in Pleistocene and Holocene deposits and would like to stress that it is indispensable to those who are working with Quaternary macro-subfossils.

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Botany

This volume, **A Flora of Northeastern Minnesota** (University of Minnesota Press, Minneapolis, 1965. 557 pp., $10), by Olga Lakela, is a valuable addition to the steadily accumulating list of regional floras. The book is attractively printed and bound and is a credit to both author and publisher.

It is quite true, as has been frequently pointed out, that plant distribution is not limited by political boundaries, but is controlled by natural environmental influences. Local floras limited by artificial boundaries will continue to be published, however, and will continue to have great value, both as convenient teaching aids and as contributions to the knowledge of the entire continental flora. This is consistent with man's perennial urge to pigeonhole his knowledge for ready reference.

Botanists of the mid-continent region will have abundant cause to be deeply grateful to Olga Lakela. She has spent 30 years exploring the triangular northeastern corner of Minnesota, north of Duluth, in the course of which she collected 23,000 specimens and studied thousands of others assembled by various explorers, especially G. N. Jones. And then, at the age of 75 (she was born in Finland on 11 March 1890), 7 years after she had retired from the faculty of the University of Minnesota, she brought her studies together in this scholarly work.

The area covered is a most fascinating one. The "Arrowhead," comprising St. Louis and Lake counties, includes 9229 square miles and is larger than the State of Vermont. (Cook County is not included in the present work.) Much of it is wild forested land, with rugged cliffs, or moist lowlands with meandering streams and sphagnum bogs. The boreal coniferous forest is the principal vegetational type, with jack pine predominating. But plant habitats are infinitely varied, from the sands of the 7-mile beach facing Lake Superior or the rocky shores elsewhere along the Lake to the lowland and upland forests, sedge meadows, and muskegs of the interior. Three important drainage systems meet in the region, some streams flowing north to the Rainy River and Hudson Bay, some east to Lake Superior and the Atlantic Ocean, some south to the Mississippi River and the Gulf of Mexico.

The book begins with a key to the 111 families of vascular plants treated (including the Pteridophytes). Families are briefly described and then keys lead to genera and species; these, too, are briefly described. For each species, occurrences throughout the Arrowhead region are listed, and the general continental range is given. More than 100 well-executed sketches illustrate some of the more interesting species.

The concluding portion of the work is a set of maps that show, by various symbols, the location of collections made of each species treated. Other valuable aids include a bibliography, a glossary, and an extensive index.

Another, often overlooked, value of a work of this sort is its historical significance. This vast, semiwild area is being subjected to drastic changes with the pressures of civilization, and the present vegetation may in the future be destroyed or greatly altered.

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Orchids of Venezuela

In the first four volumes of this monumental work, **Venezuelan Orchids Illustrated** (Museum Books, New York, 1959–1966), by G. C. K. Dunsterville and Leslie A. Garay, 650 species in 130 genera of orchids are described. Although the work represents the orchids of Venezuela, it in fact goes far beyond the political boundaries of that country, for almost 75 percent of the species included are known to occur in other countries of northern South America and in Central America. This enhances the value of these volumes to anyone who is interested in tropical American orchids and makes the series a standard reference.

The 650 detailed line drawings have been painstakingly executed from living material collected in the wild by Dunsterville, a research associate of the Orchid Herbarium of Oakes Ames, who lives in Caracas, Venezuela, while the identification and description of each species has been assiduously and meticulously done by Garay, the curator of the Orchid Herbarium of Oakes Ames Botanical Museum, Harvard University. In each of the four volumes the genera and species have been alphabetically arranged; each species is fully described and the description includes notes on its geographical distribution and Venezuelan habitat, as well as a complete listing of all taxonomic synonyms together with a full page of line drawings. The genera known to occur in Venezuela are also presented in a special phylogenetic arrangement. The index is cumulative in each volume, with approximately 2500 names listed in the fourth volume.

An extremely important aspect of this work, to both the amateur and professional, is the fact that about 80 percent of the species are illustrated for the first time. This is probably the only orchid publication in which every species and every name used has been checked with type material. About one-third of the species described are either new to science or are new distributional records for Venezuela.

Its dual approach makes the treatise valuable to the horticulturist and to the amateur orchid grower who can use the nontechnical descriptions which are limited to measurements, texture, and color, as well as the plates in identifying his plants, while the botanist and the orchidologist will find a complete systematic or taxonomic treatment of each species, in addition to the diagnostic botanical illustrations.

Each volume contains a special essay, both in Spanish and in English, directed to horticulturists and orchid hobbyists. Volume 1 has an introduction in which general aspects of the orchid family, ranging from general morphology to flower structure and pollination, are discussed. There is an additional section, "Geographical Notes and Climate," that describes the various topographical and ecological areas where orchids have been collected by the authors and their friends.

"Naming plants," an essay in the second volume, was written in response to a number of requests from nonbotanical readers of volume 1, who wanted to know how plant names are derived. Some of the taxonomist's problems are elucidated in lay terms —for example, name changes, conservation of names, valid names, synonyms, combination of genera and species, and problems that arise from the rediscovery of forgotten names.

"Distribution of orchids in Vene-

zuela," an essay in volume 3, discusses the various phytogeographical regions and climatic conditions and gives detailed descriptions of each locality where the actual material described and illustrated in these volumes has been collected.

