

and white. It is not always clear that all the ethnobotanical information is derived from the island, but I assume so.

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Monosaccharide Sugars: Chemical Synthesis by Chain Elongation, Degradation and Epimerization. By Z. Györgydeák and I. F. Pelyvás. (Lajos Kossuth University, Debrecen, Hungary). Academic Press, San Diego, CA. 1998. xviii + 508 pp. 15 × 22.5 cm. \$89.95. ISBN 0-12-550360-1.

Monosaccharide Sugars in an extensive compilation of new developments in the growing field of modern synthetic monosaccharide chemistry drawn together in the form of a textbook and offering a summary of the synthetic manipulation of monosaccharides in all three categories: elongation, degradation, and epimerization. The novelty of this book is that it is written from the perspective of a synthetic organic chemist using naturally occurring, inexpensive starting materials in organic synthesis, and it covers all three title transformations. The volume emphasizes experimental details for all published literature, including that from non-English-speaking countries, which is difficult to obtain for many carbohydrate chemists.

The Foreword, written by the late Professor Sir Derek H. R. Barton, introduces the reader to the importance of modern aspects of synthetic carbohydrate chemistry. Specific reference is also given to "chiral synthons" and their usefulness in synthetic carbohydrate chemistry. The short, two-page Introduction outlines the purpose and goals of the volume and justifies the selection of all three areas of synthetic manipulation. The first chapter deals with "Ascending Synthesis of Monosaccharides" and is broken into two subchapters, "Buildup with Total Synthesis" and "Buildup of Sugars with Ascending Synthesis", which are discussed in seven sections. The first subchapter concentrates on cyanohydrin synthesis (Kiliani-Fischer synthesis) and offers an excellent tabular summary of starting saccharides and reaction products. It concludes with 119 important references. The second subchapter discusses "Miscellaneous Methods for Extension of the Monosaccharide Chain" and is divided into 12 sections. Grignard reagents and organolithium, organotin, organoboron, and organosilicon reagents are discussed there. The aldol condensation, hydroformylation of glycals, chain extension of aldehyde sugars with thiazole, furan, pyrrole, and the Reformatsky reaction are also covered in detail in these sections. Additionally, ascending syntheses with aldehyde saccharides, sulfonic acid esters, and nitrogen-containing saccharides are reported. Each section extensively discusses all the methods, concluding with broad, up-to-date references (470). Additionally, selected experimental procedures are included in each section, beginning in the first subchapter. This particular innovation enhances the usefulness of the book as a laboratory handbook and as a quick reference.

Chapter 2 describes "Descending Syntheses of Monosaccharides" and is divided into four subchapters. The first subchapter, entitled "Disulfone Degradation", describes the well-known methodology of dithioacetal oxidation to sulfones followed by descent with a base into an aldose with

a chain shorter by one carbon atom. This subchapter concludes with 31 references. The last subchapter is entitled "Degradation of Saccharides with Oxidative Methods" and consists of six sections. All the oxidative methods including periodate, hypochlorite, peroxide, and lead tetraacetate reactions are discussed here. The last notable section, entitled "Chain Shortening of Saccharides by Means of Photochemical Methods", illustrates the photochemical degradation of sugars, which are divided into two groups: "Light-exposure-induced" and "Metal-ion-catalyzed reactions". References for each section are most recent and up to date.

Chapter 3, entitled "Preparation of Sugars with Isomerization", consists of three informative subchapters. The first subchapter, "Epimerization of Saccharides in Alkaline Media", presents four types of transformation, anomerization, aldose-ketose isomerization, reversible aldol reaction, and β -elimination and concludes with 56 references. The second, short subchapter, entitled "Epimerization of Sugars with Molybdate Ions", provides experimental procedures for the above methodology for the preparation of important monosaccharides such as gulose, talose, lyxose, and ribose. The last subchapter, "Epimerization of Saccharides with Amine Complexes of Transition and Alkaline Earth Metals", provides a general experimental procedure for these transformations and concludes with 24 references.

The Appendix, "Notes Added in Proof", summarizes the most important recent results on monosaccharide synthesis. It covers the literature roughly through June 1997 and is organized according to the respective previous chapter/section numbers. The book concludes with an extensive, 9-page subject index. The organization, unification, and presentation of the material is highly commendable. The book is well-produced, and the written material is free of any obvious errors.

This textbook provides the foundation for a course in synthetic carbohydrate chemistry or in a special topics course, for it introduces students to the newest developments. Thus, the volume is an indispensable reference for lecturers, especially in the emerging new field of modern synthetic carbohydrate chemistry. It should be an essential addition to any institutional library. In addition, the attractive price of the book should convince all scientists and graduate students engaged in research on the chemistry of carbohydrates to purchase it for their personal library.

