This is a valuable book, timely and sound and containing a prodigious amount of information, but it might have been a better and shorter one if the (unquestionably competent) authors had decided what purpose it was to serve.

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Plants and Pollinators

The Principles of Pollination Ecology. K. FAEGRI and L. VAN DER PIJL. Pergamon, London, 1966. 258 pp., illus. $9.50.

In view of the central position of pollination in the morphology, ecology, and evolution of flowering plants and the popular appeal of the precise and intricate interrelationships involved, it is remarkable that comprehensive books on the subject are so scarce (only four in English or translated into English in the last 25 years). The authors of *The Principles of Pollination Ecology* supply their own explanations of this anomaly.

First, there was the early disrepute which befell floral biology following the sometimes overenthusiastic and undercritical studies of 19th-century botanists. More recently the emphasis on cellular biology has tended to relegate nature study (including pollination ecology) to a low position on the biology totem pole. As might be expected, the book vigorously defends the value of and need for studies in floral ecology.

The authors emphasize principles rather than handbook information. There is, however, a systematic treatment of methods of pollen dispersal and of flower types on a functional rather than a phylogenetic basis. The floral biologies of particular plant species are described only to illustrate the various principles and functional groupings discussed. The next-to-last chapter serves as an appendix of additional examples to illustrate the preceding chapters. Naturally, this could serve as a reservoir of illustrative material for many types of classroom discussions and exercises.

The book was obviously written by botanists for botanists, but there is a better presentation of animal structure and behavior in relation to pollination than one might expect. Animal pollinators are not taken up systematically but are grouped into functional classes on the basis of the types of floral mechanisms with which they are associated.

A short and rather inadequate chapter on applied pollination looks like an afterthought intended to widen readership. The final chapter is an epilogue stating the authors' philosophy concerning such evolutionary problems as morphogenetic potentiality, orthogenesis, specialization versus generalization, and the fallibility of adaptations. The bibliography is extensive. A collection of the works listed would make an excellent representative library for the floral biologist.

On the whole, the book is well organized and the ideas clearly expressed, with only an occasional slip to reveal that English is not the authors' native language. The authors are not reticent about ascribing functional evolutionary significance to nearly every modification of floral structure and activity. Van der Pijl's experience with tropical floras leads him to emphasize the important role of birds and bats in parts of the world other than Europe, where insects are almost the only animal pollinators.

In many ways this book resembles *The Story of Pollination* written in 1961 by B. J. Meeuse. However, the style is less popular and the documentation more complete. There is also a more elaborate classification of adaptive phenomena and a consequent greater use of definitions and terminology. *The Principles of Pollination Ecology* should be very useful as a textbook for pollination courses and as source material for courses in evolution, behavior, ecology, general botany, and plant systematics.

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Nature Guide

Wild Flowers of the United States. Vol. 1, The Northeastern States. HAROLD WILLIAM RICKETT. Published for the New York Botanical Garden. McGraw-Hill, New York, 1966. In two parts, boxed. 575 pp., illus. $39.50.

This is the most extensive book on wild flowers of the northeastern states ever published, containing over 1200 photographs in natural color, mostly of flowers growing in their natural surroundings, and 350 line drawings. The first of five projected volumes, it takes in the region from Maine to Minnesota to Missouri to Virginia. Of the 3000 wild flower species (exclusive of woody plants, grasses, and sedges) known to exist in that region, 1700 are here represented, in pictures contributed by 51 nature photographers, several of whom were commissioned to find and photograph particular plants.

Six eminent botanists collaborated with the author, a senior curator at the New York Botanical Garden, to supply detailed, although mostly nontechnical, information. Various means are provided by which the amateur can easily identify plants as he finds them. There is a key to 14 groups of plants based on general flower characteristics, and each group is further reduced by simple keys to genus and species. The pictures are conveniently grouped with the text. Taxonomists may be disappointed by the absence of detailed information concerning individual plants, but amateurs, and many others who appreciate good, simple aids to plant identification, will be delighted.

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Mathematics for Geologists

Geological Data Processing Using FORTRAN IV. F. G. SMITH. Harper and Row, New York, 1966. 302 pp., illus. $14.

