

POLYETHERS: PART I. POLYALKYLENE OXIDES AND OTHER POLYETHERS, edited by N. G. Gaylord (Interscience Publishers, John Wiley and Sons, Inc., 1963, xiv + 491 pp., \$16).

This book constitutes the first of three parts of Vol. XIII of the High Polymer series. Part III, entitled *Polyalkylene Sulfides and Other Polythioethers*, was published in 1962, and Part II, *Epoxy Resins*, will be published later. Polyethers include those polymers, straight-chain or cyclic, which have carbon-oxygen bonds in the main skeleton but do not include such compounds as vinyl ethers which have ether linkages in the side chains.

Part I, with which this review is concerned, carries on the tradition of excellence established in earlier volumes of this series. Subjects treated in separate chapters of this book include polymers from aldehydes and other carbonyl compounds, polymers from 1,2-epoxides: chemistry, polymers from 1,2-epoxides: application and technology, polymers from 1,3- and higher epoxides, polyurethanes from polyalkylene oxides, and polyacetals and other polyethers. Each chapter is intended as a literature review as well as a summary of the current knowledge of the subject.

Without exception the chapters are well organized, well written, and very readable. Particularly enlightening and enjoyable are Chapters II, VI and VII. In each of these the authors not only summarized existing literature sources but also critically evaluated these sources and moreover drew freely on their own knowledge and experience to present extremely informative reports.

Primary emphasis of this book is upon the chemistry, applications and technology of 1,2-epoxides and their polymers. Chapters III and IV, which deal with these subjects, occupy about 40% of the book and concern themselves largely with ethylene oxide and propylene oxide. In the section of Chapter III dealing with the preparation and properties of the monomeric epoxides, the reader will miss an explanation of the difference in the chemistry of terminal and internal epoxides. Such an explanation would be helpful in explaining the almost exclusive use of terminal epoxides for the formation of polyethers. Furthermore, a few paragraphs concerning the rather specialized analysis of these monomers and polymers would be a welcome addition to this chapter.

The book is equipped with an excellent and detailed Table of Contents, an Author Index, and a rather too brief Subject Index and a List of Trademarks. The latter could be improved by providing it with a page index to enable the reader to find the structure and applications of the trademarked material in the text.

This book is recommended highly to those investigators who have an established interest in the field of polymers and particularly polyethers and who wish to update their knowledge and their literature files. The book will also serve as an excellent introduction and guide for further reading (more than 1400 references to 1961) for those new in the field. Part I will further gain in value with the appearance of Part II.

GERHARD MAERKER
U.S.D.A.
Eastern Regional Research Lab
Philadelphia, Pa.

ADVANCES IN ENZYMOLOGY AND RELATED SUBJECTS OF BIOCHEMISTRY, Vol. 26, edited by F. F. Nord (Interscience Publishers, 453 pp., 1964, \$12.50). The seven chapters comprising this volume have been written by men who have made significant contributions in each of the areas covered. The treatments, on the whole, are not mere authoritative compilations of research papers but rather judiciously integrated studies of the pertinent subject matter. In general, the backgrounds in most of these surveys permit the reader to come away with a reasonably complete picture of the subject.

H. W. Sigelman and S. B. Hendricks cover the discovery, extraction and properties of phytochrome. This amazing

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blue protein is the photoreceptor which is involved in the many red-far red light effects in plants. Enough of the relevant physiological phenomena are discussed to make the significance of this pigment clear.

Victor Ginsburg presents a well-integrated summary of the growing catalog of natural sugar nucleotides, and the biological reactions which utilize these in glycoside formation. Readers will find this chapter useful in learning of the newer developments in poly- and oligosaccharide biosynthesis.

F. B. Straub has contributed a somewhat speculative discussion of the problem of secondary and tertiary structures of proteins touching upon biological activity, denaturation and the ways in which conformational changes might arise.

