

BOOK REVIEWS

Man and the Boreal Forest. Edited by C. O. Tamm, Ecological Bulletin 21. Swedish Natural Science Research Council, 1976.

This substantial bulletin represents the proceedings of and papers written for a regional meeting on a boreal forest project which is part of UNESCO'S Man and the Biosphere Programme (MAB). The volume is one of a series published by the Swedish Natural Science Research Council. F. Ebeling introduces the collection and usefully quotes the general objective of MAB, "To identify and assess the changes which result from man's activities in the boreal, temperate and Mediterranean zones and the effects of these changes on man". Then C. O. Tamm provides a summarized report of the meeting which consists mainly of a list of recommendations from the four working groups. These comprised participants from Sweden, Norway, Finland, Poland, USSR, USA and Canada. Not unexpectedly, there was a great deal of emphasis on the need for more co-operative research programmes. Of particular interest among the many recommendations were those which called for the involvement of social scientists in multiple-use development; the comprehensive monitoring of air and water ecosystems for pollutants; simultaneous studies of energy, monetary and material flows; and the problems created by the introduction of exotic tree species and monocultures.

The supporting papers cover an astonishingly wide range of topics, from the effects of air-borne acid pollutants on forests to the effects of forestry operations on the yields of wild berries and edible fungi, and from energy accounting in forestry to the effect of silvicultural practices on reindeer. There is likewise a wide range of quality in the papers; some are disappointingly general with no references cited at all and one or two of these approach banality. Indifferent translation does not help in some cases.

However, there are some impressive papers. G. Abrahamsen presents a most interesting account of the damaging effects of sulphur pollutants from the air on the germination and establishment of spruce, and also on brown trout which apparently have been devastated. M. Falkenmark writes of catchment models and the hydrologic cycle and records an interesting consequence of hydrogen-bomb experiments during the fifties when traces of tritium, produced in the explosions, were used to determine the transit times of precipitation through catchments. E. Jaatinen describes an energy accounting system

which distinguishes carefully between the net use of energy at each stage of a technological activity, and total energy flow. His point that the accounting of physical energy flow can be used to identify environmental impacts effectively and comprehensively could be of considerable importance. A. Chambers points out the nub of environmental problems in the boreal forests, (indeed in all forests) when he says that society is so organized that different elements in it exploit single resources single-mindedly, with resultant ecological and social tension. The only feasible approach, of course, is one that considers the many resources together and analyses the biophysical and socio-economic consequences of using resource complexes in different ways.

This bulletin will be useful to many people, but probably more to the geographer or general forester than to the ecological specialist; the treatment is usually too general for the latter. However, it represents a useful and wide-ranging collection of accounts of many aspects of the boreal forests and the many man-induced problems associated with them. Indeed, the reader who works his way systematically through the papers will emerge with a clear impression of the boreal forest region.

P. J. McKelvey

Nitrogen, Phosphorus and Sulphur-Global Cycles. B. H. Svensson and R. Soderlund. SCOPE Report 7. Ecological Bulletins (Stockholm) No. 22. 192 p.

In 1975 the Scientific Committee on Problems of the Environment (SCOPE) of the Royal Swedish Academy of Sciences initiated a project surveying the global cycles of nitrogen, phosphorus and sulphur. Following a meeting in Stockholm attended by experts in disciplines related to the cycling of N, P and S, SCOPE Report 7 was prepared.

It consists of nine articles, prepared by different authors, covering the global cycles of N, P and S; the influence of man; transfer processes and time scales; the nitrogen cycle between micro-organisms, vegetation and soil; and soil erosion. Each article is a review of some aspect of the cycle.

The information is presented in tables and simple diagrams showing the amounts of a particular element or molecule in different parts of the environment.

Data are shown as minimum or maximum values

based on the authors' interpretation of relevant information. Their interpretation is adequately explained in the text.

The influence of man on the global cycles of N, P and S is apparent throughout the book. A prediction is made that if present growth rates in the fertilizer industry continue, by 1989 N fertilizer production will roughly balance all terrestrial biological fixation of atmospheric nitrogen. Against this, estimates of the N lost from soils by denitrification vary widely by nevertheless amount to many millions of tonnes.

This book will be of use to anyone interested in environment, and particularly to anyone interested in the cycling of nitrogen, phosphorus and sulphur. However imperfect some of the estimations might be it serves a useful purpose in showing where more investigation is needed, and in showing how management is likely to affect these important nutrients on a world scale.

A. H. Nordmeyer

Vegetation of Mount Cook National Park, New Zealand. Hugh D. Wilson. National Parks Authority Scientific Series No. 1, Wellington, 59 Figures, 7 Tables, 138 pages, 1976. Price \$7.05. Available from National Parks, Department of Lands and Survey and Government Bookshops.

