

Book review

Monosaccharides: Their Chemistry and Their Roles in Natural Products

Peter M. Collins and Robin J. Ferrier. John Wiley & Sons, Chichester, and New York, 1995, ISBN 0 471 95343 1, paperback, xix + 574pp, UK £27.50/US \$55.00

This book is a completely revised and updated version of the authors' 1972 book *Monosaccharide Chemistry*, (Penguin), which has long been out of print. Its appearance will be greatly welcomed by both instructors and students, for whom an affordable text that provides an in-depth treatment of the chemistry of sugars from the interpretive viewpoint of modern organic chemistry has been notably lacking.

In its eight chapters the book develops the structural fundamentals of stereochemistry, cyclic forms, and conformation, and then deals in turn with chemical reactions at the anomeric center, at non-anomeric carbon atoms, and at the hydroxyl groups. Short chapters follow on the chemical synthesis of oligosaccharides, and the synthesis of enantiomerically pure non-carbohydrate compounds from monosaccharides. A chapter on natural products related to and containing monosaccharides deals in an overview manner with di- and oligo-saccharides, polysaccharides, glycoconjugates, natural glycosides, glycosylamines, C-glycosyl compounds, and cyclitols. A series of appendixes deal with the literature and nomenclature of the subject, give tabulated data for selected compounds, and discuss the polarimetry of sugars. There is both a general subject index and an index of compounds. Original literature references, from which author names are omitted, are given at the end of each chapter, and total over 1000 citations.

The book is directed to the student or scientist familiar with modern organic chemistry, and the authors present much of the subject material from

an interpretive and mechanistic viewpoint rather than the descriptive approach that characterizes many older texts. This reviewer used the book as a class text for a course on carbohydrates offered to graduate students and advanced undergraduates. Those students whose primary background was in organic chemistry responded warmly and enthusiastically to the book, while biochemistry majors seeking to comprehend the fundamentals of sugar chemistry found themselves somewhat overwhelmed by the heavy emphasis on mechanisms and reactions.

As the title indicates, the emphasis is on the chemistry of monosaccharides, and some 90% of the text is devoted to what is essentially a portrayal of modern general organic chemistry with monosaccharides as model systems. The references are well chosen, with extensive citations of recent research papers interspersed with seminal papers from the early literature and well chosen review articles, and there is good balance of subject material throughout the book. Early work that was presented in essentially descriptive manner in the original articles has been interpreted by the authors in current terms that will be appreciated by today's students of organic chemistry.

The 60 pages devoted to complex saccharides serve only as an outline leading to the vast literature on this aspect, but the references are well selected to lead the reader to in-depth reviews and original articles, and the text itself effectively develops, within the limited amount of space allocated, important aspects of structure, structural methodology, conformational analysis, and biological function.

The book is well produced, with clear text and an abundance of structural formulas and flow charts drawn with excellent uniformity of presentation. The authors make intelligent use of conformational formulas, Haworth projections, and even the traditional Fischer formulas, as appropriate for illustrating the points under discussion. Errors of fact are very few, and typographical errors negligible.

This book meets a long unfulfilled need for an accessible text that presents the chemistry of sugars in the language of today's organic chemistry and without the mystique, arcane specialization, or naive misinterpretation that is to be found in some

other attempts to provide an introductory text to the carbohydrate field. The volume is priced at a reasonable level for purchase by the student or professional chemist, and it can be highly recommended for both the advanced student of organic chemistry and the "mainstream" organic chemist who wishes to become knowledgeable on the intricacies of the chemistry of these multifunctional molecules without having first to digest a vast body of older, descriptive material.

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