H. Sund, H. Diekmann and K. Wallenfels present an exhaustive survey (in German) of the surprisingly great number of reactions, both chemical and enzymological, involving pyridine nucleotides. The reactions and spectral properties of the natural and model pyridine nucleotides, as well as those of the pertinent pyridines, are included. The mechanisms of the enzyme reactions in which the nucleotides participate are also discussed.

An extraordinarily interesting concept, that the cell wall is but a single bag-like macromolecule, is developed by W. Weidel and H. Pilzer. The concept is highly stimulating with respect to the relationship connection between enzymes, structural substances and morphology. Written in a light and pleasant style, this chapter, in marshalling support for this concept, presents the modern chemical and electron microscopic developments in the knowledge of this bacterial cell wall. Those who have not recently studied in this field will be pleasantly surprised by the advances in this area.

K. Bernhauser, O. Miller and F. Wagner review the recent advances in the metabolism and complex chemistry of vitamin B₁₂ coenzymes, and the mechanism of the apparently diverse enzyme reactions in which they are involved (in German).

The final chapter by Y. Kizara and S. Ochoa integrates the recent and earlier information on the metabolic reactions which involve propionic acid. This subject will be of special interest to those concerned with lipid metabolism, for propionic acid is frequently encountered in the metabolism of fatty acids in animal nutrition, and is, further, the starting point for the biogenesis of the now, not-so-odd, odd-numbered fatty acids.

BERNARD AXELROD
Department of Biochemistry
Purdue University
Lafayette, Ind.

REAGENTS AND REACTIONS FOR QUALITATIVE INORGANIC ANALYSIS: FIFTH REPORT, by P. W. West *et al.* [Butterworths, London, 1964, 88 pp., \$6.50 (International Union of Pure and Applied Chemistry, Analytical Chemistry Division, Commission on Analytical Reactions)].

This volume brings up to date the recommendations for the preferred qualitative tests (mostly spot tests) for most of the metallic elements and for many of the common anions of the nonmetals. Since the preceding reports are all out of print and in any even had only limited distribution in the cases of Reports 3 and 4, the authors of the Fifth Report have included many of the recommended tests from earlier reports. Consequently the Report attempts to be sufficiently comprehensive to be of general utility. To the extent that this aim is accomplished this should be a very useful little book, especially since the authors have taken great pains actually to check the procedures personally for selectivity, sensitivity and general utility. Nevertheless many common metallic elements and common anions are omitted because of "the conclusion that no satisfactory tests for the ions in question have come to the attention of the Commission." These omissions include cerium and all other rare earth elements, cesium, indium, iridium, lanthanum, niobium, osmium, rubidium, scandium, silicon,



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1964. 745 pages. \$25.00

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strontium, tantalum, tellurium, thallium, tin, uranium and yttrium; bromide, bromate, the oxy anions of chlorine, iodate, periodate, sulfate, thiosulfate, selenide, selenate, hypochlorite, azide, all anions of phosphorus except orthophosphate, carbonate and oxalate.

Many of the recommendations made in the earlier reports have been improved. Modifications of procedure to eliminate interferences have increased the selectivity of tests compared to the versions given in the Second Report, e.g., extraction of the antimony-rhodamine B complex away from interferences into benzene, use of thiosulfate to mask interferences in the cobalt-thiocyanate test, use of malonic acid for the same purpose in the copper-rubeanic acid test, of phosphoric acid in the chromotropic acid test for chromate, and of cyanide in the magnesium-Titan yellow test, to name a few.

