

Book Reviews*

Encyclopedia of the Alkaloids, Volumes 1 and 2. By JOHN S. GLASBY (ICI Organic Division Ltd.). Plenum Publishing Corp., New York, N.Y. 1975. 1423 pp. \$85.00.

This work is complete in two volumes, in which it covers alkaloids from abrasine to zygadenine. The substances are listed in alphabetical order, with about two to three compounds to a page. The empirical and structural formulas and the melting point are given, followed by a discursive paragraph of comments on the occurrence, characterization, special properties and reactions, and relation to other alkaloids. In this respect it differs from the format of the recently published "Handbook of Naturally Occurring Compounds" by Devon Scott, which does not contain discursive material (the alkaloid volume of this work is yet to appear, however). The "Encyclopedia" also gives references, in many cases several per alkaloid, and in some cases many, keyed as to synthesis, crystal structure, etc., where pertinent.

Because of the alphabetic arrangement, there are no indexes, although a formula index might have been useful. It would also have been helpful to know when the literature coverage of this rapidly advancing field ceased. Nevertheless, it is an obviously useful work of reference, the result of a great deal of tedious work, and it seems sure to find a firm place among the organic chemists' reference resources.

Solid Phase Synthesis. Edited by E. C. BLOSSEY and D. C. NECKERS. Dowden, Hutchinson & Ross, Inc.; distributed by Halsted/Wiley, New York, N.Y. 1975. xvii + 360 pp. \$27.00.

This is the second in the series Benchmark Papers in Organic Chemistry, and consists of 62 photographically reproduced original papers plus editorial comments. The subject is more specifically the use of polymer supports for synthetic organic reactions, a method that has seen greatest use in the synthesis of polypeptides, carbohydrates, and nucleosides. The subject is very recent and begins with papers by Merrifield and by Letsinger and Kornet in 1963. It is now growing rapidly into other areas of organic synthesis.

Structure Reports for 1968. Volume 33B. Edited by J. TROTTER. Published for the International Union of Crystallography by Oosthoek, Scheltema & Holkema, Utrecht. 1974. viii + 580 pp.

As those to whom this series is familiar with know, "structure" is used in the sense of the actual position of the atoms as determined by diffraction methods, rather than structural formulas deduced from a combination of spectroscopy, physical and chemical properties, and chemical degradation. The anticipated readership thus consists of crystallographers. This volume is devoted to reports of complete structures of organic compounds reported in 1968. For each are given data on the unit cell, space group, atomic positions, distances, angles, and references, accompanied in some cases by critical editorial comments. There is about one page per structure.

Synthetic Methods of Organic Chemistry. Volume 29. Edited by W. THEILHEIMER. S. Karger AG, Basel. 1975; distributed in USA by Albert J. Phiebig, Inc., White Plains, N.Y. xix + 585 pp. \$200.00.

The appearance of this useful work is always a welcome event for organic chemists, if not for those responsible for the library budget. The price of 34¢ per page reflects the advance of inflation forcefully. Nevertheless, the value of "Theilheimer" in saving man-hours of both library and laboratory work must surely be vastly greater than its cost for any active research group.

The arrangement of the concise abstracts of synthetic methods is that of previous volumes, and the coverage is of papers published "between" 1972 and 1974, with some new references to material in preceding volumes. A highly informative prefatory chapter entitled "Trends in Synthetic Organic Chemistry in 1975" brings the subject up to date in most aspects, and includes 54 references to

papers of 1975 or late 1974. The usual elaborate indexes are included, but since the next volume will contain both a cumulative index and a classified arrangement of all titles in Volumes 26 through 30, the indexes are for this volume only.

Librarians will be interested to know that the entire series is now in print, by virtue of the appearance of second editions of many earlier volumes, beginning with Volume 1; these second editions are relatively modest in price (about \$32.00 for Volume 1).

Textbooks Received

Physical Chemistry Laboratory Experiments. By JOHN M. WHITE (University of Texas, Austin). Prentice-Hall, Inc., Englewood Cliffs, N.J. 1975. xii + 563 pp. \$12.95.

Experiments in Physical Chemistry. By DAVID P. SHOEMAKER (Oregon State University), CARL W. GARLAND, and JEFFREY I. STEINFELD (Massachusetts Institute of Technology). McGraw-Hill Book Co., New York, N.Y. 1974. x + 725 pp. \$12.95.

