

BOOK REVIEWS

The Phosphatides. By HAROLD WITTCOFF, Research Dept., General Mills, Inc., Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y. 1951. xviii + 564 pp. 16 × 23.5 cm. Price, \$10.00.

The book comes in 6 parts divided as follows: Part I. The Chemistry of the Phosphatides. Chap. 1, Nomenclature. 2, 3, 4, 5, Structure of Lecithin, Cephalins, Sphingomyelin and Minor Phosphatides. 6, Purification and Chemical Properties. 7, Physical Chemistry. 8, Phosphatide Complexes—Lipoproteins, Carbohydrate, Metallic Salt and Cholesterol Complexes. 9, Lysophosphatides and Lecithinases. 10, Synthesis of the Phosphatides.

Part II. The Analytical Determination of the Phosphatides. pp. 147–191. Chaps. 11 and 12, Extraction and Determination of Total and Individual Phosphatides.

Part III. Phosphatides from Plant Sources. pp. 191–252. Chap. 13, Introduction. 14, Microorganisms. 15, Cereals, Grains and Oil Producing Plants. 16, Vegetables and Miscellaneous Plants.

Part IV. Phosphatides from Animal Sources. pp. 255–336. Chap. 17, Introduction. 18, Normal Animal Organs and Tissues. 19, Eggs and Milk.

Part V. The Biochemistry and Physiology of the Phosphatides. pp. 339–483. Chap. 20, Introduction. 21, General Aspects. 22, The Phosphatides as Metabolic Elements. 23, Hydrolysis Products in Metabolism. 24, Role of Phosphatides in Pathological Conditions. 25, Serological and Oxidation Functions.

Part VI. The Industrial Aspects of the Phosphatides. pp. 483–535. Chap. 26, Manufacture. 27, Industrial uses.

Author and Subject Indexes.

This book gives a complete and up-to-date (1949–1950) coverage of the subject with plenty of literature references. It should be in the hands of all workers in the Lipide field and will save a great deal of time in the search of a literature widely scattered and diffuse. At a time of great revival of interest in the Lipides it provides another source of accurate information about a group of substances known to be very important in plant and animal physiology and pathology, but about which our knowledge is scanty.

DEPARTMENT OF BIOCHEMISTRY
UNIVERSITY OF ROCHESTER MEDICAL SCHOOL W. R. BLOOR
ROCHESTER, NEW YORK

Crystal Structures. First Supplement and Volume II. By RALPH W. G. WYCKOFF, Laboratory of Physical Biology, National Institute of Arthritis and Metabolic Diseases, Bethesda, Maryland. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1951. viii + 509 pp. 22 × 26 cm. Price, First Supplement \$4.00, Volume II with binder \$10.00.

The first volume of Dr. Wyckoff's compilation of reliable crystal structure data was published in 1948. We now have Volume II of this work, together with 136 pages of supplement for Volume I. The material in Volume II is to be found in four chapters. These are: Chapter VIII, Compounds of the Type $R_n(MX_n)_p$; Chapter IX, Compounds of the Type $R_x(MX_n)_y$; Chapter X, The Crystal Structures of the Hydrates and Ammoniates; and Chapter XIII, The Structures of Aliphatic Compounds. Chapters XI and XII are to appear later.

The arrangement of the material within each chapter closely follows the plan begun in Volume I. Each of the four parts of each chapter, namely, text, tables, illustrations and bibliography, is paginated separately. A publisher's note at the beginning of the volume gives directions on how to locate material. Owners of the previously published Volume I will be interested to learn that it is every bit as easy to locate data on a particular compound in Volume II as it is in Volume I. Several classifications of compounds are noted: KIO_3F_2 and Mn_2O_4 are listed as being of the type $R_n(MX_n)_p$. Although this assignment is sensible

on the basis of the determined structures, the reader should not be expected to make *a priori* guesses in order to locate data. It is surprising to find the formulas of pyrophosphates in Table IXF,1 written as P_2HFO_7 , P_2SiO_7 , etc. Such transpositions lead to confusion when attempting to locate a compound in an alphabetized table.

The illustrations are of the high quality established by Dr. Wyckoff in his two earlier books on the structure of crystals (ACS Monographs No. 19 and No. 19A). Some readers will find it a source of annoyance that a large number of the references are given only as "I" or "II," meaning that the author and journal for the reference are to be found in one of the two monographs just mentioned. For completeness, it is thus necessary to have these two additional books. Since the present volumes are intended to supersede the monographs, the decision to use the latter as reference sources seems somewhat odd. Moreover, Monograph No. 19 ("I") has been out of print for some years.