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Enzymatic Reactions in Organic Media. By A. M. P. Koskinen (University of Oulu) and A. M. Klivanov (Massachusetts Institute of Technology). Blackie Academic & Professional, Glasgow, U.K. 1996. xiii + 314 pp. 15.5 × 23 cm. \$119.00. ISBN 0-7514-0259-1.

Most pharmaceuticals and agrochemicals are more efficient when presented as the enantiomerically correct isomer. During the last decade, dramatic advances have been made in the use of enzymes in nonaqueous media to produce these important biologicals.

This book has assembled significant contributors in the field of nonaqueous enzymology. Each provides an au-

thoritative account of a key area comprehensively covering both theory and practice of enzymatic transformations in nonaqueous media.

Each chapter draws on the minimum of significant work to bring the reader to the current state of the art. A valuable feature of each chapter is the concluding remarks wherein authors outline key areas of research that need further development.

The first chapter sets the stage for the remaining chapters by providing key industrial examples and an analysis of the commercial demand for enantioselective reactions. The second chapter presents and interprets models for selection of nonaqueous solvents and solid supports used in enzymatic transformations. This is followed by chapters describing the effect of nonaqueous media on enzyme conformation and mechanism.

Sih and co-authors provide an excellent review of enantioselective enzymatic hydrolysis and transesterification in nonaqueous media. Particularly interesting is their review of changes in lipase specificity after chemical treatment.

The unique ability of lipases and hydrolases to specifically derivatize one hydroxyl of monosaccharides is discussed. Advances in this field have rendered practical heretofore impractical synthetic procedures producing pre-selected polysaccharides.

The concluding chapters on enzymatic transformation of synthetic interest and peptide synthesis provide both wide-ranging examples and interpretations that will aid the practitioner in selection of a system to meet their needs.

Final chapters deal with the theory and practice of enzymatic transformations on a large scale.

The true value of a book of this thrust is in its potential to aid the student and research scientist in understanding and using the systems discussed. In both regards, the organization and content of this book are right on target.

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Second Supplement to the 2nd Edition of Rodd's Chemistry of Carbon Compounds, Vol. IV, Heterocyclic compounds, Part E. Edited by M. Sainsbury (University of Bath, England). Elsevier Science Limited, Oxford, England. 1997. xiv + 692 pp. 15 × 22.5 cm. \$447.75. ISBN 0-444-827536.

The advertisement for this book promises that it will provide "easy access to a vast amount of data, presented in a concise yet readable form...a detailed index allowing rapid location of reaction types, synthetic procedures or individual compounds". In this reviewer's opinion, comprehensive reviews of the chemical literature should more or less report, summarize, correct, analyze, reinterpret, and extend published research. Reviews that do the latter

three of these are rare and generally found in new and rapidly emerging fields. On the other hand, "reviews" that only report and summarize published research are increasingly more common, and probably unnecessary, due to their ease of compilation from *Chemical Abstracts* by computer search. Structure-, subject-, or compound-driven searches can in a few minutes provide the abstracts and bibliography ready for organization and editing into a review manuscript. Unless the review author critically reads each reference, errors in the original paper may go undetected and any reinterpretation, analysis, and extension of a research field in the review is unlikely.

So what kind of review is this one? Factually it covers six-membered monoheterocyclic compounds containing heteroatoms from Groups IV (Si, Ge, Sn) and VI (O, S, Se, Te) divided into Chapter 20 dealing with oxygen compounds and Chapter 21, which discusses the remaining heteroatoms. This parallels the organization of the original 2nd Edition published in 1977 and the First Supplement published in 1989 except that neither lead nor iodine heterocycles are included (in spite of a subtitle stating that heteroatoms from Group VII are included). The author of these chapters, Professor R. Livingstone, is the same as in the original 2nd Edition and First Supplement. The time period covered by the book is not explicitly stated but references as early as 1982 were noted with most between 1987 and 1994 consistent with a two year publication lag in this series. The preface was written in January 1997.

The book is a collection of one-to-two sentence abstracts, with literature citation, of articles on compounds that fit the organizational scheme, which is solely by structure. The emphasis on synthesis, reactions, or properties varies depending on the point of the original reference (or abstract). Thus, if a series of compounds was prepared for evaluation of their bioactivity, the specific structures are given, but not the method of synthesis.

The index of over 2000 items also is almost solely organized by structure with less than a dozen references to reaction types, procedures, or properties. In contrast to the original Edition, no citations to natural sources were found, although they are promised in the index guide. Neither an author index nor a compiled bibliography is included.

In summary, "easy access" is possible only for specific compounds or classes, and the information provided is exactly that which is easily obtained by computer search of *Chemical Abstracts*. Coverage is limited, but undefined, so a complete literature search will require additional sources. Considering limited library budgets and the hefty price of this book, I could not recommend it to our librarian for purchase.

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