

predatory tendencies, effect mutual arousal, and eliminate or reduce interspecific mating, the male (usually much smaller than the female) initiates an elaborate courtship. When successful, this induces female participation and eventual submission to copulation.

In their monograph the Robinsons present the synthesis of nearly a decade of field studies in the African, American, and Pacific tropics. After describing in detail the courtship, copulatory, and postcopulatory behavior of 53 araneid species belonging to 15 genera, the authors characterize three major patterns of araneid courtship, discuss the origin, modification, and function of constituent behavioral units, and suggest probable evolutionary trends.

At a time when the related problems of araneid phylogeny and classification (both traditionally based largely on morphology) are far from resolved, it is exciting to find ethologists suggesting a credible solution based firmly on analysis of 21 behavioral characters. In testing their hypothesis systematists will be challenged to consider many new kinds of evidence. For example, the Robinsons' description of differences in orientation and insertion of male pedipalpi (copulatory organs) suggests that the functional morphology of these complex appendages should be more carefully investigated.

This study will prove useful both to those interested in spider behavior and evolution and to those concerned with the general topic of animal communication. Although the authors remain true to their major objective of evaluating macrobehavioral differences and trends they provide many useful observations and comments on such topics as postcopulatory cannibalism of males, competition between males for a female, species-specific mating behavior, and the function of courtship. By so doing they offer implicitly and explicitly a number of hypotheses for future ethological and evolutionary studies.

The text is supported by nearly a hundred illustrations, half being close-up photographs of mating sequences and the remainder being drawings and tables depicting components of courtship and copulatory behavior. Despite its technical nature this monograph is both easily read and efficiently used as a reference. Without being anthropomorphic the authors communicate their patient fascination with spider behavior.

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Plant Biochemistry

Secondary Plant Products. E. A. BELL and B. V. CHARLWOOD, Eds. Springer-Verlag, New York, 1980. xvi, 676 pp., illus. \$108.90. *Encyclopedia of Plant Physiology, New Series*, vol. 8.

This volume is a compilation of authoritative reviews of secondary natural products, the aim of which is to present updated accounts of this rapidly expanding field. The book contains a large amount of theoretical and practical material concerning the chemistry, biochemistry, taxonomic significance, and ecological roles of secondary products. The careful organization, systematic approach, and comprehensiveness of the volume make it a valuable resource for both graduate students and investigators in the biological sciences.

Of special interest is the historical introduction by K. Mothes, which gives the reader an understanding of the many roles secondary products play in nature (a protective function, both past and present, may be the *raison d'être* for most of them) and in applications in such fields as agriculture and medicine. The possible significance of secondary products in plants and the control of secondary metabolism are discussed by E. A. Bell and M. Luckner respectively. Regulatory mechanisms have been studied very little for secondary metabolites, but Luckner has done a thorough job of presenting selected data from bacteria, fungi, and higher plants that show how the formation of different types of secondary products may be controlled. There are, in addition, five chapters each on alkaloids and isoprenoids and single chapters on plant phenolics, nonprotein amino acids, amines, cyanogenic glycosides, glucosinolates, betalaines, carbohydrates, and plant lipids of taxonomic significance—enough to whet the appetite of any plant scientist.

All the chapters are quite readable. Most of the chapters on alkaloids have been written by organic chemists (the one exception is a chapter on isoprenoid alkaloids by J. G. Roddick, who is a biologist). As a result they are chemically oriented, discussing alkaloids as derivatives of a particular amino acid, with emphasis on biosynthetic pathways, and have considerably less treatment of biology than biological scientists would have desired. The other chapters present more general information on such topics as distribution, localization, isolation, characterization, and quantitative measurement and offer some speculation on function. The book could have been im-

proved tremendously if each chapter had had a section on environmental influences and catabolism of secondary natural products. The old belief that secondary natural products are inert end products of plant metabolism is erroneous; they undergo a variety of degradations, some at appreciable rates.

Some 99 of the book's 676 pages are devoted to author, species, and subject indexes. The book is amply illustrated with many structures; unfortunately a few are incorrect. The literature coverage generally extends only through 1977, with the latest references dated 1978.

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Symbiosis

Cellular Interactions in Symbiosis and Parasitism. Papers from a colloquium, Columbus, Ohio, Sept. 1978. CLAYTON B. COOK, PETER W. PAPPAS, and EMANUEL D. RUDOLPH, Eds. Ohio State University Press, Columbus, 1980. xiv, 306 pp., illus. \$25. *Ohio State University Biosciences Colloquia*, No. 5.

Particular aspects of lichens, malaria parasites, cestodes, trypanosomes, mycorrhizas, and algal-invertebrate associations are covered in this book. The individual contributions, which focus on the cellular aspects of symbiotic and parasitic interactions, deal with four general themes: initiation and establishment of relationships, cellular mechanisms for nutrient uptake and translocation, defense mechanisms of host cells, and genetic and metabolic integration. For the most part the papers are written in such a way as to facilitate comparison of the relationships between partners in various host-symbiont or host-parasite systems and comparison of the techniques that have been used to elucidate them. The candor of many of the contributors in describing the limitations of the methodologies and the gaps in present knowledge will make their chapters excellent points of departure for new research.

A number of papers are particularly noteworthy. A paper by Aikawa, for example, is a gem. He assumes that the reader has little or no familiarity with *Plasmodium*, the malaria parasite. After describing the parasite he analyzes the evidence for recognition sites on the parasite and the process of invagination of the erythrocyte membrane, leaving the reader with little doubt that this aspect of malaria is fairly well understood.