^{13}C, $[\alpha]_D$, and GLC retention times of their silyl derivatives). The presence of two acetate moieties on the disaccharide in phyllanthoside was determined by ^{13}C, ^{1}H NMR, IR, and mass spectral comparisons of **2** and its methanolysis products, phyllanthocin (**1**) and the dissacharide.

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Supplementary Material Available: A listing of atomic coordinates and thermal parameters for the structure at this stage of refinement (2 pages). Ordering information is given on any current masthead page.

References and Notes

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(3) Roots were collected in Costa Rica in 1974. The authors acknowledge with thanks receipt of the dried plant material from Dr. R. E. Perdue, Jr., U.S. Department of Agriculture, Baltimore, Md., in accordance with the program developed by the National Cancer Institute.

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Book Reviews

Detergency: Theory and Test Methods. Part II. Edited by W. G. CUTLER and R. C. DAVIS (Whirlpool Corp.). Marcel Dekker, Inc., New York, N.Y. 1975. 288 pp. $21.75.

"Detergency", which is Part II of three parts, and Volume 5 of Surfactant Science Series, covers the wetting agent and enzyme field processes as well as bleaches and stain removal in the handling of textiles in a very complete manner. It also describes test methods for damage to fabrics as well as toxicological tests of material used, even to the cleaning of metals as well as textiles.

F. J. McIntyre,
The Columbus Water & Chemical Testing Laboratory

Spectrophotometric Determination of Elements. By ZYGMUNT MARCZENKO (Warsaw Technical University). Wiley/Halsted Press, New York, N.Y. 1976. xi + 643 pp. $55.00.

Classical spectrophotometric methods of analysis continue to enjoy wide use in practical situations and, especially, for routine analysis. Marczenko's book represents a compendium of such methods, arranged alphabetically by element, with a very brief and elementary introduction to spectrophotometric principles and sample pretreatment techniques. The most useful feature of the book is its extensive list of references, many from the Eastern European literature. Unfortunately, the literature coverage ends in 1973. Translation into English appears to have been carefully done, although the reader will note a certain monotony of style. The price of the book seems extraordinarily high; however, workers who wish to have a personal collection of procedures or who do not have access to review articles on the subject may find a single-volume source convenient.

G. A. Rechnitz, *State University of New York—Buffalo*

Encyclopedia of Electrochemistry of the Elements. Volume VI. Edited by A. J. BARD (University of Texas at Austin). Marcel Dekker, Inc., New York, N.Y. 1975. xiv + 431 pp. $64.00.

Dedicated to Klaus J. Vetter, Volume VI of this impressive encyclopedia now brings the coverage to approximately two-thirds of all the elements in the periodic table. There remain yet to appear in future volumes the alkali metals (no. 15), the actinium series (no. 24), and a few elements scattered about the table such as H, N, C, Ag, Hg, Fe, and Mg to name a few. The numbering, of course, refers to a Gmelin-like system as explained in the six-page introduction.

Six of the nine chapters deal with the platinum metals (no. 41) and have all been written by three members of the Institute of Physical Chemistry in Madrid, Spain. Not only does each of these six chapters adhere to the standard format to include the Pourbaix diagram as well as tables of standard potentials, and polarographic behavior of the metal, but also cover in an extensive and informative manner kinetic parameters, double-layer properties, and the copious work that has been done on adsorption and surface electrochemistry. For example, the Pt chapter exhibits a variety of compact tables and the major textual discussions are on Pt polarography–voltammetry, kinetic parameters, double layer properties, adsorption, anodization, and applied Pt electrochemistry.

The same high quality of presentation is consistently evident in the other chapters on these six metals, although the emphasis shifts here and there owing to the different nature of the referenced work, none of which is as extensive as that for Pt, a chapter of 51 pages compared to 14, 17, 14, 22, and 24 pages for the chapters on Ir, Os, Pd, Ru, and Rh, respectively. A total of 494 references in two groups are given for these six metals.

The other three chapters cover group III elements, namely, indium (27 pp, 172 references), aluminum (93 pp, 353 references), and scandium, yttrium, and lanthanides (26 pp, 116 references). That learning rapidly about an unfamiliar element is an important benefit of this encyclopedic approach is readily demonstrated for many readers by the chapter on indium, a chapter which will surprise such a reader as a result of the very large number of entries under polarographic characteristics (6-page table), and this despite only the two oxidation states (+3 and 0). Numerous other ideas are given, ranging from interesting and useful applications of this element to the dependence of electrode irreversibility on the slow dissociation of water from the aquo complex of the indium ion.

