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Book review

Advances in Carbohydrate Chemistry and Biochemistry: Volume 38, edited by R. STUART TIPSON AND DEREK HORTON, Academic Press, New York and London, 1981, xi + 529 pages + Author and Subject Indexes, $64.00.

This volume begins with a biographical tribute by H. S. El Khadem to the Swiss sugar-chemist Emil Hardegger. Basically a sound organic chemist, he made many contributions to saccharide chemistry, including an elegant synthesis of muscarine. Perhaps less well recognized than he might have been, his many publications, including Ph.D. dissertations written under his supervision, are listed.

Carbon-13 nuclear magnetic resonance (n.m.r.) spectroscopy has assumed an important role in the elucidation of polysaccharide structure and conformation. Therefore, P. A. J. Gorin's article thereon is timely, although, in a rapidly developing field, it contains referencing only up to the end of 1978. The chapter is essentially in two parts. The first part outlines the information that can be obtained from the spectrometer (chemical shifts, and ^{13}C–^{1}H and ^{13}C–^{31}P coupling), and describes the fundamental methodology of signal assignment. The dynamic mode of operation of the spectrometer is also mentioned. In the second part, most of the proton-decoupled, ^{13}C-n.m.r. spectra of polysaccharides that have been published since 1971 have been illustrated, and the essential detail in each is discussed.

R. W. Binkley has produced a comprehensive and authoritative chapter on the photochemical reactions of carbohydrates that is a much needed update of previous reviews. Although it is oriented to the chemist, the reactions being indexed under functional groups, this article will prove to be invaluable to researchers in all related disciplines. The mechanisms of these photochemical transformations are also discussed in detail.

A. A. E. Penglis has provided the first comprehensive treatment devoted entirely to fluorinated carbohydrates; this, also, is chemically oriented. All of the different methods of introducing fluorine into saccharides are discussed, together with the physical methods used in determining the structures of the products. Biological aspects of fluorinated sugars are only briefly touched upon.

A third chemically oriented chapter, by T. C. Crawford, provides a highly detailed and specialized account of the structure, synthesis, reactions, and derivatives of the gulono-1,4-lactones. This comprehensive article covers all aspects of the chemistry related to the lactone moiety and the hydroxyl groups of these lactones.

F. M. Unger contributes an excellent and much needed discussion of the 3-deoxy-D-*manno*-2-octulosonic acid (KDO) molecule, a molecule that is critically important in the biosynthesis of the lipopolysaccharide O-chains of Gram-negative bacteria, and the article covers its assay, synthesis, and structural elucidation. Con-

siderable attention is focused on the need to make definitive, anomeric configurational assignments for the KDO residues in polymeric substances. Authoritative sections on KDO metabolism, and inhibitors of this metabolism, are also included in this chapter.

The application of standard, methylation techniques to the specialized study of the structural analysis of glycoproteins and glycolipids is thoroughly treated by H. Rauvala, J. Finne, T. Krusius, J. Kärkkäinen, and J. Järnefelt.

The final chapter, by G. A. Jeffrey and M. Sundaralingam, is one of a continuing series of articles surveying crystal-structural work on carbohydrates and nucleosides. The structures are presented in an easily comprehended, pictorial format, but the indexing of the chapter is extremely brief. In consequence of this, a page-by-page perusal of the chapter is needed, in order that the reader may find the compounds listed.

This issue of *Advances* follows in the tradition of all previous issues, being a well balanced mix of new material and valuable updates of previous chapters. As with the other volumes, it will prove to be invaluable to both the professional scientist and the research student, although the latter may find purchase of a personal copy difficult.

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