Book Reviews

Advances in Carbohydrate Chemistry. vol. 9. M. L. Wolfrom, R. S. Tipson, and E. L. Hirst, Eds. Academic Press, New York, 1954. xviii + 426 pp. Illus. $10.50.

This volume continues the timely and well-documented presentations characteristic of its predecessors. In the first chapter R. U. Lemieux discusses "Some implications in carbohydrate chemistry of theories relating to the mechanisms of replacement reactions." The reactions of *O*-acyl derivatives of sugars, glycosides, and glycosyl halides are described. An attempt is made to generalize the various reactions that these compounds undergo, but the author is careful to point out known exceptions. This chapter will also provide many interesting ideas to those engaged in the synthesis of glycosides.

The chapter on "Alkali-sensitive glycosides," by C. E. Ballou, emphasizes mechanisms proposed for the hydrolysis of glycosides of phenols, enols, and beta-substituted alcohols.

"The 2-hydroxyglycals," by Mary G. Blair, is a brief review of the preparation, proof of structure, and chemical reactions of this series of compounds. A table of the properties of 2-hydroxyglycals and their conversion products is included. This chapter emphasizes that a great deal of work remains to be done in this field.

The chapter on "The methyl ethers of hexuronic acids," by G. O. Aspinall, continues the review of methyl ethers of sugars undertaken in previous volumes.

"The raffinose family of oligosaccharides," by D. French, is a well-written and thoroughly documented account. Following a discussion of the methods useful in oligosaccharide chemistry, the chapter relates the proof of structure of these compounds in order of their increasing complexity.

The inclusion of the chapter on "The conjugates of D-glucuronic acid of animal origin," by R. S. Teague, continues the discussion of these compounds undertaken in volume 8 of this series. Of considerable interest is a treatment of the intermediary metabolism of D-glucuronic acid and its conjugates.

"Paper chromatography of carbohydrates and related compounds," by G. N. Kowkabany, includes a useful correlation of R_f values with structural features. Color reagents, solvents, and methods of quantitative analysis are included. This chapter is probably the most thorough treatment of this subject available.

Other chapters include "Color and turbidity of sugar products," by R. W. Liggett, and V. R. Deitz, and "Carboxymethylcellulose," by J. V. Karabinos and Marjorie Hindert. I highly recommend this volume.

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L'Analyse Spectrale Quantitative par la Flamme. pt. I, Propriétés de la flamme. Réalisation et utilisation; pt. II, Analyse des émissions dans la flamme. R. Mavrodineanu and H. Boiteux. Masson, Paris, 1954. 247 pp. Illus. Cloth, F. 4.300; paper, F. 3.800.

The spectral emission of flames has assumed increasing importance in recent years, both for fundamental studies of combustion processes and for applications to the analysis of mixtures. This book is designed primarily for the analyst who is concerned with the field of flame applications and who is interested in the combustion process as it affects sensitivity and reproducibility of analytic determinations. However, there is an abundance of tabular and graphic information in this book that will interest the investigator of fundamental flame processes as well.

The book is divided into two parts: the first, by Mavrodineanu, covers the properties of flames, regulation of flow rate and pressure, burners, interferences, and photographic and photoelectric measurement of flame emission; the second, by Boiteux, treats the theory of atomic and molecular spectra, spectra of flames of air-acetylene and oxygen, and excitation of elements in the flame. This is followed by an extensive appendix giving tables of wavelengths and band heads observed in air-acetylene and oxygen-acetylene flames, 11 pages of plates showing the spectra of various elements in flames, a bibliography, a subject index, an author index, and table of contents.

The treatment of instruments and techniques is informative but incomplete, particularly with respect to modern flame photometers. Burners used in American flame photometers are mentioned but are not discussed in detail, probably because of the authors' unfamiliarity with this equipment. The theoretical treatment and the considerable amount of factual data are excellent. The serious investigator of flames and their analytic applications will find this book to be a useful contribution.

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The Chemistry of Portland Cement. Robert Herman Bogue. Reinhold, New York, ed. 2, 1955. xix + 793 pp. Illus. $16.50.

The author of this book has achieved well-deserved international eminence as an authority on cement chemistry. From 1924 until his retirement within recent months, he was director of the Portland Cement Association fellowship at the National Bureau of Standards.

The first edition was published in 1947 and filled a gap in the existing literature. This second edition, which follows the same pattern as the first, is still unique in its field. No other book in English provides such a thorough résumé of the research literature. Robert Bogue has not been content to present only the later material but has provided historical perspective throughout. He has been a faithful reporter of the various investigators' material. Indeed, one could wish that he had given the reader more of his own viewpoint. However, the volume of work that has been done by Bogue's own staff is extensive, and accounts of it occupy a significant, although not disproportionate, fraction of the book.

This is primarily a book for the research chemist; but it can be used profitably for reference by the operating chemist and by others also. The initial chapters present an interesting history of the cement industry, a survey of various types of cement, and a concise account of portland cement manufacture. The main content is in three parts: "The chemistry of clinker formation," "The equilibria of clinker components," and "The chemistry of cement utilization."

The new edition has been brought up to date by the incorporation of a large amount of recent material. The number of pages has increased from 572 to 793, but this is partly the result of the use of larger type, a distinct improvement. A better conception of the amount of new material can be gained from the nearly 50-percent increase in literature references. The total is now nearly 1300. Owing to some duplication of references from chapter to chapter, this figure is

larger than the number of independent references, but it is still striking testimony to the industry of the author. The book is truly a comprehensive work and a boon to the literature searcher.

