

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  $\beta$ -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-