

aware of the inherent dangers and pitfalls, such as the frailty of micro-organisms and the chances for altered genotypes. A somewhat speculative paper on xanthan biosynthesis is included. The reader not very familiar with the field of commercially useful, bacterial polysaccharides might have wanted the inclusion of more information on the polysaccharide from *Methylobacter* — certainly, this reviewer did.

The next seven chapters deal with the physical chemistry of polysaccharides and with their conformational structures. They do so lucidly and concisely.

Following that, two chapters are devoted to the chemical structure of xanthan gum. The first of these deals with acetolysis as a tool for structural elucidation; although the article is adequate, this method is well known and needed no defence here. In this section, this reviewer would have appreciated a discussion of the work by Lindberg's group on the structure of xanthan gum.

The last part of the book (seven chapters) covers the industrial uses of xanthan gum and other polysaccharides.

All in all, this is an excellent collection of papers with up-to-date references, and the editors are to be congratulated on the organization of the monograph. All chemists interested in polysaccharides, be it as food additives or as aids in other, more exotic, industrial applications (such as oil recovery), will find this book an essential tool.

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Synthetic Methods for Carbohydrates: edited by HASSAN S. EL KHADEM, ACS Symposium Series 39, American Chemical Society, Washington, D.C., 1977, ix + 285 pages, \$19.50.

The vigor and breadth of modern research on organic synthesis with and of sugars are limned in this volume, which records the proceedings of an excellent symposium organized by Professor El Khadem at the centennial meeting of the American Chemical Society held in New York in April, 1976. The papers may be grouped, somewhat arbitrarily, in three categories. In the first category are reports of work, new at the time, on the chemistry of specific sugar derivatives or specific classes of substituted sugars. In the second, there are descriptions of recent progress on some of the major, classical problems of organic sugar chemistry. In the third group, in addition to presenting recent work, the authors review the fields they have been instrumental in developing.

Outstanding in the first two groups are the contributions of Köster and Dahloff on the novel and very interesting *O*-diethylboryl and *O*-ethylboranediyl sugars; of Horton and Weckerle on the scope and usefulness of the reaction of benzylidene acetals with butyllithium; and of Lemieux and co-workers on the use of 2-deoxy-2-phthalimido- β -D-glucopyranosyl halides in oligosaccharide synthesis. Also noteworthy is the inclusion of a paper on the chemistry of the phenylhydrazones and

osazones. Almost a century after the discovery of these venerable derivatives, questions about the mechanism of their formation persist. Some answers are offered by Simon and Kraus.

Subjects reviewed in the third group of papers include the synthesis of sugars with hetero atoms other than oxygen in their rings (Whistler and Anisuzzaman), heterocycles from the reactions of sugars with β -dicarbonyl compounds (García González *et al.*), chiral products from the reaction of D-glucose with aromatic hydrocarbons in liquid hydrogen fluoride (Micheel *et al.*), and the synthesis of glycolipids from sugars differentially blocked with allyl and benzyl ether groups (Gigg).

An important role of a symposium volume is to serve as an initial reference to the new results described by the speakers, pending the detailed publication of those results. At the time of its appearance, about one year after the original presentation of the papers, this book was useful in this way. But now, as this review appears, much of the content of the volume has found its way into the journal literature. As the book has largely fulfilled its function as a primary source, the chapters with the most residual value are those having, in part, the character of reviews. Individuals and institutions desiring complete collections of works on carbohydrate chemistry might still wish to purchase the book on this basis. It is well edited, carefully produced, and reasonably priced.

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