The larger type and other changes in styling have given the volume a distinctly improved and attractive appearance. It is well illustrated.

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La Végétation de Kaniama (Entre-Luishi-Lubilash, Congo Belge). Série Scientifique No. 61. William Mullenders. Institut National pour l'Etude Agronomique de Congo Belge, Brussels, Belgium, 1954. 499 pp. Illus. + plates. Paper, F. 180.

This book presents the results of the botanical part of a detailed pedo-botanical survey of an irregular area of several hundred square kilometers in south-central Belgian Congo. The Braun-Blanquet system of formally named, hierarchically arranged vegetational units is used throughout. Twenty-nine such units are recognized, of which several are "new." As with other treatments in which the units of vegetation are so finely and (to judge from the maps) precisely divided, the status and significance of these units in relation to a larger region are obscure.

The evidence from the area studied is considered to corroborate the view, previously advanced by others, that the extensive savannahs in the Belgian Congo lying between the equatorial forests and the more southern, dry and open forests are anthropic rather than climatic, with fire as a principal factor. Two main climax types, both dense forests of Guinean affinities, are recognized in the area, correlated with the nature of the soil and underlying rock. These forests are now largely destroyed and replaced by savannahs rich in Sudano-Gambesian elements.

Eight hundred sixty-five species of vascular plants are recorded from the area, each represented by one or more collections deposited at the herbarium of the Institut National pour l'Etude Agronomique du Congo Belge, at Yangambi, C.B., and at the Jardin Botanique de l'Etat, Brussels. The identifications have been carefully done, with the help of well-known specialists in some groups.

Mullenders' detailed, thoughtful, and technically competent work provides some of the basic data toward an understanding of the vegetation of tropical Africa.

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Deterioration of Materials. Causes and preventive techniques. A collaboration under the joint auspices of the Service Technical Committee of the Department of Defense (contract No. N7-mr-29127) and the Prevention of Deterioration Center, Division of Chemistry and Chemical Technology, National Academy of Sciences–National Research Council. Glenn A. Greathouse and Carl J. Wessel, Eds. Reinhold, New York, 1954. xvii + 835 pp. Illus. $12.

Deterioration of materials is constantly going on around us, but only when we are faced with the cost of a repair or replacement do we give the matter much thought. That deterioration of materials associated with our daily life and our industries is important is highlighted by the conservative figure of $12 billion, exclusive of foodstuffs, used by the editors of this book in assessing the nation's annual loss.

World War II was instrumental in demonstrating to our government, industry, and men in the armed services the terrific cost potential of deterioration. As a result, attention was focused on the entire problem. Problems of decay, corrosion, water damage, and weathering, which had been present but not extremely acute in our temperate zone, assumed tremendous importance when we were fighting a global war, with men and materiel exposed to all the known extremes of climatic conditions.

In compiling the most up-to-date information on deterioration in one book, the editors hope that it will serve as a guide to those engaged in the handling of materials everywhere as well as stimulate further research in unsolved areas of deterioration. Some of this information has been known for years and has been published in various journals and books, other data are the result of recent research dating from the early 1940's.

Each chapter was prepared by one or more specialists in the field, and the authors are to be complimented on striking a happy balance between condensation and information, while at the same time presenting their material in a readable, logical way. Those interested in a single material or a single aspect of deterioration may feel that too much has been sacrificed for brevity's sake. However, for those who wish to pursue a subject further, a list of literature citations and, in some instances, an additional bibliography included at the end of each chapter will be of great value.

Although it would be unjust to say that any one part or chapter was more important than the others, I wish to call particular attention to those chapters in part I that so clearly set forth some of the factors that bring about deterioration. Solutions to deterioration problems come only through an understanding of those climatic, chemical, physical, and biological factors and an appreciation of their importance.

Part II is concerned with individual materials and their reaction to the several factors of deterioration. In general, the problem of deterioration prevention is somewhat simpler when one deals with individual materials than when several materials are brought together in one unit. Part III describes the deterioration problems and the prevention methods that have been developed for two general classes of assembled units.

The three chapters in part IV deal with quite diverse subjects, but all are important in the over-all field of deterioration. "Dehumidification," the title of Chapter 13, is not particularly informative. The chapter deals with storage of materials in a relatively dry atmosphere. Techniques developed by the U.S. Navy, which is successfully using this preservation method for both ships and warehouse-stored material, are described.

The appendix deserves mention because it gives information on sources and identifying symbols of government specifications.

The editors and authors are to be complimented on gathering this information into one volume. The book should be of value to all who are in any way concerned with deterioration, whether in industry, research, or government service. As one who was associated with packaging of war materiel during World War II, I only wish that such a book had been available in 1942.

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Contributions to the Theory of Partial Differential Equations. L. Bers, S. Bochner, and F. John, Eds. Annals of Mathematics Studies, No. 33. Princeton Univ. Press, Princeton, N.J., 1954. vi + 257 pp. Paper, $4.

In October 1952 a conference on partial differential equations organized and sponsored by the National Academy of Sciences–National Research Council was held at Arden House, Harriman, N.Y. Fifteen papers presented there and subsequently submitted for publication are collected in this volume. Their authors are well-known specialists in the field of partial differential equations connected with various American universities: Bergman, Bers, Bochner, Browder, Diaz, Douglis, John, Lax, Leray, Loewner, Milgram, Morrey, Nirenberg, Protter, and