

## Book Reviews

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## BOOK REVIEWS

*Biological Applications of Photochemical Switches*. Edited by HARRY MORRISON. John Wiley & Sons, 605 Third Avenue, New York, NY 10158. 1993. ix + 316 pp. 15.5 × 23 cm. \$59.95. ISBN 0-471-57293-4.

This is the second volume in the Wiley Series in Bioorganic Photochemistry. Like its predecessor, which dealt with the photochemistry associated with nucleic acids, the current volume consists of five chapters by authors who have been leading contributors to this rapidly developing field. While mention is made of important light-triggered biological processes, the focus of this book is on artificial, as opposed to natural, processes.

The first and longest chapter provides an overview of the field including the necessary operational definitions and conceptual basis. Included is a review of the photochemistry of several classes of molecules which undergo reversible photoisomerization and of molecules in which an active functional group can be liberated by photochemical removal of a protecting group. These two classes of molecules are respectively employed in the design of multi-cycle and single-cycle photoswitchable systems. This chapter serves as an excellent introduction for both the biologist seeking a background in organic photochemistry and for the photochemist seeking a background in biomaterials.

The four subsequent chapters each deal with a single topic. The second chapter describes photoprocesses (isomerization, fragmentation, polymerization, etc.) which occur in bilayer membranes and the effect of these processes on membrane properties. Increased membrane permeability is of practical importance in the design of photoactivated systems for delivery of therapeutic agents. The third chapter deals with the photomodulated binding and transport of metal ions. Synthetic organic chemistry occupies the spotlight in this chapter as the design and function of photoresponsive chelating agents is discussed. Particularly intriguing are the molecules which incorporate crown ethers with azo or spiropyran switches. In the fourth chapter the reversible and irreversible photoactivation of enzymes is presented. The approach in this chapter is that of the mechanistic chemist. The mechanisms of enzyme action and the photochemical reactions employed to regulate enzyme activity are presented in detail. The highlight of this chapter is the description of the changes which occur during photolysis in the active site of chymotrypsin acylated with a photocleavable cinnamate as revealed by X-ray diffraction. The final chapter describes the photochemical liberation of nucleotides and neurotransmitters from caged (protected) precursors. The emphasis is on the preparation and photochemistry of the caged precursors. Experimental considerations are more prominent than is the case in the earlier chapters. While this information will be useful to those seeking to apply these methods, the general reader will find the concluding section of this chapter, which describes several interesting biological examples, to be the most interesting.

I concluded a review of the first volume in this series with the statement: "The appearance of additional volumes in this series can be anticipated with pleasure by the broad audience for which the series is intended." The present volume has lived up to this advance billing.

FREDERICK D. LEWIS, *Northwestern University*

*Phytochemical Dictionary*. Edited by JEFFREY B. HARBORNE and HERBERT BAXTER. Taylor & Francis, 1900 Frost Road, Suite 101, Bristol, PA 19007-1598. 1993. viii + 791 pp. 20.5 × 29.5 cm. \$350.00. ISBN 0-85066-736-4.

The purpose of this Dictionary is to provide a chemical index on the most widely encountered plant constituents that have been demonstrated to have biological activity or economic value. Each compound is listed by its generally accepted trivial or systematic name and synonyms are included. Information provided for each entry includes the major plant sources, chemical structure with stereochemistry, molecular weight and formula, biological activity, and human use. The entries are arranged into five major divisions, namely, Carbohydrates and Lipids, Nitrogen-containing Compounds (excluding alkaloids), Alkaloids, Phenolics, and Terpenoids. Within each division, compounds are grouped together into chapters according to natural product classes.

A major problem with this book is the omission of primary references. The book has the subtitle *A Handbook of Bioactive Compounds from Plants*, and one would assume, at the very least, primary references would be given for the bioactivity information. The editors state in the introduction that primary references are accessible in other reference works such as *Dictionary of Organic Compounds* or through *Chemical Abstracts*.

It is my opinion that if one is going to have to use these sources to get to the primary references, one might as well start with them and not bother with this Dictionary.

In recent years there has been an explosion in the number of new compounds isolated from nature, and the literature is burgeoning with reports of bioactivity studies for both new and previously isolated natural products. It would be an impossible task to accommodate this wealth of information in a single volume such as this Dictionary. In addition, without yearly supplements the Dictionary will rapidly go out of date; consequently, from the researcher's point of view this book would not provide any substantial assistance. I do not recommend purchase of this book either by individuals or by libraries.

JAMES E. ROBBERS, *Purdue University*