General University Chemistry: Responses to Queries, Problems, and Exercises. By SIDNEY GOLDEN (Brandeis University). Oxford University Press, New York, N.Y. 1975. 237 pp. \$1.95 (paper).

Organic Chemistry: A Brief Course. By JOHN R. HOLM (Augsburg College). John Wiley & Sons, Inc., New York, N.Y. 1975. xii + 446 pp. \$12.95.

Elementary Organic Chemistry. By JAMES A. MOORE (University of Delaware). W. B. Saunders Co., Philadelphia, Pa. 1974. vi + 353 pp. \$11.50.

Fundamentals of Organic Chemistry: Solutions Manual. By C. DAVID GUTSCHE and DANIEL J. PASTO. Prentice-Hall, Inc., Englewood Cliffs, N.J. 1975. iv + 284 pp.

Organic Chemistry: How to Solve It. By RUTH A. WALKER (Herbert H. Lehman College). Freeman, Cooper & Co., San Francisco, Calif. 1972. 251 pp. \$3.95.

General University Chemistry: A Developmental Approach, Volumes I and II. By SIDNEY GOLDEN (Brandeis University). Oxford University Press, New York, N.Y. 1975. 704 pp and 694 pp. \$6.95 each (paper).

Study Guide to Organic Chemistry. Third Edition. By R. T. MORRISON and R. N. BOYD. Allyn and Bacon, Inc., Boston, Mass. 1975. 677 pp. \$7.50.

The Chemistry of Functional Groups: The Chemistry of the Hydrazo, Azo, and Azoxy Groups. Parts 1 and 2. Edited by SAUL PATAI. Wiley/Interscience, New York, N.Y. 1975. xiv + 1190 pp. \$84.00.

These two volumes continue the thorough and comprehensive treatment that has characterized the earlier volumes of this well-known series, and brings it near to completion. In fact, the preface reveals that there is only one planned volume, "The Chemistry of the Carbon-Carbon Triple Bond", that is not either in press or in preparation. The group of contributors who made this latest addition possible is thoroughly international in scope; their origins range from Canada to Hong Kong and from Germany to New Zealand, with many other countries in between.

The organization is not quite what might have been anticipated. The three functions are for the most part considered together in the separate chapters, as in "Mass Spectra of Hydrazo, Azo, and Azoxy Compounds". The close interrelationship of hydrazo and azo compounds on the one hand, and of azo and azoxy compounds on the other, justifies such an approach. The term "hydrazo" in the title is interpreted to mean organic hydrazine derivatives in general, even hydrazides being included. However, diazonium and diazo

* Unsigned book reviews are by the Book Review Editor.

compounds are not covered; they are the subject of a separate volume now in preparation.

The great value of this series grows as it becomes more nearly complete. There is an inevitable time lag between the earliest volumes and the latest, and it is gratifying to see that a supplementary volume on the chemistry of double-bonded groups is planned. It is unfortunate, however, that the date to which the literature has been covered is not explicitly stated in each chapter; it would take so little effort to provide this information! Some references from 1972 can be found, and even a few from 1973, but presumably the several chapters are not all equally up to date. All in all, this addition to the series is once again a major contribution to organic chemistry.

Computer Aided Data Book of Vapor-Liquid Equilibria. By M. HIRATA, S. OHE, and K. NAGAHAMA. Elsevier Scientific Publishing Co., New York, Amsterdam, Oxford. 1975. vii + 933 + VII pp. \$64.75.

This book, published simultaneously by Kodansha Ltd., Tokyo, consists almost entirely of tables accompanied by graphs of observed data and the curve calculated by the Wilson equation for vapor composition vs. liquid composition for 800 binary systems, together with the Wilson parameters, the Antoine constants, and the source of the data. In addition, for 133 binary systems, experimental vapor-liquid equilibrium data for the system under high pressure and the parameters for the modified Redlich-Kwong equation are given. The first 23 pages of the book contain discussions of vapor-liquid equilibrium relations and the methods used in constructing the tables. Altogether, this work assembles basic information needed for the efficient operation of industrial distillation processes.

