The last chapter of the book concerns seasonality and insect pest management. Methodology is briefly discussed, including treatment of genetic control strategies. There is no critical review in this part, and one wonders to what extent the information on seasonal adaptations of insects has benefited the development of pest management tactics. There is an optimistic tone, however, given the progress of research in discovering some of the mechanisms underlying insects' seasonal adaptations.

WILLIAM J. BELL
Department of Entomology and Department of Physiology and Cell Biology
University of Kansas
Lawrence, KS 66045

INSECTS-IN-DEMAND


The amount of information on the physiology of insects doubles roughly every ten years, if the size of reference works is any gauge. There are over 45 programs in the United States alone offering a Ph.D. in the field of entomology or the equivalent, with insect physiology obviously an important part of any curriculum. Therefore, a contemporary text in insect physiology is always in demand. The recent volume by Blum and his colleagues is a valiant effort to fill the void and will definitely be useful.

In 14 chapters contributed by 14 physiologists, the book covers circulation, nutrition, excretion, respiration, metabolism, integument, reproduction, muscles, behavior, hormones, the nervous system, pheromones, and defensive secretions. Growth and development are not covered per se, but some egg development is described in the chapter on reproduction. The excellent hormone chapter deals mostly with development during late instars and metamorphosis, where most of the current knowledge is centered.

An excellent treatment of integument contains new information on the structure of silk protein. The only minor drawback in the chapter is a lack of sharp distinction between sclerotization, tanning, hardening, and darkening. The chapter on circulation, while being one of the more useful treatments available on hemocytes and cellular defensive reactions, does contain a few minor errors. Chapter eight presents us with a lovely treatment of sensory structures. The full use of examples and anatomy are very helpful and will be good lecture supplements. The chapter on respiratory systems is not only descriptive, but quantitative.

In general, I would have been happier with more chemical formulas in the book. The chapter on metabolism documented numerous reactions and is very useful, but has only one incomplete structure of trehalose. The general lack of chemical structures is in marked contrast with lists of chemical formulas used with the final chapter on exocrine systems. A textbook on insect physiology may not be the place for what appears to be essentially a review of this particular subject, since it really does not deal with fundamental principles of insect physiology. I would have preferred to see a balanced account of the pheromone biosynthesis scheme in the leafroller complex, a topic that has been ready for the textbooks for a few years now, and which every student should know.

Two notable features present problems. First, few references are used. Although I assume this was done intentionally, checking a subject for accuracy or knowing what authority is referred to is difficult or impossible. Second, there are omissions and inconsistencies throughout the index, making it difficult to get at specific subjects. When authors strayed into unfamiliar areas, they tended to get into trouble; however, this textbook contains large amounts of useful information and most of the chapters make good outlines around which to design lectures.

THOMAS A. MILLER
Division of Toxicology and Physiology
University of California
Riverside, CA 92521

ON CRUSTACEANS


The need for a major single-volume reference on crustaceans has been evident to both specialists and nonspecialists for some time. Given the amount of attention devoted to crustacean research, it is rather surprising that the last major one-volume compendium written on Crustacea was the classic work of W. T. Calman (Crustacea. 1909. Pt. VII. In E. R. Lankester, ed. A Treatise on Zoology, Adam & Charles Black, London) published almost 80 years ago. The book Crustacea, by F. R. Schram, was written to serve as a reference text in crustacean evolutionary biology. Although it covers many aspects of crustacean biology, the primary emphases are morphology and phylogeny. The author is to be commended for bringing together recent literature on these themes. The book is comprehensive, including detailed chapters on taxa not usually covered in other one-volume texts or references.

The author, whose background is in paleontology, presents separate chapters on fossil taxa or integrates fossil groups into appropriate chapters on recent forms; he also describes the embryology of those groups for which such information is available. The author uses current biogeographical and geological concepts to interpret geographical distributions of several taxa. The book begins with a short introduction to the Crustacea, contains a chapter on their relationships to other arthropod groups, and ends with chapters on the author's view of crustacean phylogeny and evolutionary patterns. Most of the book is made up of chapters on individual taxa, and the author follows a basic format similar to Calman's in providing a definition of the group; a short historical account; a detailed
Fortunately, after amassing so much information and detail from the literature, that the author has been careless in the presentation of this material. I was struck by the sheer number of outright errors and orthographic mistakes but it would take too much space to detail all of them here. As an example, in one page (p. 256) in the chapter on the Procarididea, there is a mix-up of figure captions (paragnaths with maxillule), a misspelling of the figure label scaphognathite, and a mistake in the gill formula of Procaris (this animal does have maxillipedal epipods, correctly stated in the first source given for the table).

