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although in highly alkaline lakes dissolution can continue in the sediments. Freshwater diatoms on the whole are better preserved than marine species. Fairly detailed directions are given for recovering diatoms from sediments, including differential flotation with a heavy liquid.

The review concludes with a consideration of a number of major interglacial and Holocene diatom sequences, chiefly from the Soviet Union. Lake Baikal is interesting in that the endemic species presently occurring in the lake are unknown from the Pliocene sediments, suggesting that the flora is relatively young. The questionable "marine" elements in the flora do not argue for any former direct connection with the ocean.

DAVID G. FREY

ECOLOGICAL DEVELOPMENT IN POLAR REGIONS. A Study in Evolution.

By M. J. Dunbar. Prentice-Hall, Inc., Englewood Cliffs, N. J. \$4.95. viii + 119 p.; ill.; author and subject indexes. 1968.

There are clear indications that ecology in the coming decades will be less and less dominated by ideas developed in the middle latitudes. Tropical and polar regions will get increased attention, and work in these areas will have an increasing impact on the thinking of ecologists.

Dunbar's little book should give a big push to these developments. It is admirably written, full of stimulating ideas, and suitable for both undergraduate biology majors and experienced professionals. It deals mainly with lowland and marine areas of the arctic and subarctic. Its primary theme is that these areas have supported a significant biota only since the geologically quite recent retreat of the continental glaciers, and that we now find them in an early stage of ecosystem development. The emphasis is on the evolution of the arctic ecosystem as a whole, not its component populations.

Despite some disagreements with Dunbar's views on evolution and on the nature of community organization, I can warmly recommend this book to anyone interested in the ecology of the far north.

GEORGE C. WILLIAMS

TROPICAL PASTURES.

Edited by William Davies and C. L. Skidmore. Faber and Faber Limited, London. 50s. 215 p. + 15 p. pl.; text ill.; subject index. 1966.

In many parts of the tropics, lack of protein constitutes a serious dietary problem. Bettering pasture lands offers one direct way of alleviating this deficiency. There are many and unusual problems in creating and maintaining good pastures in the tropics. This collection of articles, by 15 authorities, on problems of grazing land emphasizes both theo-

retical and practical aspects, and convincingly argues for urgent and intensive research in many areas now poorly understood, in spite of their basic importance to programs of improvement.

The contributors represent specialists working or with experience in the United Kingdom, Mexico, the West Indies, Africa, Russia, Australia, and New Zealand. They cover such far-ranging topics as pasture improvement, soils and fertility, ecology and the influence of man, plant physiology, plant introduction, selection, breeding and multiplication, legumes and nitrogen-fixing bacteria, feeding value of pastures, animal selection, diseases and dysfunctions of grazing animals, and various problems of a logistic and economic nature. Several appendixes discuss grass management for dry-season production, useful plant species for tropical pastures, and a list of common and technical names of tropical grasses and legumes. Each contribution ends with a short but up-to-date list of references for further study.

One of the pleasing characteristics of this book is the relative homogeneity in length, coverage and quality of the contributed chapters—a credit to both the authors and the editors. Several chapters do, however, seem, in my opinion, to be outstanding. *Soils and Fertility*, a most complicated topic, especially for the tropics, is a mine of condensed and digested factual wealth. *Ecology and Human Influence*, a chapter characterized by an interdisciplinary breadth of treatment in 12 pages, is not only an extraordinary summary but is enjoyably, sometimes amusingly, presented; in speaking of the value of vegetation maps, for example, the author states that ". . . generalized maps of tropical vegetation are as false as the medieval maps . . . with mythical monsters and one-legged or two-headed men" (p. 57). *The legumes and Their Associated Rhizobium* points up much widely known material in the vital context that ". . . the world can no longer afford the luxury of blindness to one of its greatest potentials, the fixation of nitrogen by legumes in its vast tropical lands" (p. 105). *Diseases and Dysfunctions of the Grazing Animals*, though perhaps too short for the subject, does indicate how much we know and how much we still do not know about this basic study.

Since all of the topics are discussed from the point of view of Old World (mainly African) pastures, any references to the New World being incidental and passing, one wonders why the title of the book is so broad. All in all, however, this volume may be heralded as a much-needed spur to scientific and practical attention to the potentiality for the world's tropical grasslands. It will be invaluable to geographers, agronomists, government and commercial administrators, teachers, and researchers

interested in bettering protein sources in the tropics; there is every evidence that the authors and editors kept this purpose in mind throughout the writing and organization of the book.