The Conservation of Antiquities and Works of Art. Second Edition. By H. J. PLENDERLEITH and A. E. A. WERNER (British Museum). Oxford University Press, New York and London. 1972. xix + 394 pp. \$24.00.

The need for a second edition of what has come to be regarded as a standard work is attributed to "the phenomenal growth of interest in cultural property within recent years and the intensification of laboratory studies devoted to its conservation". The subject is an excellent exemplification of chemistry in the service of culture. It is so well written that it is hard to put down, and three people tried to borrow it on the same day it arrived in the mail, and two announced their immediate intention to buy a copy.

The content is organized in three parts: organic materials (leather, paper, textiles, wood, bone); metals; and siliceous and related materials (stone, ceramics, glass). The chemical composition of these substances is presented from the standpoint of their susceptibility to deterioration or attack, and methods for preservation and restoration are given with sufficient practical detail to enable the technically trained individual to use them. The subject is essentially an exercise in the application of chemical principles. It is made interesting by numerous examples of objects photographed before and after treatment. An illustration of a frieze from the Parthenon, compared as it is today with a plaster cast made in 1803, dramatically illustrates the intensification of the problem of preservation resulting from pollution of the atmosphere caused by modern industrial activity.

Problems come to light as one reads this book that are not yet satisfactorily solved, and thus pose interesting challenges to the chemist. For example, there is a need for methods to prevent and to reverse crizzling of glass, a form of deterioration involving exchange of alkali metal ions for protons upon prolonged exposure to moisture.

Most chemists find themselves asked at one time or another for practical advice by their spouses, acquaintances, employers, public servants, etc., on subjects covered in this book. If, before this, the chemist has felt inadequate to the request, that need no longer be so. This book quite rightfully belongs in an academic chemistry library, and a good case can be made for including it in an industrial or governmental one. It is also a delight to own personally.

Faith, Keyes, and Clark's Industrial Chemicals. Fourth Edition. By J. A. LOWENHEIM and M. K. MORAN. Wiley/Interscience, New York, N.Y. 1975. x + 904 pp. \$47.50.

Those familiar with previous editions of this work, the last of which appeared in 1965, will welcome this current updating. It deals with the 140 chemical products (inorganic and organic) that are of the greatest industrial importance in the United States. They range in alphabetical order from acetaldehyde to zinc oxide. For each substance, succinct details of the methods of manufacture are given, followed by principal uses, properties, production and price over the last twenty years, economic aspects, and principal manufacturers. The production and price information is given in graphic form, and it is interesting to note the dramatically steep rise in most prices from 1973 to 1974. It is surprising, however, to note that some few compounds have escaped the rise, and a few have even fallen; although acetaldehyde rose about 33% in one year, acetic acid remained steady, and acetic anhydride dropped 14%, for example. The great usefulness of this work to industrial chemists is obvious, but it is also a valuable adjunct to an academic book collection. An index of manufacturers makes it easy to find out who makes what, and a subject index supplements the alphabetical organization by compound name. Quantities are now given in both metric and English units, an innovation with this edition.

Mechanisms of Hydrocarbon Reactions. Edited by F. MÁRTA and D. KALLÓ. Elsevier, Amsterdam and New York. 1975. 812 pp. Dfl. 140 (ca. \$58.50).

This volume is the proceedings of a symposium held in Siófok, Hungary, in 1973, organized by the Hungarian Academy of Sciences. The content consists of plenary lectures and contributed papers, reproduced directly from typescript, together with the transcript of the ensuing discussions. The papers are organized under the headings: Heterogeneous Catalytic Reactions (Catalysis by Metals; Catalysis by Metal Oxides; Catalysis by Zeolites) and Homogeneous Reactions (Catalysis by Coordination Compounds; Pyrolysis; Radiolysis; Oxidation). Participation was international, with strong representation from the East Bloc countries, including a posthumous lecture by Professor B. A. Kazanskii, one of the pioneers in catalytic hydrocarbon chemistry, delivered by one of his closest coworkers.

Natural Products Chemistry. Volume 2. Edited by K. NAKANISHI, T. GOTO, S. ITO, S. NATORI, and S. NOZOE. Academic Press, New York, N.Y. 1975 (published simultaneously by Kodansha Scientific Ltd., Tokyo). x + 586 pp.

