

Book Reviews

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BOOK REVIEWS

Organic Reactions, Volume 41. Edited by L.A. PAQUETTE. John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1992. xvii+645 pp. 15×22.5 cm. \$90.00. ISBN 0-471-54409-4.

After forty invaluable contributions, one does not need to belabor the importance and the utility of *Organic Reactions* to practicing chemists. This latest volume presents two timely and comprehensive reviews which will be well received.

The first chapter, written by Tomas Hudlicky, Rulin Fan, Josephine W. Reed, and Kumar G. Gadamasetti, is entitled "Divinylcyclopropane-cycloheptadiene Rearrangement" and covers work published prior to 1991. This well-written review details the scope and limitations of using Cope rearrangements for the preparation of seven-membered rings, the application of this methodology to natural product synthesis, and the rearrangement of divinylloxiranes, divinylaziridines, and divinylthiiranes for the preparation of seven-membered ring heterocycles. Particularly noteworthy is the number of unpublished results incorporated in this chapter.

The second survey, "Organocopper Reagents: Substitution, Conjugate Addition, Carbo/Metallocupration, and Other Reactions," was written by Bruce H. Lipshutz and Saumitra Sengupta. This authoritative, timely, definitive work fills the void left since earlier reviews in this series [G.H. Posner, *Org. React.*, **19**, 1 (1972); G.H. Posner, *Org. React.*, **22**, 25 (1975)]. The scope and limitations of copper-catalyzed reactions of RMgX, lower-order lithio organocuprates, higher-order organocuprates, and other organocopper species are covered in the space of 496 pages encompassing more than 1700 references. My only disappointment with this easy-to-read survey is the unnecessary inclusion of a brief sampling (five pages) devoted to synthetic applications of organocopper-organocuprate reagents. Given the explosive growth of the use of organocuprate reagents, it is not inconceivable that in time even this masterfully written review will require updating.

In conclusion, these two scholarly chapters will be well received by the scientific community and represent excellent additions to this series.

G.F. MAJETICH, *The University of Georgia*

The Biochemistry of the Nucleic Acids, 11th Edition. R.L.P. ADAMS, J.T. KNOWLER, AND D.P. LEADER. Chapman and Hall, 29 West 35th Street, New York, NY 10001. 1992. xxii+675 pp. 19×24.5 cm. \$95.00 (HB), \$45.00 (PB). ISBN 0-412-46030-0 (HB), 0-412-39940-7 (PB).

The first edition of this long-established book appeared in 1950 under the authorship of the late Professor J.N. Davidson. Over the last twenty years, systematic revisions and new authors have maintained its contemporaneity without major change in its character or objectives.

The book is written for advanced undergraduates or younger graduates in biochemistry. It provides a major expansion of the coverage of nucleic acids such as is found in modern biochemistry students texts. The volume thus aims to occupy the ground between other works that concentrate on the chemistry of nucleic acids or on more genetic approaches. It succeeds in that objective rather well, although its layout and black-and-white illustrations are not quite up to the quality that might generally be expected today.

This 11th edition is said to be over 60% rewritten, though the vast majority of the figures remain unchanged. It is certainly some 25% longer than its predecessor, and the major part of this increase is given to an expanded treatment of the control of DNA transcription and processing of mRNA, which is now split into two chapters. In addition, coverage of DNA replication has been updated and there is a sizeable growth in the sections on RNA biosynthesis. The copious references, a strong feature of this book, have been updated into early 1991 when the manuscript was completed.

The volume does not really live up to its claim to give "a detailed and accessible account of all aspects of nucleic acids." In consequence, it is less than the ideal book to put into the hands of natural product chemists. They will find in it little that deals with modern structures (no diagram or cartoon of left-handed, Z-DNA) or structural techniques (nmr receives only a passing mention), they will locate just 1½ pages on DNA synthesis, they will be frustrated by its inattention to stereochemistry (typically, Figure 12.11 provides a stereodiagram of aminoacyl *t*-RNA having an achiral amino acid bonded to L-ribofuranosyl adenine), and they will bemoan its thinness on chemical perception (e.g., the failure to identify the vital

difference between hard and soft alkylating agents as mutagen/carcinogens) and accuracy [acyclovir is described in the text as "9-(2-hydroxymethyl)-guanine"]. The significant contribution of a wide range of natural products to nucleic acids studies, e.g., nucleoside analogues, groove binding agents, intercalators, strand-breaking agents, etc., is collated in three tables in an Appendix.

In conclusion one has to say that, notwithstanding its thorough update, this volume remains a biochemist's book of nucleic acids.