The reasons for treating scandium, yttrium, and lanthanides together arise from the similarity of these elements electrochemically (largely the +3 oxidation state) and the scarcity of literature. Only about one and one-half pages of standard potential values are listed in tabular form and most of these are free energy calculations from Latimer rather than direct measurements. Despite the presence of fewer than eight references per element, however, these authors have made an excellent presentation of what is to be had. Most of this is concentrated in polarographic studies (much of that being nonaqueous) and in kinetic parameters and double-layer properties, especially for cerium and europium. The latter is apparently of much interest because the Eu^{3+}/Eu^{2+} standard redox potential in $HClO_4$ is very close to the zero charge potential on Hg.

The monumental task of summarizing the electrochemistry of aluminum has fallen to Paul A. Malachesky, and monumental it is for this work is nearly one third of Volume VI. Aluminum, of course, has a long electrochemical history, not only in terms of discovery but of industrial manufacture. The emphasis has thus been less on polarography, voltammetry, or $E°$ values, though these are admirably reviewed here, but more upon fused-salt electrochemistry and studies pertaining to the anodization processes of commercial interest. The lengthy reference list bears this out in that many citations are from the industrial and patent literature. This chapter is very well written and interesting certainly even to the nonspecialist, particularly because of the numerous diagrams of cells and anodic film structures, for example. There are other absorbing subsections on various topics, e.g., effects of alloying elements, specific types of Al corrosion, color anodizing, etc.

This volume will be a high priority acquisition for college and university libraries and libraries supporting chemical, electrochemical, or catalysis research. The specialist in precious-metal catalysts or electrochemistry will also consider this an important reference work for personal use as will the industrial or academic aluminum scientist.

Bruce B. Graves, *Eastern Michigan University*

Gmelin Handbuch der Anorganischen Chemie. 8 Auflage. Band 34. Borverbindungen, Teil 9: Bor-Halogen-Verbindungen, Teil 1. Prepared by the Gmelin-Institute for Inorganic Chemistry. Springer-Verlag, Berlin–Heidelberg–New York. 1976. x, viii + 332 pp. $273.50.

This volume is the first of two parts specifically on boron–halogen compounds. In this volume general topics include partially halogenated derivatives of BH_3 including their precursors and ether adducts, partially halogenated diboranes, oxyhaloboranes, a general introduction into the chemistry of (organyl) haloboranes, (organyl) dihaloboranes, and (diorganyl) haloboranes. As indicated in the Preface, boron substituents other than halogen are listed first in Chapters 3 to 6 to maintain systematics. Pseudohalogen derivatives are also included in this volume. Literature is covered through 1974 although some recent data are included.

The second volume on boron–halogen compounds will be devoted to trihaloboranes, tetrahaloborate ions, and halogenated boron hydrides containing more than two boron atoms in the molecule. It should also be noted that some specific types of boron compounds bound to a halogen and certain other atoms or moieties may have been covered in earlier "Borverbindugen" volumes. Volumes 3, 4, 5, and 8 also contain references to some haloboron chemistry. The final volume of this series should go far toward solving this confusion. It is anticipated that a joint index for all boron volumes and a list of the individual chapters in chemically, ordered sequence will be included.

The volume under review contains a comprehensive amount of data including the syntheses, physical constants, and chemical behavior of the type of compounds described above. It will be extremely useful to the investigator in these areas because of its completeness. For example, it is vastly more inclusive than a more general review such as Volume 1 of "Comprehensive Inorganic Chemistry" published by Pergamon Press in 1973. Although five of six chapters are in German (the other in English), the organizational style with the marginal paragraph headings in English make reference work easy even if one's German is somewhat rusty. In addition, the preface, table of contents, and introductory remarks in three chapters are given in English as well as German.

Leo J. Malone, *St. Louis University*

Annual Reports on the Progress of Chemistry. Volume 72. 1975. Section B: Organic Chemistry. Senior Reporters: M. F. ANSELL (University of London) and P. G. SAMMES (The City University, London). The Chemical Society, London. 1976. xvi + 456 pp.

