gots doesn't leave me with a very clear picture. But these are minor problems. The illustrations are good with the exception of a few of the color plates which are quite unrealistic in appearance. Most biology textbooks devote very little space to blood. This book will fill a very real need and should be a great stimulus to future work in the field of comparative hematology.

RALPH L. ENGLE, JR.
Department of Medicine,
Cornell University Medical College

Modern Biology Series

Interacting Systems in Development. James D. Ebert. Holt, Rinehart, and Winston, New York, 1965. x + 227 pp. Illus. Paper, $3.

Interacting Systems in Development, a volume in the Modern Biology Series, is designed to introduce beginning college students to developmental biology. As indicated, interactions represent the major theme; this includes such diverse phenomena as egg-sperm, nucleo-cytoplasmic and tissue interactions, cleavage and gastrulation, molecular expression of genes expressed during development, products of gene expression and their regulation, humoral regulation of growth, endocrine and nervous coordination, and developmental aspects of immunity.

In the 12 chapters and 216 pages of this paperback book, Ebert presents a well-balanced view of developmental phenomena and problems. Model systems (adequately covered in other books) have been studiously ignored; instead, the actual problems encountered in embryos and other multicellular systems have been presented. Areas of ignorance are clearly and unhesitatingly indicated, along with an invitation to students to prepare themselves for the excitement of becoming involved in attempts to seek answers and solutions.

I like the book, possibly because it takes essentially the approach that I have used in my course. There are, as one would expect, differences in emphasis and organization. For instance, I would tend to devote more than seven pages to gastrulation and to relate this topic more closely to cell sorting and migration. Both of the latter subjects are covered in other parts of the book without relation to the earlier morphogenetic movements. Most of the highlights of the major aspects of development are covered quite adequately for this type of introduction.

Use of many terms without definition could be criticized, but I do not consider such usage a serious drawback. Instead, I believe that it may serve to whet the curiosity of the more interested students. This book should serve admirably to cover the developmental-biology portion of introductory courses in biology. It should also serve as a supplement to many courses in embryology and developmental biology (in fact, I have recommended it as a supplement to my own students in such a course). The blend of the molecular with the structural, the liberal inclusion of genetic analyses, along with the broad coverage and viewpoint, tend to make this a valuable little book.

EDGAR ZWILLING
Department of Biology,
Brandeis University

A Literature Survey

Balsam Fir. A monographic review. E. V. Bakuzis and H. L. Hansen. University of Minnesota Press, Minneapolis, 1965. xxii + 445 pp. Illus. $9.50.

This monograph is an outgrowth of a recommendation, made in 1953 by the Quetico-Superior Wilderness Research Center Advisory Committee to the University of Minnesota School of Forestry, that the literature of *Abies balsamea* (L.) Mill. be surveyed in an attempt to understand the successional role of the species. The authors, assisted by seven contributors, examined 2334 sources of which 1393 are cited. They have done an outstanding job in bringing balance and unity to a work assembled from such a wide background. The book is divided into nine chapters, each with a preface and conclusions. The first five chapters deal with basic fields: Botanical foundations, geography and synecology, ecological factors, microbiology, and entomology. The last four chapters deal with more practical applications: Reproduction, stand development, growth and yield, and utilization. Two indexes list the myxomycetes and fungi and the insects associated with balsam fir. Forty-seven pages are devoted to listing the literature cited, with the sources for each chapter listed separately. The index is helpfully arranged in four subdivisions: General, species, communities, and localities. Tables, figures, and plates are well done—usually completely reworked for clarity and uniformity.

Careful editing and revision is indicated by the unity that exists between chapters of this well-written book. The title could be misleading in that some may, on the basis of the title, think that the book covers a specialized topic. Although it covers the topic of balsam fir exhaustively, it will be useful to a wide range of readers. The ecological approach is so effectively used throughout the book that ecologists and plant geographers, as well as foresters, will find it especially helpful. The commercial value of the species as well as the rich natural history of the spruce-fir region will add to the list of potential readers.

The authors deserve praise for the manner in which they were able to condense the source materials without losing the meaning of the original authors. The conclusions at the end of each chapter effectively summarize the types of studies that have been made, and are especially valuable in that they point out specific areas where further research is needed. An outstanding feature of the book is the stress on and effective use of multidimensional ecosystem models to illustrate the interaction of environmental factor complexes.

GEORGE S. RAMSEUR
University of the South,
Sewanee, Tennessee

Organic Chemistry

Introduction to Mass Spectroscopy and Its Applications. Robert W. Kiser. Prentice-Hall, Englewood Cliffs, N.J., 1965. xii + 356 pp. Illus. $14.

