

sides of the plane of  $R^{\oplus}$  with no further equilibration of the oxygens.<sup>5,6,7</sup> If the step involving the loss of nitrogen is relatively slow, elimination of  $R'CO_2H$  apparently can occur, since in the reaction

(5) S. Winstein and G. C. Robinson, *ibid.*, **80**, 169 (1958).

(6) D. B. Denny, *ibid.*, **77**, 1706 (1955).

(7) In the presence of deuterobenzoic acid, the reaction yielded ester containing no significant amounts of deuterium.

of the nitrosoamide of the methyl ester of alanine, methyl  $\alpha$ -diazopropionate was formed.<sup>8</sup>

(8) Footnote 1a, p. 6013.

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## BOOK REVIEWS

### The Carbohydrates. Chemistry, Biochemistry, Physiology.

Edited by WARD PIGMAN, Department of Biochemistry, University of Alabama Medical Center, Birmingham, Alabama. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1957. xvii + 902 pp. 16 × 23.5 cm. Price, \$20.00.

The present text and reference book represents an exceptionally extensive revision and expansion of "Chemistry of the Carbohydrates," first published in 1948 by Professor Pigman and Dr. R. M. Goepf, Jr. The earlier edition, which was the first extensive general treatise on carbohydrate chemistry in the English language, and which was received enthusiastically by carbohydrate chemists and biochemists, has been brought up to date through 1956 in the current first revision. In contrast to its predecessor, the present text is written by Professor Pigman, also its editor, with the aid of some twenty contributing authors, all active research specialists in some branch of carbohydrate science. In view of the tremendous and rapidly growing literature in this field, this departure gives the present volume greater breadth of scholarship than would be conceivably possible under single authorship. To the editor's credit the divided authorship is completely unobtrusive, and the reader receives a pleasant impression of uniformity and homogeneity on continuing from chapter to chapter through the book, a feeling augmented, perhaps, by the editor's adoption of the new official rules of nomenclature wherever applicable throughout.

The chapter headings in the present volume indicate a generally similar organization to that employed in the earlier edition. The first ten chapters, treating mainly the chemistry of the simple sugars and their derivatives, are revised mainly by expansion to include more recent material. This expansion averages an approximately 23% increase in the number of pages in each of these chapters. The later chapters of the earlier edition, dealing with polysaccharides, have been more extensively changed, and the detailed treatment of starch and cellulose has been abbreviated in favor of more general information regarding plant, bacterial, fungal and animal polysaccharides. In addition, new chapters covering the Identification and Quantitative Determination of Carbohydrates, Photosynthesis and Metabolism of Carbohydrates, and Carbohydrates in Nutrition have been included. Those subjects which now receive more cursory consideration are adequately covered in other monographs, to which reference is always given in the present treatise. In general, frequent references to more detailed treatments help to increase the coverage of the text. The expanded information and scope of the present volume over its predecessor is reflected in an increase in the number of the textual pages from 647 to 817, the pages of author index from 20 to 31 and the number of footnotes from 1834-2994 (representing references to about 4500 individual articles). That the subject index is somewhat less detailed, however, is suggested by its decrease from 80 to 52 pages.

For a text of its size the present volume appears remarkably free from typographical errors. In view of the considerable selection of material from the literature which such a treatise requires, the reader may perhaps disagree occasionally and trivially with the various authors on their emphasis. Similarly, such points as this reviewer found at all objectionable on first reading proved rather unimportant on re-examination in the light of the over-all monumental task of the revision.

Designed as both a textbook and a reference book, this volume fulfills both functions admirably. The general excellence and coverage will ensure its purchase by every practicing organic chemist, biochemist and medical research worker concerned with the chemistry of carbohydrates for a long time to come.

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### Advances in Catalysis and Related Subjects. Volume IX.

Edited by D. D. ELEY, Nottingham, England; W. G. FRANKENBURG, Lancaster, Pennsylvania; and V. I. KOMAREWSKY, Chicago, Illinois. Proceedings of the International Congress on Catalysis, Philadelphia, Pennsylvania, 1956. Edited by ADALBERT FARKAS, Houdry Process Corporation, Marcus Hook, Pennsylvania. Academic Press, Inc., Publishers, 111 Fifth Avenue, New York 3, N. Y., 1957. xviii + 847 pp. 16 × 23.5 cm. Price, \$16.00.

The ninth volume of "Advances in Catalysis" series consists essentially of the papers presented at the International Congress on Catalysis at Philadelphia in 1956. It is thus different in format and content from the preceding eight volumes which consist of reviews and interpretations of selected sections of the massive literature of catalysis. There is no doubt that the material of volume IX belongs in this distinguished series, because the sum total of these papers represents a thorough and modern review of catalysis as the subject was conceived in 1956. This is indeed a worthy climax to the efforts of the late W. G. Frankenburg and V. I. Komarewsky toward bringing together from world wide sources the best thought on catalytic chemistry. Dr. Eley and Dr. Farkas are to be commended for completing this task with no delay after the death of their editorial collaborators.

Many outstanding scientists specializing in catalysis have contributed to this volume. The organizers of the International Congress on Catalysis are to be congratulated not only for assembling this worthwhile program but for consolidating the achievements of the Congress by securing publication of the papers in this useful form.

The 81 papers and the introductions by Hugh S. Taylor and Eric K. Rideal were contributed by 147 scientists from