since they stress the essential floristic and phytogeographic unity of the Lower Tertiary floras of Britain.

The arrangement of the text in volume 3 is the same as that in the previous volumes of the series. A brief introduction (29 pages) includes important information relative to the occurrence and composition of the flora to supplement the general introduction provided in volume 1. This is followed by a section (129 pages) of detailed descriptions and comments on the species of the 80 named genera representing some 51 families of plants recovered primarily from the Eocene Bournemouth Freshwater Beds and the Highcliff Sands. The prime objects of study are again, as in the earlier volumes, angiosperm fruits and seeds and fern and gymnosperm leaf and cuticular remains. The Bournemouth Freshwater Beds also yield abundant angiosperm leaves not yet comprehensively studied. The systematic descriptions are accompanied by 25 excellent plates (including about 800 figures), which are the work of Chandler, and by 33 text-figures, most of which are based on Chandler's sketches.

The three volumes of the present series are largely descriptive. But we have to look forward to a statement that Chandler indicates she will prepare, which will survey all of the floras described by her from the Thanet Beds (Paleocene) of Kent to the Oligocene of the Isle of Wight and the Bovey Tracey Lake Basin and will provide the main floristic and phytogeographic conclusions that arise out of her extensive and painstaking work.

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Biogeography

North Atlantic Biota and Their History. A symposium held at Reykjavik in July 1962, under the auspices of the University of Iceland and the Museum of Natural History. Áskell Löve and Doris Löve, Eds. Pergamon, London; Macmillan, New York, 1963. xii +430 pp. Illus. $15.

In July 1962 a symposium on the biogeography of North Atlantic land areas was held at the University of Iceland in Reykjavik; the symposium was sponsored by the NATO Advanced Study Institutes Program. The 26 papers in this volume were presented at the symposium. Six of the papers are geological; three are paleobotanical. The remaining deal primarily with the distribution and ecology of modern species and with their bearing on historical problems—13 on plants, 3 on animals, and 1 on plant dispersal, in which animal agents are considered in some detail. The authors come from seven North Atlantic countries plus Czechoslovakia and Italy, the countries most strongly represented being Sweden (8 papers), Iceland (5), and Norway (4).

Iceland was an area of appropriate focus for the symposium—first, because it is a "stepping stone" in dispersal paths between America and Europe; second, because its unusually varied and dramatic geology offers such rich clues to the past; and third, because for Iceland there is an impressive knowledge of floras, both present and past, and of Tertiary geology, all of which are highly relevant to broad problems of floristic and faunistic relationships across the North Atlantic. The central question to which the papers directly or ultimately are addressed is, as Áskell Löve states in his introduction, "whether certain flora and fauna elements on both sides of the Ocean reached their present areas by dispersal over existing lands . . . or, whether these continents in a not too remote past were in direct contact . . . united by land bridges. . . ." The contributions vary in both taxonomic and geographic scopes. Some papers are confined to specific areas (for example, the papers on Svalbard and the Faroes) or to specific groups (for example, lichens and oligochaetes), but most are more wide-ranging one or both ways, and all partake of the broad perspective indicated by the book's title. Angiosperms get the most attention. The two papers hitting the central question mentioned above most directly are the one in which Dahl cites plant evidence and the one in which Lindroth cites animal evidence. Both authors argue in favor of a land connection across the North Atlantic, existing in the late Pliocene or perhaps even into the Pleistocene.

This well-edited volume is clearly one of wide interest on both sides of the Atlantic, not only to biogeographers, but also to ecologists, taxonomists, and historical geologists. Those biogeographers with especially keen interests in North Atlantic land areas should know that the symposium discussions are recorded in a mimeographed volume, presumably accessible through any of the participants. This book may well stand as a model for the sort of intensive and collaborative regional attack on problems of historical biogeography now needed for various parts of the world.

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Ecology and Plant Geography

Vegetation and Flora of the Sonoran Desert. vols. 1 and 2. Forrest Shreve and Ira L. Wiggins. Stanford University Press, Stanford, Calif., 1964. 1740 pp. Illus. $22.50.

Publication of this work on the vegetation and flora of the Sonoran Desert, described from both the ecological and taxonomic points of view, has been awaited for some time—about 35 years. For a book like this one a long preparation period is necessary because the taxonomic problems involved are intricate—just the mechanical work of writing the descriptions is enormous. Wiggins is to be congratulated on his outstanding contribution to the knowledge of the taxonomy of vascular plants that appear in a highly important vegetation type which covers an enormous area, and especially since access to that area is difficult. One hardly expects such a project to be completed during the life-span of one man, for this is no mere compilation of the work of others, but original research.

In volume 1, along with the monumental work by Wiggins on the taxonomic side of the flora of the Sonoran Desert is the equally outstanding work by the late Forrest Shreve on natural vegetation. This was first published in 1951 by the Carnegie Institution of Washington, and it is reprinted here without material change. This also represents a lifetime of work, although it is more briefly summarized. Shreve's interpretation of the desert flora of Mexico and the United States has been the standard of many authors, and its excellence stands beyond question.