The type is easily read, the illustrations pertinent and excellently produced, the paper good. One might wish for a stronger, more durable, binding, but the volume is certainly moderately priced.

RICHARD EVANS SCHULTES

ÖKOLOGIE DER WÄLDER UND LANDSCHAFTEN. *Volume 1: Waldgesellschaften des mitteleuropäischen Gebirgsraumes nördlich der Alpen. Part 1: Text; Part 2: charts and maps as separates.*

By Friedrich-Karl Hartmann and Gisela Jahn. Gustav Fischer Verlag, Stuttgart. DM 148; subscription price, DM 128 (parts 1 and 2 together). Part 1: vii + 635 p. + 1 fold-out chart; indexes of Latin, German, and Polish and Czech names; Part 2: 52 separate charts and maps. 1967.

The basic data of plant sociology are descriptions of individual stands of vegetation. As individual plant specimens are to a flora, so individual stands are to vegetation. But whereas monographic taxonomic treatments, citing individual specimens that others may then consult in herbaria, are numerous, vegetational abstractions as descriptions of particular kinds of vegetation, citing the individual stand surveys from which inductively the abstractions were made, are much less common. Usually American papers on particular kinds of vegetation lack these basic data in the printed record.

Here they are for the forest plant communities of the central European mountainous areas north of the Alps. Hartmann's original data are in 26 association tables each of which includes from 12 to 85 stands. These are presence tables. Species constancy is listed in 34 more tables, drawn from the rich literature on central European forest vegetation. Each table treats an association, and 7 of these were not already covered in Hartmann's original presence tables.

The tables are for associations, arranged under the Classes Vaccinio-Piceetea, Dicrano-Pinetea, Erico-Pinetea, Querco-Fagetea with the orders Fagetalia, *Quercetalia pubescentis*, and *Quercetalia robori-petraeae*, and *Alnetea glutinosae*. This is a phytosociological arrangement. It therefore includes correlated information on ecology, distribution, history, and successional position of the plant communities discussed. A section of 79 pages tabulates soil analyses for many of Hartmann's stands.

This book is not a pre-digested picture, nor is it simply a compilation. It is an arrangement in a classificatory scheme of the basic data on some kinds of forest vegetation, supplemented with similar data drawn from the literature. It obviously contains a

wealth of precise information on forest vegetation not available elsewhere or widely scattered in the literature. Autecologists will welcome the data on ecological occurrences and associates of many hundreds of forest plants (including mosses and lichens). Anyone wanting to test various phytosociological systems has available here the raw data to carry out his tests.

JACK MAJOR

GREAT WATERS. *A Voyage of Natural History to Study Whales, Plankton and the Waters of the Southern Ocean.*

By Sir Alister Hardy. Harper & Row, Publishers, New York and Evanston. \$10.95. 542 p. + 36 p. pl.; ill. subject index. 1967.

This book is unique in the annals of oceanography. The author's experience spans more than forty years, from the days when he was simply A. C. Hardy, Chief Zoologist of the *Discovery* in 1925, to his present status as Sir Alister Hardy, one of Britain's senior marine scientists. The *Discovery* is now permanently anchored in the Thames at Temple Dock as a memorial to Robert Falcon Scott, but fortunately Sir Alister is still very much alive and here to tell his tale. This book may well be based on scientific travel, as he says, but it is also the best non-technical account yet written of oceanographic work, from the raw days at sea to the final reports, with much of the thinking and work that goes on in between faithfully reported. It is therefore not only the story of a voyage of the *Discovery*, but of the *Discovery* Committee and its work as well. This indeed was Sir Alister's intention, and he has fulfilled it most successfully. By the device of using his contemporary diary as a framework for all sorts of digressions, both historical and scientific, we have the feeling of reading fresh news from the expedition as well as an analysis of the final monographs. There are many illustrations—photographs (some of them showing their age a bit), pen and ink drawings of all sorts, and a number of the author's water colors of scenes of the Southern Oceans. It is a book to recommend to every young person who is interested in becoming an oceanographer, but it will also be useful to professional oceanographers as well. It is a most appropriate summary of a great career in oceanography.

JOEL W. HEDGPETH

FAREWELL TO TEXAS. *A Vanishing Wilderness.*

By William O. Douglas. McGraw-Hill Book Company, New York, Toronto, London, and Sydney. \$6.95. xiii + 242 p. + 1 pl. ill.; subject index. 1967.

Justice Douglas' position on wilderness conservation is so well-known that to oppose his views is akin