G.M. BLACKBURN, *Sheffield University*

The Chemistry of Organophosphorus Compounds. Edited by FRANK R. HARTLEY. John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1992. xiv+647 pp. 15×23 cm. \$360.00. ISBN 0471-93056-3.

This is the second volume to be published in the planned 4-volume treatment of organophosphorus compounds in the extensive Patai series, *The Chemistry of Functional Groups*. The sole subject of this volume is the chemistry of the oxides and other chalcogenides (S, Se, Te) of phosphines of general formula $R_3P=Chal$ as well as $R_2HP=Chal$. Most of the book is concerned with the tertiary phosphine oxides, however, which are the better known members of the family. The treatment of the subject is not limited to the $P=Chal$ bond as a functional group but includes consideration of synthetic methods for molecules that contain this functional group, as well as the influences of the group on general chemical properties. This approach makes the volume of considerable value, as it contains a wealth of information on a broad range of organic structures containing the $P=Chal$ group. Organic and medicinal chemists would especially profit from reading the lengthy (120 pages) and well-constructed chapter by R.S. Edmundson on chemical properties and reactions of phosphine chalcogenides, which clearly reveals the fascinating array of organic frameworks, many heterocyclic, now being examined in this area of phosphorus chemistry. The stereochemical consequences of installing $P=Chal$ groups in carbon frameworks, both cyclic and non-cyclic, are of equal importance to such readers, and are admirably covered by M.J. Gallagher in a separate chapter.

The volume begins, appropriately, with a detailed yet quite readable treatment by D.G. Gilheany of the historical development of the theory of bonding in the phosphine chalcogenides and covers the most recent views of this important and still unsettled subject. The discussion of current ideas on bonding of the phosphoryl group would be pertinent to phosphates as well and thus would be of value to the biochemical community. No treatment of the interaction between aryl and other unsaturated groups with the $P=Chal$ group is given; very important consequences arise from this interaction, and organic chemists might have welcomed inclusion of such a discussion. The notion that phosphorus d-orbitals are involved in the back-bonding in $P=Chal$ groups is discredited in this chapter, leading one to suppose that these orbitals would not be of significance in the interaction with unsaturated carbon groups. However, authors in other chapters do make use of explanations based on d-orbitals, and the subject is left unclarified.

Another strong component of the book is the coverage of methods of preparation of phosphine chalcogenides by A.K. Bhattacharya and N.K. Roy. This too will be of significant value to organic and medicinal chemists. Readers should be aware, however, that more than an allowable number of non-trivial technical problems (incorrect structures, equations, and statements on the literature) were detected, which detracts from this chapter.

The chapter "Spectroscopy of Phosphine Chalcogenides" (G. Davidson) is written in terse, compact style, especially in the nmr section; it is more a compilation of references than a discussion and integration of the knowledge in this critically important area. It will be difficult for someone wishing to learn something of the field to attempt it with this type of presentation. The treatment of ^{13}C nmr is typical; the presentation of data in 30 references is given in 1.5 pages. The literature, of course, contains many more references than that, and the treatment of the very valuable stereochemical influence on ^{13}C chemical shifts and on ^{31}P coupling with ^{13}C , both widely used to determine structure, is left largely unmentioned. In the treatment of ^{31}P nmr, there are numerous instances of the use of a positive sign for shifts upfield of H_3PO_4 (which was the practice up to the late 1970s) and of the same sign for downfield shifts, the current practice, with no mention anywhere of this change in convention. Anyone trying to make sense out of the shift data in this chapter faces a serious challenge. It also is regrettable that it was not possible to make the reader aware of the extremely valuable and extensive compilation of ^{31}P nmr data of Tebby (CRC Press, 1991).

Other chapters on special topics include one by M. Dankowski on photochemistry and one by T.S. Lobana on coordination chemistry; they provide valuable and accurate accounts of research in these areas. On the other hand, the chapter "Electrochemistry of Organophosphorus (V) Compounds" by K.S.V. Santhanam is out of place in this book. The subject is of interest and is handled well, but there is not enough information about phosphine chalcogenides to justify a full chapter on this subject. Of its 60 pages only about two are devoted to the phosphine chalcogenides; the treatment goes on to include phosphates and the

families of phosphazenes, phosphorus-bridged metallics, and phosphonium salts, which adds unnecessarily to the cost of the book.

On the whole, the book is a valuable addition to the organophosphorus literature, although as noted there is the probably inevitable spread in styles and in quality of the presentations. The subject of phosphine chalcogenide chemistry and its extensive literature is certainly well covered, and the book is an important member of the series on Organophosphorus Chemistry being edited by F.R. Hartley.