This book, written to help students in geology develop a wider working knowledge of mathematics, introduces the reader to a variety of mathematical topics at a level intermediate between abstract theory and actual computer programs. It is intended for those who wish to learn FORTRAN IV computer programming but who lack sufficient mathematical background. The exercises at the end of the chapters have been designed especially for geologists.

The first part of the book covers symbolic logic, Boolean algebra, number systems, vectors and matrices, the calculus of discrete and continuous functions, probability, and statistics. For each topic, the basic concepts are simply stated and then formulated as part of the FORTRAN IV language. This is supplemented with numerous examples of short written computer programs. There is a chapter describing the basic FORTRAN IV language. One

wonders if this was really necessary what with so many manuals already available on the market. It is the latter part of the book that geologists will find most interesting. Here are collected a number of computer applications often encountered in geological research. Examples include numerical processing of chemical analyses, calculation of mineral norms of rocks, and various statistical tests applicable to geological data. These are aptly illustrated through the use of flow diagrams.

Unfortunately, the book covers only a small part of what might be called geological data processing. For example, no treatment is given of subjects related to the acquisition, storage, or retrieval of geological data. Nor is there any discussion of the various modes of presentation of results with computers, such as the preparation of contour maps, stratigraphic sections, or correlation diagrams. All are important facets of geological data processing.

The danger in a book of this kind is that the oversimplification in presentation will lead to misuse of the mathematical methods it contains. Even worse is that coverage of this material by the student will substitute for a more formal exposure to mathematics. Provided these strictures are kept in mind, however, this book should prove useful to the geologist learning FORTRAN IV computer programming.

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New Books

Alcoholism: Mechanism and Management. Max Hayman. Thomas, Springfield, Ill., 1966. 331 pp. Illus. $10.50. American Lecture Series.

Annual Review of Nuclear Science. vol. 16. Emilio Segrè, Gerhart Friedlander, and H. Pierre Noyes, Eds. Annual Reviews, Palo Alto, Calif., 1966. 677 pp. Illus. $8.50. Seventeen papers.

The Biochemical Genetics of Vertebrates Except Man. I. E. Lush. North-Holland, Amsterdam; Saunders, Philadelphia, 1966. 128 pp. Illus. $7.50. Frontiers of Biology, vol. 3.

Concepts, Theory, and Explanation in the Behavioral Sciences. Proceedings of a symposium (Fairfield, Conn.), April 1964. Gordon J. DiRenzo, Ed. Random House, New York, 1966. 314 pp. Illus. $4.95. Eight papers.

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The Development of Sex Differences. Eleanor E. Maccoby, Ed. Stanford Univ. Press, Stanford, Calif., 1966. 361 pp. Illus. $8.50. Five papers. Stanford Studies in Psychology, vol. 5.

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The Human Skull: A Cultural History. Folke Henschen. Translated from the Swedish by Stanley Thomas. Praeger, New York, 1966. 168 pp. Illus. $7.95.

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The Indian: America's Unfinished Business. Report of the Commission on the Rights, Liberties, and Responsibilities of the American Indian. Compiled by William A. Brophy and Sophie D. Aberle. Univ. of Oklahoma Press, Norman, 1966. 256 pp. Illus. $5.95.

Insect Pests of Farm, Garden, and Orchard. Ralph Howard Davidson and Leonard Marion Peairs. Wiley, New York, ed. 6, 1966. 685 pp. Illus. $17.50.

Insects and Hygiene. James R. Busvine. Methuen, London; Barnes and Noble, New York, ed. 2, 1966. 479 pp. Illus. $18.

Introduction to Diophantine Approximations. Serge Lang. Addison-Wesley, Reading, Mass., 1966. 93 pp. Illus. $6.75. Addison-Wesley Series in Mathematics.

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Mechanics of Secondary Oil Recovery. Charles Robert Smith. Reinhold, New York, 1966. 512 pp. Illus. $18.

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The Middle Ultraviolet: Its Science and Technology. A. E. S. Green, Ed. Wiley, New York, 1966. 404 pp. Illus. $15.75.

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