Volume 1 of this work was recently reviewed. The six chapters in this volume complete the coverage of the subject according to these classifications: Fatty Acid Derivatives and Related Compounds; Sugars; Carboaromatic and Related Compounds; Alkaloids; Non-alkaloidal Nitrogen Compounds; Aspects of Natural Products Photochemistry. The aim continues to be to bridge the gap between works on general organic chemistry and advanced treatises. The succinct style gives most of the essential information in a form that makes for quick visual recognition. The orderly arrangement of the entries is sufficient for easy retrieval, but it is supplemented by index.

Horizons in Organometallic Chemistry (Annals of the New York Academy of Sciences. Volume 239). Edited by I. BERNAL (University of Houston). The New York Academy of Sciences, New York, N.Y. 1974. 321 pp. \$28.60.

This volume contains papers presented before a conference on organometallic chemistry held by the New York Academy of Sciences in August 1973. The intent of this book is to have some of the leading investigators in organometallic chemistry present their current investigations as well as discuss future trends in organometallic chemistry. The twenty-seven papers are divided into four parts. Part 1. Recent Developments in Organometallic Catalysis; Part 2. New Synthetic Aspects of Organometallic Chemistry; Part 3. Physical Methods and Properties of Organometallics; and Part 4. Chemistry and Bonding in Organoregular Elements. Although many aspects of organometallic chemistry are not covered, a wide range of topics is discussed within the limits of the above headings. This book should be particularly useful for those workers wanting a broad view of research in organometallic chemistry.

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Experiments in Thermometric Titrimetry and Titration Calorimetry. Revised Edition. By DELBERT J. EATOUGH, JAMES J. CHRISTENSEN, and REED M. IZATT (Brigham Young University). Brigham Young University Press, Provo, Utah. 1974. vii + 121 pp. \$4.95.

Thermometric titration is a technique in which the progress of a titration is followed by monitoring the temperature of the reaction mixture. Thermometric titrations were performed for the first time in 1913, but did not arouse widespread interest until 1953, when Linde, Rogers, and Hume pointed out the advantages of thermistors as temperature sensors and of continuous as opposed to incremental addition of the reagent. During the subsequent decade Hume, Jordan, Zenchelsky, and their coworkers, among others, proved that thermometric titrations were more widely applicable for analytical purposes than any other titration technique, and also that they made it easy to obtain useful data on the enthalpy changes that accompany chemical reactions. Since about 1963 the authors of the present volume have developed and refined techniques for evaluating ΔH and ΔG° simultaneously from thermometric titration curves, and within the last several years it has been found to be possible to use such curves to evaluate rate constants as well. There are few other techniques that can furnish such a wealth of thermodynamic and kinetic information and that are equally widely applicable.

The present volume is described as a laboratory manual "designed to acquaint the reader with the general usefulness" of the technique. It begins with a short introductory chapter which is followed by a 28-page review of the ideas, theory, apparatus, techniques, and data-handling procedures associated with thermometric titrations. Unlike most of the prior literature devoted to thermometric titrations, this review stresses their thermodynamic rather than their analytical applications, and should both enlighten and tempt many chemists whose interest has not been aroused by the stress on end-point location elsewhere. There are then 66 pages of detailed directions for the calibration of apparatus, the execution of typical experiments—including several that involve related calorimetric techniques—and the interpretation of the data obtained. The examples are diverse and well chosen and, though written for student use, should not only enable the chemist to gain an easy and reliable introduction to the practical applications of the technique, but also suggest other kinds of problems to which it might be applied. Finally there are 12 pages of appendices, including a computer program for evaluating pK_a and ΔH for the dissociation of a weak acid BH^+ from data obtained in the thermometric titration of its conjugate base B with a strong acid. Many literature references are given, chiefly for the period between 1960 and 1971.

Those who know the authors' contributions to the original literature of the field will expect, and find, that this volume is both authoritatively and clearly written. This reviewer deplores the oversimplification made in discussing the range of values of the equilibrium constants that can be calculated from thermometric titration data, but oversimplification should perhaps be taken for granted in a laboratory manual. On the whole the book is a welcome and valuable addition to the meager literature of an important and insufficiently known technique.

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Macromolecules in Solution. Second Edition. By HERBERT MORAWETZ (Polytechnic Institute of New York). John Wiley & Sons, Inc., New York, N.Y. 1975. xvii + 549 pp. \$27.50.