The entire treatise makes a valuable two-volume coverage of a vast subject, and Stanford University Press is to be congratulated upon its excellent work. The total bulk, 1740 pages, is considerable. The text could have been pub-

lished in a single volume, the size of either of the two, had the publisher used thin paper like that used for some of the standard manuals of the floras of regions and states. This would have made the book easy to carry in the field but would have had the disadvantages inherent in the use of thin paper. Heavy paper makes a book that is easier to use indoors, even though the bulk is greater. Either procedure has its advantages.

This treatise will take its place with the outstanding regional floras and manuals and with the best sourcebooks on ecology and plant geography.

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Nematology

Soil and Freshwater Nematodes. T. Goodey. Rewritten by J. B. Goodey. Methuen, London; Wiley, New York, ed. 2, 1963. xvi + 544 pp. Illus. $16.

As the author stated in the preface of the first edition, this book is selective with respect to the material covered; the marine nematodes are omitted, and only a few brackish water species, which are also found in brackish soils, are included. This preface also states that symptoms and pathology are covered in the previously published book by T. Goodey, *Plant Parasitic Nematodes and the Diseases They Cause.*

This revised edition follows the general pattern of the first edition, but the class Nematoda is directly divided into ten (included) orders. Evidence of the great recent expansion of nematology is indicated by the inclusion of 2166 species in the present edition, compared with 1299 species formerly listed. These species are distributed in 394 genera, 87 subfamilies, 48 families, and 18 superfamilies. Many new grades are recognized and new combinations abound, but only two new genera and a few new specific names are given. Following the "Contents," "Illustration," and "Prefaces" (pp. i–xvi), there is an eight-page introduction which is subdivided into sections entitled "Plan," "Technique," and "General structure of a Nematode." An outline of the classification of included taxa through subgenera requires 16 pages.

The text begins with the order Tylenchida, followed by lower grades (with brief statements), followed by the genera. Each genus includes a definition, description, and illustration of type or representative species, a listing of species recognized, with synonyms, and bionomics. Other orders follow. The orders Teratocephalida and Trichosyringida are recognized for the first time, the first having been previously recognized as a family, the second as a suborder. The Trichosyringina Ward, 1917, is listed as a synonym; Ward used the spelling Trichosyringata. No reference is made to the orders Diplogasterata Paramonov, 1952, and Cephalobata Paramonov, 1956, presumably regarded as synonyms of the Rhabditida. Typographical errors are extremely rare for so comprehensive a publication; hence I must mention the consistent citation of *Mononchoides* Rahm, 1928, which is cited as "*Monochoides* Rahm, 1928/29."

Most users will welcome the inclusion of 87 tabular keys to genera and higher taxa and the list of genera placed in the Mermithidae. The retention of the three-page appendix listing the "Hairworms" of the British Isles, however, seems unnecessary.

Many nemic parasites of invertebrates have free-living stages, and to the extent that they are included, they follow the taxonomic scheme. However, some inconsistency in the genera that are listed may be due to lack of descriptions of free-living stages for members of the Drilonematidae, Ungellidae, Tetradonematidae, Sphaerulariidae, Allantonematidae, and Daubayliinae.

The original plan of the book was so selective and, as a result of the growth in taxonomy, the need for a new edition so urgent that little change was made in the scope. Some attempt might have been made to provide means of obtaining more information on species than names, authors, and dates. Instead, reference is made to the *Zoological Record, Helminthological Abstracts*, Stiles and Hassal's (1920) *Index Catalogue of Medical and Veterinary Zoology: Roundworms* (with its accompanying author index), and Tarjan's (1960) *Check List of Plant and Soil Nematodes.* Inclusion of references to descriptions of all species mentioned would have tripled or quadrupled the list of references. This, with a slight expansion in the treatment of Bionomics and an increase in the chapter on general structure of a Nematode might be considered for future editions.

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Entomology

The Insects. Url N. Lanham. Columbia University Press, New York, 1964. 240 pp. Illus. $6.95 *(to be published in May 1964; reviewed from galleys).*

The author, Url Lanham, has assembled a mass of interesting, significant, and thought-provoking information about insects in general. To grasp the full significance of this compilation, the reader should possess some knowledge about arthropods and know the essential facts about many common insects found among the more important orders and families. For a beginning student in entomology, the author's presentation of this sort of information (in chapter 2, "Diversity of insects") is inadequate and lacks references to the illustrations.

The organization of the 20 chapters, and especially the titles of many chapters, differs from most general textbooks on entomology. This creates for the reader a new look at insects. In some chapters the subject matter is presented in an excellent manner; this is especially true of chapter 1, "The place of insects in nature"; chapter 4, "Flight"; chapter 7, "Sense organs and behavior"; chapter 12, "Insects without wings"; and other chapters. Two chapters, 12 and 16—"Insect life in waters" and "Ancient aquatics"—might have been combined. Chapter 11, "Insects versus insects," presents a brief but an incomplete summary of this important subject.

Many of the significant statements throughout the various chapters come from sources with which most readers are not familiar. For a professional

The clubbed antennae, characteristic of butterflies, are shown in this series of a South American species. These butterflies are called "88's" by commercial collectors. [From U. N. Lanham, *The Insects* (Columbia Univ. Press, New York, 1964)]