Wedge-tailed Shearwater" (no common name is given for this subspecies).
3. Lost species: Turkey, Guinea-fowl, Australian Pratincole.
4. Lost subspecies: Crozet Island Prion.
5. Species split into subspecies: Giant Petrel, New Zealand Pipit.
6. Subspecies raised to full species: Pycroft's Petrel, Hutton's Shearwater, Chatham Island Oystercatcher, Whitehead, Siberian Tattler.
7. Species lowered to subspecies: Dieffenbach's Rail, White-backed Magpie, Welcome Swallow.
8. Species relegated to suspense list: Corn Crake, Least Sandpiper, Raven, Australian Silver Gull, Grey Heron.

Readers will notice many changes in approved vernacular names. Those of us who have referred to "white-eyes" for so long must now adapt to "silvereyes", the vernacular in Australia if not in other parts of the world; and of the New Zealand muttonbird no trace exists. One hopes that there was more justification for the 27 other changes (not including changes in optional names) which have been made, because birds are normally referred to by their vernacular names and stability is important.

Carelessness and endless variety in the form and punctuation of records cause confusion. Thus, for Wilson's Storm Petrel we find: "(three specimens, Hamilton, Mar. 1950; Gisborne, 1963, and Makarewa, Southland, Apr. 1969)" — is this five or three birds? (Incidentally, what has happened to several earlier records from the 1953 list?). For Stejneger's Petrel: "(four records; Cook Strait, Dec. 1961; Bay of Plenty two, Jan. 1962; Wanganui, Nov. 1963)" — one assumes this totals four birds, not seven. But is it really four records, or three records of four birds? For Gould's Petrel: "straggling to New Zealand (two records, Muriwai, 1946, Otaki, June 1961) and one collected off Westland (Mar. 1965)" — how many records and how many birds? For Great Knot: "one sight record, Manawatu (three in 1967)" — does this mean "three seen (Manawatu, 1967)"? For South Georgian Prion: "Breeding South Georgia (probably Scott Island and possibly elsewhere); ranging widely and straggling to New Zealand" — the brackets here clearly imply that Scott Island is in South Georgia, where as it is actually in the Ross Dependency.

The criteria for accepting or rejecting subspecies are not defined and seem arbitrary. Small-billed Lesser broad-billed Prions were listed in the 1953 Checklist as *Pachyptila salvini crozeti* but are no longer accepted although they "occur in the Tasman Sea in winter and

are sometimes storm-wrecked". Similarly *Puffinus gavia byroni* is now described as a small subspecies of unknown origin "sometimes found storm-wrecked on New Zealand west coasts" but not listed as a valid subspecies. On the other hand, a subspecies of *Pterodroma leucoptera* is accepted from 10 birds cast ashore in 1942 although they have never even been properly named.

Despite these criticisms this is a most useful publication. It is completed with maps of the New Zealand and Ross Sea regions, and of the two main islands; and an index listing scientific, vernacular and Maori names. The format is pleasing, and we found only ten typographical errors. Yet the same feeling remains that one has on examining a new model car — it looks good, but is it as mechanically sound as the 1953 model? Only time will tell.

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Ekologia Polska, Seria A, Vol. XVII. H. Sandner, Editor.
State Scientific Publication. Warszawa 1969. 417 zloty.

There are 44 papers in this volume averaging 20 pages each. Additional summaries of all the papers are reprinted on special sheets presumably to save the time of the hurried reader. All papers, except one in French and one in Russian, are in English with Polish summaries. However, the paper in Russian is in Cyrillic including the title, making it difficult to absorb by readers unfamiliar with that alphabet.

It is hardly possible even to list all the 44 papers but the range of topics gives a fair idea of the problems that engross the minds of Polish ecologists. Generally,

the topics of the papers in this volume fall into the following main groups: agroecology (16 papers), limnology (7), insect ecology (6), wildlife (5), ornithology (4), rodent ecology (2) and miscellaneous papers (4). The above division of the contents is somewhat arbitrary because as often with ecological research some of the papers may fall into more than one category.

The importance of crops in Polish agriculture, together with the successful establishment of the notorious Colorado beetle (*Leptinotarsa decemlineata*) in Poland (4 papers), explains the pre-occupation of Polish ecologists with agro-ecological problems. A paper by Kowalska on the fertility of the Colorado beetle in relation to various factors of the environment is of particular interest. The limnological studies deal with phyto- and zoo-plankton chemical compositions, sediments and other aspects of various lakes and are obviously a part of long-term, basic investigations.

Papers on a number of aspects of insect ecology range widely and seem well documented. Some of the papers on the ecology of birds and mammals raise questions. One wonders for instance about the general validity of an investigation of deer food-habits based on a three months study in a restricted area (Dzieciolowski) or of the significance of the material available for a study of the food of the starling (Gromadzki). This, however, is more than compensated by other contributions such as the ecological model of daily costs of maintenance in the vole *Microtus arvalis* (Trojan and Wojciechowska) or the interesting comparison of the ecology of the blackbird and the thrush (Dyrcz).

Despite the above reservations, Vol. 18 of *Ekologia Polska* is a valuable contribution to a wide field of ecology and provides a pabulum for practically every ecologist working in this country.

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