About a decade ago, Botany Division of the DSIR began a project to describe and map the vegetation of the New Zealand National Parks. Individual botanists took on the task of collecting the information and preparing publications. This is the first of them to be finished and sets a high standard for others to follow. An impressive amount of fieldwork was done, in this most mountainous of our National Parks, to provide a thorough coverage of the vegetation. In fact this is probably the most thorough account of vegetation on any area of comparable size ever to have been done in this country and it reflects the enthusiasm and dedication of its author who, with a few staunch helpers, carried out the entire work in some 270 days in the field between 1969 and 1972. It will be an important reference work to the New Zealand mountain flora and vegetation for a considerable time to come. It will be most useful not only to our own students and scientists, but to workers in alpine regions elsewhere.

The introductory chapter briefly outlines geology, climate, soils, previous botanical work and the survey methods. Sites were selected from air photographs after initial ground inspection. The aim was to sample

all of the kinds of habitat with a scatter throughout the Park. Each site description (in 6 x 6 m quadrats) included a list of all species, a note of their physiognomic importance, a brief description of the vegetation and an estimation of the percentage of bare ground.

Chapter 2 is a short account of vegetation patterns in the Park, chiefly the vegetation zonation. Chapter 3 is an outline of the plant communities. Some 1500 site descriptions were done and were used to synthesize the range of plant communities present in the Park. We are not told how this was done and it would have been useful to know.

The classification system used begins with landform (landscape) physiognomic (-floristic) vegetation categories and these are then subdivided according to their floristic composition. A brief account of the species composition is given as each type of vegetation is listed. Five maps, at a scale of 1:60 000, show the vegetation (or lack of it) by 11 categories (perennial névé and glacier ice, bare rock, bare moraine + scree + alluvium, alpine grassland + herbfield, scrub, beech forest, hall's totara forest, recently burnt areas, subalpine-montane grassland, water, moraine-covered glacier ice). Table 5 in this chapter is a full listing of the communities in which each species is present, a most valuable summary of the floristic composition of communities, permitting the degree of objectivity of the communities to be seen.

Chapter 4 describes factors in vegetation change and has an important section on the effects of fire from Polynesian times forward, including the devastating Liebig burn of 1970. Ten permanent quadrats were established in this area. Another important part of the chapter concerns influences of introduced mammals. The message is loud and clear, documented with good field evidence, that thar are detrimental to the alpine and subalpine vegetation. Clearly they must be eradicated in the Park and adjacent areas.

In Chapter 5 is an annotated floristic list which includes lower and higher plants, both native and introduced. Some 3000 specimens were collected and are housed at Botany Division, DSIR, with a duplicate set of vascular plants at Park Headquarters, Mount Cook.

This volume will be a valuable baseline, not only against which to measure other work in the Southern Alps, but also when assessing vegetation change in the area in future. I find it wholly commendable with one exception. The vegetation maps would have been much better if they had been printed in colour. Otherwise the format is attractive, with a pleasant cover drawing by Nancy Adams, clear

photographs and a clear, logical presentation of information.

C. J. Burrows

Applied Climatology, An Introduction. Second Edition. Oxford University Press, 1976. John F. Griffiths. Texas University. 127 pages of text, 5 pages of references, well illustrated with tables and diagrams. Price £4.00 (United Kingdom).

The last decade has been one of increasing specialisation at the expense of generalisation. As a good friend of mine once said, "I was taught to look at a tomato plant and its environment, today there is an increasing tendency for one to call in a specialist to look at the top of a leaf, and another to look at the bottom of a leaf". A rather exaggerated claim yet not without some truth in the field of most applied sciences. It is refreshing, therefore, to find a text which attempts to look at a whole subject in a scientific fashion right through from the first principles to specialist applied applications from architecture to home heating and fashion in clothing.

Yet in all aspects of life climate must be a prime influence factor whether it be from the agricultural standpoint providing food for our ever increasing population or the design of urban communities taking into account wind flow and light penetration into street and living and working areas.

John Griffiths attempts to do all these things at a very acceptable level. Starting with instrumentation which defines parameters and their measurement he moves on to elements of applied climatology at a level that explains relationships by means of equations and standard deviation from the means. Mathematical expressions are used to explain the variation of wind speed with height and Penmans equation is explored with regard to evaporation and evapo-transpiration.

Having laid the ground work simply and well he moves on to ocean currents and air masses, the effect of these on the ideal climate followed by the actual climatic classifications and then aspects of micro-climate. These basics occupy the first fifty-three pages, probably the most concise precis ever to be written on this subject. The remainder of the book attempts to tie in climatology with soils, agriculture, forestry, animals, buildings, hydrology, humans and the urban environment.

The subject matter is vast, so the depth of approach is naturally limited. However, the interest is there and the coverage with given references offers

what is claimed, an introduction to areas where climatology has influence.

No book on climatology would be complete today without a chapter on climatic change and its causes. John Griffiths has added such a chapter which follows the same precis approach serving to whet the appetite for greater things to come. In this respect the omission of Professor Lamb's text on Climatic Change from the reference list appears unfortunate.

This book is claimed to be suitable for the non-specialist. This is certainly true and should be read by anyone interested in the environment for a quick and general resumé of the impact of climate on human affairs.