Errors and inconsistencies in the use of family names and their vernacular forms are common throughout the book. For example, the vernacular form of the family Physetocariddae, correctly “physetocarids” is given as “phycetocarids” and “physetocarids.” The caridean taxonomy also omits the family Eugonatonotidae and has several typographical errors. Among the goals stated for this book is that it serve “to standardize the terminology and orthography used in the discipline.” To meet that goal, the many inaccuracies, errors, and orthographic mistakes must be eliminated from any future editions.

It would have been useful if the author had followed Calman in giving an outline of his classification, or at least referring the reader to it, before beginning his chapters on specific taxa. Schram’s classification is not given until the next-to-the-last chapter, and the reader is not directed to it in the chapters on particular groups. The higher taxonomic categories to which a group belongs are not given. The interested reader must do a lot of searching to find a definition for some of these categories to which a group belongs are not given. The interested reader must do a lot of searching to find a definition for some of these.

In the chapter that deals with crustacean phylogeny and classification based on standard cladistic methods, the author’s approach is organized and rigorous. But, I object to his statements that his cladograms “afford a much clearer understanding of crustacean phylogeny than anything proposed heretofore” (p. 526) and that “The taxonomy proposed here is more natural than any proposed heretofore” (p. 541). The choice and interpretation of characters used by the author to generate phylogenetic trees seem no more natural, objective, or lucid than other recent studies on crustacean evolution. On the contrary, the brilliant analysis of Hessler (1983), to pick one example, on eumalacostracan and, in particular, peracaridan evolution and phylogeny is far more objective, balanced, and informative than that presented by the author. As the author himself points out, in reference to his cladogram on the Maxillopoda, “choices of slightly different characters or elimination of some others can produce some significant changes in the tree.” This book would be much better if the author had followed Hessler’s (1982) style of clearly stating both sides of a phylogenetic controversy.
The last chapter, on evolutionary patterns, has brief sections on paedomorphosis and sex that are followed by a lengthier, better developed review of feeding mechanisms. The author is correct in presenting paedomorphosis as an important process in crustacean evolution, although it would have been instructive to discuss in more detail specific samples (e.g., hypothesized progenetic origin of maxillopodans). Some of the author’s views on the role of sex in evolution are perplexing, particularly his “interpretation of sex as a means of dampening variation” and his suggestion that the hypothesized inbreeding of tanaidaceans has beneficial effects. The brief paragraph on protandric hermaphroditism fails to discuss the best documented and most relevant example in the Crustacea, that of pandalid shrimps (Charnov 1982).

In summary, although Crustacea might be useful to carcinologists, in its present form the book fails to meet its goal as a reference text in crustacean evolutionary biology. It is hoped that those specialists who might be working on their own crustacean taxa will not be discouraged by the appearance of this book. There is still a need for a single-volume reference on Crustacea, one more carefully written and edited, with alternative points of view.

RAYMOND T. BAUER
Center for Crustacean Research
University of Southwestern Louisiana
Lafayette, LA 70504-2451

REFERENCES CITED


NEW TITLES


Atlas of Trichoptera of the SW Pacific—Australian Region. A. Nebiess, Dr. W. Junk Publ., Dordrecht, Netherlands, 1986. 286 pp., illus. $85.00 (cloth).


A Biology of the Algae. P. Sze. Wm. C. Brown Publ., Dubuque, IA, 1986. 251 pp., illus. $20.00 (paper).


Bioproducts. A. Fiechter, ed. Springer-Verlag, Berlin, FRG, 1986. 179 pp., illus. $57.00 (cloth).

Biotechnology: Potentials and Limitations. S. Silver, ed. Springer-Verlag, Berlin, FRG, 1986. 312 pp., illus. $31.00 (cloth).


The Butterflies of North America: A Natural History and Field Guide. Stanford University Press, Stanford, CA, 1986. 583 pp., illus. $49.50 (cloth).


Cerebellum and Rhythmic Movements. Y. I. Arshavsky, I. M. Gelfand, and G. N. Orlovsky. Springer-Verlag, Berlin, FRG, 1986. 166 pp., illus. $83.00 (cloth).

Circannual Rhythms: Endogenous Annual Clocks in the Organization of Seasonal Processes. E. Gwinner. Springer-Verlag, Berlin, FRG, 1986. 154 pp., illus. $71.00 (cloth).


Crustacean and Mollusk Aquaculture in the United States. J. V. Huner and E. E. Brown, eds. AVI Publ., Westport, CT, 1986. 476 pp., illus. $65.00 (cloth).


Effects of Land Use on Fresh Waters Agriculture, Forestry, Mineral Exploitation, Urbanization. J. F. de L. G. Solbe, ed. John Wiley & Sons, New York, 1986. 568 pp., illus. $95.00 (cloth).


Equine Diseases: A Textbook for Students and Practitioners. H. J. Wintzer. Springer-Verlag, New York, 1986. 439 pp., illus. $89.00 (cloth).