This book has been written especially for the scientist with little or no experience in the field of mass spectroscopy, and it attempts to present systematically basic principles, applications, and recent advances as well as to discuss advances that are likely to be made during the next several years. A historical chapter that gives an interesting introduction to the subject precedes a discussion of the various parts of a mass spectrometer, the various types of complete instru-

ments, and the commercial instruments presently available. These chapters are well written and informative. In them, and also in the remainder of the book, the author is at pains to introduce numerical examples, presumably to be worked through by undergraduate students. Undue emphasis does, however, seem to be placed on certain aspects; for example there is a fairly detailed discussion of the ion optics of Aston's original mass spectroscope, a system of little current interest. Comparatively little is said, however, about such important geometries as the Mattauch-Herzog or the Nier-Johnson geometries.

In any book of this kind the author's particular interests are bound to show through clearly, and one is able to see Kiser's great interest in the fundamentals of the ionization process. This is apparent in chapter 6 which discusses the various types of ions in mass spectra, in chapter 8 which is entirely concerned with the energetics of electron-impact processes, in parts of chapter 10, and in the inclusion of two appendices that list atomic and molecular ionization potentials. I believe that it would have been better for the author to concentrate on particular parts of the subject and to treat them fully rather than to attempt complete coverage of a field that is now so highly diversified in its applications. Inevitably, when the latter course is adopted, certain subjects must be dealt with in an extremely brief manner. As an example, only half a page is devoted to rearrangement ions, surely among the most valuable of all ions in mass spectra for elucidating fragmentation mechanisms.

The chapter on analytical applications, too, has a great deal to say about the quantative analysis of mixtures, going deeply into the matrices involved, but has practically nothing to say on the much more widely practised use of the mass spectrometer for the qualitative identification of unknown compounds; the current field of data handling exemplified by the work of Biemann and others in "element mapping" is ignored. The book is not particularly up-to-date in its treatment of various subjects. To take one example, the section on ionization gives no details of the great advances made by Beckey in the last few years, neither does it discuss the great importance of this method as a means of producing ions without excess vibrational energy. It is hard to see the book competing with Djerassi's book in the field of organic chemistry and, on the physical side, small books such as Duckworth's would seem to be more concise and valuable summaries, while Field and Franklin's classic will still stand supreme in the detailed discussion of ionization phenomena.

J. H. BEYNON
Physics Section,
Imperial Chemical Industries,
Manchester, England

Chiroptera

The Bats of West Africa. D. R. Rosevear. British Museum (Natural History), London, 1965. xviii + 418 pp. Illus. £7 15s.

The Bats of West Africa is the first book to bring together available information on the 9 families, 31 genera, and 97 species of bats of this interesting area. The peculiar geographical region, which is from 20°N (approximately the southern edge of the Sahara) south to a line that runs east across Cameroon and the Central African Republic to the extreme western Sudan, is designed to encompass the four former British tropical West African colonies (Gambia, Sierra Leone, Ghana, and Nigeria); owing to its semipopular approach, the book seems written primarily for naturalists in this area. A general introduction precedes separate accounts (including keys and including much original taxonomic work) of the various families, genera, and species of the region. These are followed by an eight-page bibliography, a list of journals (with abbreviations), a glossary, notes on the preservation of specimens and on vegetation zones in west Africa, an extremely useful gazetteer, an index, and a fold-out map that shows both localities and vegetation zones. Readers should be warned that many statements in the general introduction do not apply to bats outside of Africa and that certain methods suggested for the preparation of specimens are somewhat at variance with current American practices. The book is illustrated with two colored plates and 103 line cuts, chiefly illustrating details of morphology of different kinds of bats. These figures are mostly of excellent quality, and they should be extremely useful to the novice and the professional.

My criticisms are relatively minor. The distributions of species are given mostly in very general terms, with few actual collecting localities listed. These would have been useful documentation of the distributions. Possibly because of the book's semipopular appeal, what seems to be an inordinate amount of space is devoted to color in spite of what Rosevear admits is its great individual variation and resultant low taxonomic utility. Local native common names for species are not given because of their limited utility, yet an almost completely artificial set of English "common" names for all taxonomic levels, including subspecies, has been constructed. The book is nevertheless highly recommended for all students of African bats. Its price, however, seems rather high.

KARL F. KOOPMAN
American Museum of Natural History, New York

Physical Chemistry

Chemical Physics of Semiconductors. J. P. Suchet. Enlarged and revised translation of the French edition (Paris, 1962) by E. Heasell. Van Nostrand, Princeton, N.J., 1965. xii + 197 pp. Illus. $8.50.

The author points our clearly that the phenomena of semiconduction are not restricted to a few materials but are possessed by several hundred compounds. Moreover, the materials need not be crystalline to exhibit the required properties.

A surprising fact of the state-of-the-art of semiconductor electronics is that most of the economic importance centers on two elements, silicon and germanium. An exciting possibility is that other materials can be found with outstanding parameters which would be of value in the performance of electronic functions. The III-V compounds, especially GaAs, show promise.

The most outstanding chapter in the book is chapter 7 "The crystallochemical model." The reason is twofold. This chapter contains more of the author's original work than the others, and in it he tries to answer the question of how one tries to predict the electrical properties of semiconductors on the basis of structure and bonding. A good discussion of his concept of the "Ionocovalent bond" is given, and an "ionicity" parameter is defined. Some remarkable correla-