In addition it is useful for specialists in related topics such as agriculture, forestry, architecture and engineering as a starting point for investigations of climate and its effect on their particular interest. To this end the list of over two hundred references is particularly useful although naturally somewhat limited in scope.

An interesting and useful text which makes easy reading.

R. A. Crowder

Soil Biology, with special reference to the animal kingdom. Wilhelm Kühnelt. (Translated by Norman Walker) Faber and Faber, London. Second, revised English Edition. 1976. 483 pp.

The appearance of a second edition of a book is evidence of the success of the first edition. However, I feel this book may have a more distinguished past, than a promising future. It is now 27 years since the first German edition made this book a pioneer in its field, and the 15 years that have passed since the first English edition have seen many advances in this increasingly studied field. Close comparison of the English editions reveals minor changes: a sterner editorial hand has tightened up parts of the text a little, but 1961 edition more adequately mirrored the state of knowledge at that time.

New features are: a key to the identification of higher groups of soil animals, four pages on plant parasitic nematodes, a discussion of pesticides in soil and a 6 page classification of animals found in soil. The value of these new features is questionable. Workers who need a key to distinguish vertebrates from protozoa must be few indeed! Butcher's contribution on pesticides is the most successful, but one is left wondering why the oddly arbitrary table of zoological categories called a classification was

included at all. Any standard invertebrate zoology text would supply the same information.

Many of the shortcomings of the revised edition are no doubt attributable to its long gestation: the preface is dated 1971 but five more years elapsed before publication. It is not surprising therefore that the bibliography is rather archaic. It is surprising that none of the original references have been dropped, and few have been up-dated e.g. the 1963 revision of Goodey's "Soil and Freshwater Nematodes" itself now sadly outdated is ignored, as are the innumerable revisions of his how-to-do-it booklet. In a book where literature citations take up about a fifth of the space one could have expected much more care in selecting and up-dating them. It is surprising that "Journal of Soil Biology and Biochemistry" was not considered worthy of mention on p. 23.

The strength of this book lies in its concentration on what might be called the natural history of soil animals, especially of soil arthropods. Here the author is in his element. Much of what is said at a family level, is transferable (with caution) to the New Zealand scene but New Zealand workers will have to compile their own collection of local references.

This is no how-to-do-it book and the worker in search of techniques will need to consult the various symposia on soil biology that have appeared in recent years and the more specialized works such as the I.B.P. Handbooks. Similarly the student who merely wishes to identify soil organisms will be disappointed.

The modern role of such a book is problematical. It seems that soil biology has grown beyond this stage. This was a pioneering book originally written in pioneering days. I suspect the call today is for either thoroughly up-to-date, general accounts of broader scope, or equally up-to-date specialist treatments of processes, kinds of soil environment, or groups of soil organisms. It is a disadvantage of this book that despite the "Biology" of the title, fungi, bacteria and actinomycetes are ignored, and so too I feel is the soil itself. There is no adequate account of soil or of the soil as a habitat.

The book is well bound and printed, and is pleasingly free from misprints but its origin from a translation is still apparent. (What, I wonder, is the nature of a sapro-*phytic* nematode?) Like the first edition the second edition also lacks a subject index. The prime difficulty is that the book is an inadequately revised re-tread, and at approximately NZ\$30 it's a fairly expensive retreat.

W. C. Clark

LETTER TO THE EDITOR

The Editor,
New Zealand Ecological Society.

Dear Sir,

The calculations appearing in the last paragraph of my paper "Diet of the opossum" (*Trichosurus vulpecula* Kerr) on farmland northeast of Waverley, New Zealand", (Ecological Society Proceedings 20, 1973) are not correct. This has been kindly pointed out to me by Dr Eric Spurr (Forest Research Institute) who has given the following corrected version:

If each opossum eats 0.11 kg dry matter/day, then 43 opossums/ha eat 4.70 kg d.m./ha/day. If each sheep eats 3.50 kg dry matter/day, then 43 opossums/ha eat 4.70/3.50 kg = 1.34 sheep equivalents/ha. This contrasts with my calculation of 2.5 sheep equivalents/ha.

I am indebted to Dr Spurr for sorting out this error.

Yours, etc.

Alice E. Fitzgerald,
(Previously Alice E. Harvie)

CORRIGENDUM

WARDLE, P.; CAMPBELL, A. D. 1976. Seasonal cycle of tolerance to low temperatures in three native woody plants, in relation to their ecology and post-glacial history. *Proceedings of the New Zealand Ecological Society* 23: 85-90.

On p. 87 of this paper the legend was incorrect for *Nothofagus s. cliffortioides* 1200 m. The correct notation for Fig. 1 (a) is:

.....	<i>Nothofagus s. cliffortioides</i>	1200 m
_____	<i>Nothofagus s. cliffortioides</i>	800 m
— — — — —	<i>Phyllocladus alpinus</i>	
_____	<i>Dacrydium bidwillii</i>	