"Variations within a species," in the fourth volume, has 12 line drawings that present a visual explanation of the taxonomical problems involved in interpreting the diversity of form and structure within populations; these drawings will be most useful to the orchid hobbyist. In the table of contents of this volume there is a cumulative list of all of the new species and new taxonomic combinations proposed in the series.

The illustrations on the book jackets of the four volumes are excellent color photographs that regrettably are not included in the text: *Huntleya lucida* (vol. 1); *Sobralia yauaperyensis* (vol. 2); *Lueddemannia pescatorei* (vol. 3); and the bizarre *Coryanthes biflora* (vol. 4).

Notwithstanding the fact that the authors were some 2000 miles apart, that the publisher was in England, that the printer was in Holland, and that the whole of the editorial work was done by correspondence, there are remarkably few typographical errors. The four volumes are beautifully printed on excellent paper, and they are very attractively priced at $20 each; volume 1 contains 448 pages; volume 2, 348 pages; volume 3, 348 pages; and volume 4, 344 pages.

This is one of the best compendiums of its kind published in years, and it will be an indispensable reference work for botanical institutions and university and public libraries, as well as for anyone who has an interest in plants and in orchids in particular. The authors plan to include at least two additional volumes in the series.

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Ornithology

The day is past when books devoted to the birds of a state constituted important advances in our knowledge of North American ornithology, but such volumes still serve a useful function, chiefly at the local level, and it is understandable that there is a public response to them which justifies the work and expense involved in their publication. **Birds of Colorado**, vols. 1 and 2 (Denver Museum of Natural History, Denver, Colo., 1965. 927 pp., $35), by Alfred M. Bailey and Robert J. Niedrach, are sumptuous large tomes that will certainly rank high among the "state ornithologies." The authors have every qualification required for their task; both have had many years of field and museum acquaintance with Colorado birds; both are ardent observers and photographers; both are intimately familiar with the state and with its avifauna.

With its great diversity of habitats and terrain, from the eastern prairies at less than 3500 feet above sea level to the rugged peaks of the Rocky Mountains, more than 50 of which rise to more than 14,000 feet, Colorado offers a wonderful variety of ecological areas for its bird life, which includes some 439 species, or, with subspecies, 503 kinds in all. For each of these, the authors have given well condensed summary accounts that include recognition characters, range (in general and, in greater detail, in Colorado); arrival and departure dates for migrants; life histories of breeding species; and, in some cases, discursive accounts of personal experiences.

Any lavishly illustrated work, such as this, is a picture book as well as a text. The present work contains 124 plates by 23 artists, some of whom are relatively little known to the bird-book-buying public—John A. Crosby, A. Kreml, D. F. Landau, D. L. Malick, R. A. Parks, O. O. Rice, C. L. Ripper, and W. Trimm, for example. More than 700 individual birds of 420 species are shown on the plates in these volumes, and, as might be expected, owing to the different artistic techniques used, some plates will appeal more than others to individual readers. By and large, bird illustrators are not particularly good landscape painters, and I consider the plates with the least pictorial effects the most pleasing. On some plates that attempt to show detailed backgrounds the birds seem almost like "cut-outs" pasted over the background.

In addition to the annotated discussions of each of the birds, there are short introductory accounts of bird distribution, migration, orientation, and longevity; a longer account of the state of Colorado, its rivers, topography, life zones, and plant associations; and a detailed account of the history of Colorado ornithology from its beginnings in 1776 down to 1930, at which time Bailey and Niedrach began their work.

Although the regular edition sells for $35, 200 autographed sets are offered at $100. The authors and the Denver Museum are to be congratulated on an impressive and authoritative work, one that gives every indication of serving as a reliable reference source for a long time to come.

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Treatise on the Siphonophora

Dawydoff once wrote that the siphonophores were the hardest of all animals to preserve, and anyone who has witnessed the disintegration of one of these delicate colonial hydrozoans, either in the process of capture or subsequently in the formalin bath, will be impressed with the truth of this statement. Not only does the colony disintegrate but the separated parts usually undergo severe distortion, and it is the gelatinous nectophores and bracts, taxonomically the most important parts, which suffer most. To create order out of these chaotic relics the specialist must have inexhaustible patience, learning, intuition, and a firsthand knowledge of the living animals he is trying to reconstruct. A. K. Totton is one of the few who possess these qualifications, and he has now provided his crowning contribution to the subject, the first modern synopsis on the order—**A Synopsis of the Siphonophora** [British Museum (Natural History), London, 1965. 320 pp., £11]. Totton was assisted by H. E. Bargmann.

Where Paul Kramp's *Synopsis of the Medusae of the World* (1961) is essentially a catalog based on a card-index system, Totton's synopsis is a book written in clear prose and illustrated with numerous photographs and drawings. It starts with a historical review (16 pp.) consisting of valuable commentaries on the work of T. H. Huxley, Haeckel, Bigelow, and others. Next follow sections that deal with gross morphology, reproduction, and phylogeny (13 pp. in all), followed by a note on parasites, a section on terminology, and then the core of the work, the classification and systematics sections (184 pp.). The chief innovation in the classification is the establishment of the Clausophyidae as a separate