This year's volume of "Annual Reports" continues the tradition of providing expert critical reports on those topics which will be of general interest to organic chemists. The 14 chapters in this volume cover subjects ranging from theoretical calculations to synthetic techniques. Emphasis is placed on reporting developments of instrumental methods and chemical techniques. A 20% reduction in the size of this volume has taken place this year, but the breadth of coverage does not appear to have suffered. In fact, a timely new section on infrared and laser Raman spectroscopy and a chapter on theoretical chemistry have been added. A number of subjects under the heading of biological chemistry have been grouped together in a single chapter, including a topical report titled "Insect Chemistry".

The overall quality of the reports is very high, and the succinct critical comments add considerable value by giving insight and perspective. The large group of reporters who made this volume possible are to be thanked. "Annual Reports" is a useful aid for all scientists to keep up not only in one's specialty, but with the whole of organic chemistry. Scientists involved in teaching modern organic chemistry will find this volume especially useful.

William S. Mungall, *Hope College*

The PMO Theory of Organic Chemistry. By M. J. S. DEWAR (University of Texas) and R. C. DOUGHERTY (Florida State University). Plenum Publishing Corp., New York, N.Y. 1975. xii + 576. $12.50.

This book is an extensive exposé of the perturbation molecular orbital theory of organic chemistry. It is intended as a textbook both to accompany and supplement general organic chemistry texts as well as a text for more advanced MO courses.

The first chapter provides an introduction to MO theory and basic quantum mechanics. Chapter 2 introduces the perturbation theory itself and illustrates both the foundations and scope of the theory. Chapter 3 is "PMO Treatment of Conjugated Systems" and discusses such areas as alternant and nonalternant systems, aromaticity and antiaromaticity, polyenes, annulenes, the effect of heteroatoms, and resonance theory in light of the PMO method. Chapter 4 treats "chemical equilibrium" and in particular electron transfer processes, substituent effects, cross and mutual conjugation, field effects, the Hammett equation, etc. Chapter 5 handles "Chemical Reactivity" and examines the transition state theory, the Bell–Evans–Polanyi principle, solvent effects, prototropic reactions, nucleophilic and electrophilic substitution reactions, elimination reactions, aromatic substitutions, neighboring group participation, pericyclic reactions, Woodward–Hoffmann rules, biradical intermediates, etc. Chapter 6 is "Light Absorption and Photochemistry" and treats the nature of electronically excited states, the Franck–Condon principle, singlet and triplet states, fluorescence and phosphorescence, the role of the Born–Oppenheimer approximation, the role of antibonding electrons, classification of photochemical reactions, and chemiluminescent reactions. Chapter 7 treats "Reactions of Transient Ions" and examines mass and ion cyclotron spectroscopy, the structure of radical ions, reaction of cation radicals, radical anions in the gas phase and in solution, and ion–molecule reactions.

Each chapter has a number of appropriate problems, references to the original literature, and additional suggested readings. The authors have, by and large, succeeded admirably in providing a unified view and conceptual framework of a large body of organic chemistry that should prove to be particularly valuable in more advanced undergraduate and lower level graduate courses.

Peter J. Stang, *The University of Utah*

The Filamentous Fungi. Volume II. Biosynthesis and Metabolism. Edited by J. E. SMITH and D. R. BERRY (University of Strathclyde, Glasgow). Halsted Press, New York, N.Y. 1976. xiv + 520 pp. $47.50.

The second in a three-volume series concerned with the filamentous fungi, this book will be enthusiastically received by workers and students in mycology. Each of the 17 articles, written by specialists in the field, includes an extensive bibliography. The topics covered are environmental control of fungal growth, transport and translocation in filamentous fungi, glycolysis, biochemistry and biogenesis of mitochondria, anaplerotic pathways, biosynthesis of fatty acids, nitrogen metabolism, nucleic acid and protein synthesis in filamentous fungi, reserve carbohydrates in fungi, chemical nature of membrane components, the cell wall, hormones, biosynthesis of terpenes and steroids, carotenoids, polyketides and related metabolites, secondary metabolites derived through the shikimate–chorismate pathway, and secondary metabolites derived from nonaromatic amino acids. This book would make an excellent text for an advanced course in mycology.

M. C. W. Smith, *University of Michigan*