LOUIS D. QUIN, *University of Massachusetts*

Plant Polyphenols. Edited by RICHARD J. HEMINGWAY and PETER E. LAKS. Plenum Press, 233 Spring Street, New York, NY 10013. 1992. xii+1053 pp. 16.5×25 cm. \$195.00. ISBN 0-306-44252-3.

The book is basically a collection of papers presented at the 2nd North American Tannin Conference held in Houghton, Michigan in June 1991. After a brief introductory section, which is primarily the talk presented by Dr. David G. Roux, the recipient of the 2nd North American Tannin Conference Award, the remainder is organized into sections dealing with the major topics of concern with tannins: Biogenesis and Synthesis, Chemical Properties, Biological Significance, and Commercial Significance. Although this book, in general, will have limited interest to most natural product chemists because of its concentration on tannins, there are some papers which may be of specific interest to individual researchers. For example, within the section on Biogenesis and Synthesis are papers on the biosynthesis of flavonoids and stereoselectivity in the biosynthesis of phenylpropanoids which cover some of the recent progress in these areas. Also in this section are papers on stereoselective oxygenation and enantioselective synthesis of flavonoids. The Chemical Properties section includes several papers on nmr techniques and correlations which should be of interest to researchers working with flavonoid-type natural products. The Biological Significance section incorporates papers which cover the various types of biological activities exhibited by tannins including antimicrobial activity, antitumor activity, and anti-infectious activity. These papers may prove useful to other researchers seeking to explain activity of certain polar plant constituents in a bioassay. The last section, on Commercial Significance, helps explain to many natural product chemists who routinely avoid tannins, why tannins are important on an industrial basis. The book's limited interest to most readers coupled with the relatively high price will make it difficult for individuals to justify its purchase or to recommend it to the majority of libraries given the present state of acquisition budgets for most libraries.

ALBERT T. SNEDEN, *Virginia Commonwealth University*

Dictionary of Indian Medicinal Plants. AKHTAR HUSAIN, O.P. VIRMANI, S.P. POPLI, L.N. MISRA, M.M. GUPTA, G.N. SRIVASTAVA, Z. ABRAHAM, and A.K. SINGH. Central Institute of Medicinal and Aromatic Plants, P.O. Bag No. 1, RSM Nagar, Lucknow 226016, India. 1992. 546 pp. 15.5×23.5 cm. \$80.00.

In the preface of *Dictionary of Indian Medicinal Plants*, the authors note that it has been more than 25 years since the publication of *Glossary of Indian Medicinal Plants* (Chopra *et al.*), and a complete modern reference did not exist. The book that they have produced seems to have gone a long way toward rectifying that problem. This volume provides entries for more than 1000 medicinal plants of India arranged alphabetically by genus and species. For each species entry, the name and common synonyms are listed, followed by known vernacular names from the various geographic regions of India along with notes on distribution. This is followed by sections on documented medicinal uses, biological activity, and chemical constituents with all information carefully tied to a final section of references for each species. The alphabetical entries for each species are followed by a list of abbreviations, a list of books referred to, and an index to botanical names, which is unnecessary, except for names placed in synonymy, as the text is already alphabetically arranged.

There is an enormous amount of carefully compiled data in this reference. The botanical nomenclature appears to have been checked against recent publications and reflects the currently accepted names for the plants included, which unfortunately is not often the case with works of this type. The principal difficulty with this book is that it is not cross-indexed in any way and information is only retrievable by plant name. Readers interested in those plants with a particular therapeutic use, biological activity, or active principle would have to check all entries.

The authors were correct in noting in the preface, dated 30 June 1988, that a modern reference to Indian medicinal plants was very badly needed. In 1991, Jain and DeFilipps published *Medicinal Plants of India*, and while this second text concentrates on the ethnobotanical uses and lacks the carefully compiled chemical

data, it is carefully cross-indexed by medicinal uses and vernacular names. It thus is an excellent index of Indian medicinal plants by medical use. The two volumes together simplify the search for plants and their biotically active components within specific therapeutic areas and provide access to a large number of species from the rich Indian flora. The flora of the Indian subcontinent numbers about 15,000 species and is the primary source of medical care for a majority of the population of India. Of the slightly more than 1000 species included in the dictionary, many are not native to India but rather are introduced weeds or widely cultivated species. Because of the large number of widespread taxa that are included, the utility of the book is not restricted to India but should be of value to anyone with interest in tropical medicinal plants.

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