The second edition of "Macromolecules in Solution" closely follows the first edition. Eight of the nine chapter titles are the same: I. General Considerations; II. The Solubility of Macromolecules; III. Configuration and Conformation of Chain Molecules; IV. Equilibrium Properties of Dilute Solutions; V. Spectroscopy, Optical Activity, and the Scattering of Light and X-Rays; VI. Frictional Properties of Dissolved Macromolecules; VII. Polyelectrolytes; VIII. Molecular Association. The ninth chapter is now Chemical Kinetics in Macromolecular Solutions, not significantly different than before. Beyond the chapter titles the author states that almost half of the book is new, and this fact is evident from the large number of references dated after the publication of the first edition.

Morawetz continues his original objective in the second edition of bringing together the work in synthetic and natural macromole-

cules. To include a comprehensive survey of this field in a reasonable space, the author strives to convey at least a qualitative comprehension of how theoretical results were obtained. These objectives are achieved quite well by introducing the theory in the context of physical chemistry at the beginning of each section, and then discussion of current research with references to significant publications follows.

This book remains a good choice for a text book for introductory graduate courses in the macromolecular field. It is also an excellent reference especially for the scientist who needs a starting point for an area not directly his own specialty. For example, the references recommended by Morawetz in this reviewer's own field are the same that he would have chosen.

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Science and Civilisation in China. Volume V: Chemistry and Chemical Technology. Part 2: Spagyric Discovery and Invention: Magisteries of Gold Immortality. By JOSEPH NEEDHAM with the collaboration of LU GWEI-DJEN (both of Cambridge University). Cambridge University Press, New York, N.Y. 1974. xxxii + 510 pp. \$35.00.

This latest volume of "Science & Civilisation in China" covers Chemistry and Chemical Technology. Part 2, the subject of this review, deals with Alchemy and Chemistry. In this book, Dr. Needham tries to trace the rise of the ancient Chinese alchemical tradition and to reconstruct the activities, thoughts, and motivations behind it. This chapter is well organized and beautifully written. Footnotes, numbering in the thousands, are exhaustive. When a specific Chinese term is translated into English, the corresponding Chinese character is also footnoted. The bibliography, some 160 pages, consists of three parts, covering Chinese and Japanese books before and after 1800 and books and journal articles in western languages. There is also a forty-page index.

"The impulse behind Dr. Needham's work" as was stated in the inside cover of the book, "is the desire to establish intercultural communication between East and West, and in particular to correct the grievously distorted western notion of the Chinese as other worldly, illogical, unscientific, and averse from technical progress." Indeed a mountain of evidence presented in this book has shown in many cases that the Chinese achievements in science were far ahead of the West's. Dr. Needham has done a job that no one has ever attempted before. In this respect, it is not only remarkable but monumental.

Hak-Foon Chan, *Rohm and Hass Company*

Electroanalytical Chemistry. Volume 8. Edited by ALLEN J. BARD (University of Texas). Marcel Dekker, New York, N.Y. 1975. x + 380 pp. \$29.50.

Professor Bard has again presented an excellent volume in this useful series. This volume includes three chapters on some rather diverse aspects of electroanalytical chemistry.

The first chapter, which fills almost half of the volume, is "Techniques, Apparatus, and Analytical Applications of Controlled-Potential Coulometry", by Jackson E. Harrar. The contents are well described by the title and include a complete and lucid discussion of design and analysis of potentiostat-cell systems. Analytical application to both inorganic and organic systems is well covered. Extensive references to the literature are provided, including a number of AEC reports.

The second chapter is "Streaming Maxima in Polarography", by Henry H. Bauer. Professor Bauer has made an admirable attempt to classify maxima on the basis of the physical forces that initiate and maintain the streaming. An appropriate quotation: "The subject of streaming maxima is perhaps the most confusing aspect of the literature dealing with polarography."

The last chapter is "Solute Behavior in Solvents and Melts, A Study by Use of Transfer Activity Coefficients", by Denise Bauer and Mylene Breant. This chapter introduces the concept of the transfer activity coefficient and describes how such coefficients are determined and how they are used in correlating solvent effects. Extensive tables of transfer activity coefficients are included.

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