

# NEW BOOKS

## Advances in Carbohydrate Chemistry, Vol. 8

C. S. HUDSON and M. L. WOLFROM, editors. xvii + 408 pages. Academic Press Inc., 125 East 23rd St., New York 10, N. Y. 1953. \$10.00. Reviewed by HEWITT G. FLETCHER, JR., National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Bethesda, Maryland.

This volume, the last to receive the editorial attention of Claude S. Hudson before his sudden death on December 27, 1952, begins with an obituary of the late Sir James Irvine written by E. L. Hirst. There follows a review entitled "Relative Reactivities of Hydroxyl Groups of Carbohydrates" by J. M. Sugihara which deals not only with selective esterification and etherification (the topics which first came to mind) but also such subjects as acyl migration, anhydride formation, glycol complexes, and oxidation. W. G. Overend and M. Stacey have contributed a chapter on "The Chemistry of the 2-Desoxy-sugars" which, since it deals to a considerable extent with the most important deoxysugar, 2-deoxy-D-ribose, will prove of particular interest to biochemists. R. S. Tipson has reviewed the "Sulfonic Esters of the Carbohydrates" in a very thorough and comprehensive manner. This review of such a broad topic will be of great interest and value to chemists concerned with syntheses in numerous areas of organic chemistry. Furthermore, of all the aspects of carbohydrate chemistry which have not been reviewed in recent years there are few approaching in importance that of the sulfonic esters. We are indeed fortunate that a subject having so many ramifications has been dealt with in such a thoughtful and thoroughly readable fashion. The sulfonic esters of the carbohydrates represent a lode which, while well mined, still contains many valuable nuggets, as witness the recent synthesis of 3-amino-3-deoxy-D-ribose and related substances by B. R. Baker and his coworkers. It is to be expected that the existence of the present review will lead to other, equally important discoveries.

The proof of structure of naturally occurring carbohydrates, particularly the polysaccharides, depends largely upon the existence of partially methylated monosaccharides whose structure is known unequivocally. Information regarding such authentic reference substances and their derivatives is widely spread throughout the literature and the *Advances in Carbohydrate Chemistry* has performed a notable service in reviewing from time to time the known methyl ethers of various sugars. Previous

volumes have included articles on the methyl ethers of glucose, galactose, the aldopentoses, rhamnose and fucose; the present volume contains an excellent description of the methyl ethers of D-mannose by G. O. Aspinwall.

The increased interest shown during the past decade in the uronic acids and particularly D-glucuronic acid is evidenced by a review by C. L. Mehlretter on "The Chemical Synthesis of D-Glucuronic acid and one by H. G. Bray entitled "D-Glucuronic acid in Metabolism." These two contributions together with the monograph by Artz and Osman serve quite well in bringing the chemist or biochemist up to date in this rapidly advancing field.

In the second volume of this series the late C. S. Hudson reviewed the chemistry of the trisaccharide melezitose. At the time this review was written, three features of the melezitose molecule were as yet uncertain and Hudson pointed out that these dubieties could be settled if sucrose, whose structure is known with certainty, could be obtained by the partial hydrolysis of melezitose. Prof. E. J. Hehre has recently accomplished this and his review in the present chapter, "The Substituted-Sucrose Structure of Melezitose," may be construed as the final chapter in the fascinating elucidation of the structure of this trisaccharide.

In conclusion, the present volume shows the high standards which readers have come to expect of this series and emphasizes once again that few fields are more richly endowed with secondary literature than that of carbohydrate chemistry.

### The Metabolism of Algae

G. E. FOGG. ix + 149 pages. Methuen & Company Ltd., London, and John Wiley and Sons, Inc., New York. \$2.00. Reviewed by ROBERT W. KRAUSS, University of Maryland, College Park, Maryland.

Historically the studies of the seven groups of simple green plants, collectively called algae, have been characterized by divergence. Attention to the algae *per se* was primarily the province of descriptive taxonomists. Their major value to physiologists has been their

employment as convenient tools for the investigation of such common biological phenomena as ion absorption and photosynthesis. Chemists have been interested only sporadically in the products of algal metabolism, particularly those of commercial significance. Recently a field of study, comparable in versatility to the discipline of bacteriology, has evolved for the algae. Dr. Fogg's book, written from a background of research at University College, London, is an important contribution to this development.

Subsequent to a general introduction the small volume is organized to treat five major topics in seven chapters. The first two chapters deal with the mechanisms of carbon assimilation by means of photosynthesis or alternative chemotrophy. Nitrogen metabolism from fixation or absorption to protein synthesis is reviewed with emphasis on synthetic mechanisms. Growth factor requirements of certain species are treated briefly. A series of tables included in a chapter concerning the products of algal metabolism provides a ready index to available analytical data. A general discussion of growth and metabolism in the last two chapters serves as a summary of the characteristics which justify "the consideration of the algal type of metabolism as a distinct field of study which has much to contribute to biochemistry and an understanding of the economy of nature."

As the first introduction to the field from such a point of view the book is welcome. It is unfortunate that the author was limited by the brevity required by Methuen's Monograph series. The treatment is not detailed in exposition of the topics covered; nor does it include some areas of extensive research such as inorganic nutrition. Moreover, much space is consumed filling in unknown steps in algal metabolism with reactions established in other organisms. Nevertheless, such a treatment is helpful to many readers and may be justified. The use of the physiological nomenclature of Lwoff, though cumbersome, is sound and serves as a basis for logical discussion of the subject.

The author's excellent comprehension of the problems encountered, and his ability to reduce a complex literature to a minimum of verbiage, should make this volume a useful introduction for both the uninitiated and experienced students. It will prove especially valuable as a syllabus to investigators in allied fields who wish to correlate their data with specific work on the algae.