Errors in the listing of interferences have been corrected; e.g., lithium in the cobaltinitrite test for potassium. In fact the number of interferences listed for many tests in the Fifth Report is substantially less than in the Second Report even when the specified procedure is completely unchanged. This is presumably attributable to the much more thorough survey of interferences carried out by the present authors than had been done before. For the purposes of the Fifth Report the following interferences in binary mixtures were routinely studied for all procedures:

Group I

Li^+ , Na^+ , K^+ , Cu^{2+} , Rb^+ , Ag^+ , Cs^+ , Au^{3+}

Group II

Be^{2+} , Mg^{2+} , Ca^{2+} , Zn^{2+} , Sr^{2+} , Cd^{2+} , Ba^{2+} , Hg^+ , Hg^{2+}

Group III

Bo_2^- , $\text{B}_2\text{O}_7^{2-}$, Al^{3+} , Ga^{3+} , Ce^{3+} , Ce^{4+} , Ti^+

Group IV

Co_3^{2-} , SiO_3^{2-} , Ti^{4+} , GeO_3^{2-} , Zr^{4+} , Sn^{2+} , Sn^{4+} , Pb^{2+} , Th^{4+}

Group V

NH_4^+ , NO_2^- , NO_3^- , $\text{P}_2\text{O}_{10}^{6-}$, HPO_4^{2-} , $\text{P}_2\text{O}_7^{4-}$, VO_2^+ , VO_3^- , As^{3+} , As^{5+} , Sb^{3+} , Sb^{5+} , Bi^{3+}

Group VI

S^{2-} , $\text{S}_2\text{O}_3^{2-}$, SO_3^{2-} , SO_4^{2-} , Cr^{3+} , CrO_4^{2-} , SeO_3^{2-} , SeO_4^{2-} , MoO_4^{2-} , TeO_3^{2-} , TeO_4^{2-} , WO_4^{2-} , UO_2^{2+} , UO_4^{2-}

Group VII

F^- , Cl^- , ClO_3^- , ClO_4^- , Mn^{2+} , MnO_4^- , Br^- , BrO_3^- , I^- , IO_3^- , ReO_4^-

Group VIII

Fe^{2+} , Fe^{3+} , Co^{2+} , Ni^{2+} , Ru^{3+} , Rh^{3+} , Pd^{2+} , Os^{3+} , Ir^{4+} , Pt^{4+}

Miscellaneous substances

CN^- , $\text{Fe}(\text{CN})_6^{4-}$, $\text{Fe}(\text{CN})_6^{3-}$, SCN^- , acetate, oxalate, malonate, EDTA, suc-

inate, tartrate, citrate, sulphosalicylate, formate.

My principal criticism of the Report is the sometimes frustrating lack of detail. The authors have attempted to make the presentation as concise as possible and for this purpose have used a standard format, have devoted one page to each procedure and have reduced description and discussion to the bare minimum. In terms of having a format pleasing to the eye and easy to read they have well accomplished their purpose. In quite a few cases, however, they have accomplished it so well that much desirable information has been left entirely to the imagination. For example, in the thallium nitrate test for chloride ion much of the discussion included in the Second Report would be helpful. Again, in the alizarin S test for fluoride ion it is difficult to see (and there is no discussion to eliminate the difficulty) why phosphate and oxalate (given as interferences in the Second Report) do not interfere with the test. Despite the fact that many abbreviations are used in the descriptions of the tests "as a means of conserving space," lack of space cannot have been the reason for eliminating useful discussion, since of the 80 pages devoted to procedures not more than a dozen come near to being full.

Nevertheless, despite these deficiencies and despite the rather steep price for a volume of this size, it should prove to be a very useful addition to the chemist's library.

The format, typesetting and binding are excellent. Two typographical errors (ClO_3 and Cu^{3+}) were noted on pages 4 and 53, respectively.

A. F. CLIFFORD
Department of Chemistry
Purdue University
West Lafayette, Ind.

Symposium on Food and Heat Treatment Set for Frankfurt

The Second European Symposium, "Food—Recent Developments in Heat Treatment," will be held from March 31 to April 2, 1965 in Frankfurt (Main). It was organized by the Working Party on Food of the European Federation of Chemical Engineering and the Gesellschaft Deutscher Chemiker.

The lectures of this symposium will focus on Physical and Technical Points of View in Heat Transfer and The Influence of Heat on Food.

For further information, write: Gesellschaft Deutscher Chemiker, Wolfgang Fritsche, 6000 Frankfurt (Main), Postfach 9075, Varrentrappstr. 40-42.