The plan of separating the chapters into the four parts leads also to a separation of the data on any one compound. Thus in Chapter XIII, for example, the structure of β -glycylglycine is briefly described on text pages 52–53, the parameters of the atoms are listed 30 pages later on table page 49, the molecule is illustrated 49 pages later on illustration page 41, and the literature reference is found six pages later on bibliography page 12.

Perhaps after Volume III has been published a way will be found by which an indexing system may be set up. Until then, however, most crystallographers will probably tend to rely upon "Strukturbericht" and "Structure Reports."

GATES AND CRELLIN LABORATORIES OF CHEMISTRY
CALIFORNIA INSTITUTE OF TECHNOLOGY JERRY DONOHUE
PASADENA 4, CALIFORNIA

Structural Chemistry of Inorganic Compounds. Volume II.

By WALTER HÜCKEL, Dr. Phil., Professor of Pharmaceutical Chemistry, Tübingen University, formerly Professor of Organic Chemistry in the University and Technische Hochschule of Breslau. Translated by L. H. LONG, B.Sc., Ph.D. (London), Ph.D. (Cantab.), A.R.C.S., D.I.C., Lecturer in the Department of Chemistry, University College, Exeter. Elsevier Press, 402 Lovett Boulevard, Houston, Texas. 1951. x + 441 to 1094 pp. 18 × 26 cm. Price, \$13.50.

The original German edition of this book was published in one volume (1948) and comprised twelve chapters. The English translation appeared in two volumes which correspond to the first six and the last six chapters of the original book, respectively. The first volume of the English edition was reviewed by Davidson (THIS JOURNAL, 73, 2978 (1951)). It is stated in the German edition that the first six chapters (*i.e.*, the first English volume) are in a sense an introduction to chapters 7 to 10; these latter describe structural and constitutional problems of inorganic chemistry and therefore comprise the most important content of the book. These chapters contain the following topics: VII. Inorganic Molecules (Volatility). VIII. Crystal Chemistry (Alloys). IX. Silicates and Glasses. X. Metallic Substances. In these chapters the great significance of crystal chemistry in the field of inorganic chemistry is indicated. However, in order not to give the impression that this portion might be considered the whole content of the subject, chapter XI was added. It deals with the reactions of inorganic chemistry and is admittedly very sketchy. The last chapter (XII) carries the heading "Lines of research in chemical science" and contains two main topics: "Guiding principles" and "a comparison of modes of thought of the structural approach in the fields of inorganic and organic chemistry." The author states that the book has grown in a more or less natural way from various lectures, discussion with colleagues and monographs. The book was therefore not written in accordance with a predetermined plan or outline, but the material was collected together in the best way it could be fitted in a composite whole.

The second English volume covers a large amount of material and contains many good illustrations. A number of the discussions are interesting reading, even though at times the reader might not agree with the position taken by the author. Since the ideas of resonance, so fashionable in this country at the present time, are completely ignored, the book represents a treatment of the subject that might be called old fashioned from the American point of view. Another case in point is the treatment of the homopolar bond. While the Bohr theory of the hydrogen atom is dealt with in volume I at some length, the corresponding wave mechanical problem is only mentioned in a non-mathematical descriptive way which very likely does not help many readers. The famous Heitler-London theory of the non-polar bond in hydrogen molecule is mentioned only by title (page 967). Considering the fact that the author deals with a very large number of topics only remotely connected with the main theme, it is strange that no place could be found for even one potential energy curve of a diatomic molecule. Similarly van der Waals forces are mentioned time and again and it is pointed out that London's dispersion forces have some connection with them (page 449). However no explanation of their nature is given. Quite often the statement is made that certain phenomena, as for example homopolar binding, can only be understood on the basis of quantum mechanics. These statements have at least the benefit of warning the reader that he should know these newer ideas, in case he wished to stay abreast with modern chemical thought.

Many of the discussions are rather lengthy and repetitive. The translation is at times too close to the German phrases and idioms. The author mentions with regret the fact that the book was written during the war and that a certain amount of the literature outside Germany was not available to him. This situation will tend to make the book incomplete and seems unfair to the authors whose work was thereby neglected.

However the book does contain a wealth of material and the chemist who already has a good foundation of the modern ideas of chemical binding will leaf through it with some interest. Certain historical sections concerning the development of the theories and ideas of inorganic chemistry add a welcome feature to the book.

OFFICE OF ORDNANCE RESEARCH
BOX CM, DUKE STATION
DURHAM, NORTH CAROLINA

GEORGE GLOCKLER

Tables of Chemical Kinetics—Homogeneous Reactions.

National Bureau of Standards Circular 510. By N. THON (Editor), Frick Chemical Laboratory, Princeton University. United States Government Printing Office, Washington 25, D. C. 1951. xxiv + 731 pp. 23 × 29 cm. Price, \$4.00.

This volume is the product of monumental and very worthwhile labors of G. S. Forbes, D. G. Kelemen, G. Paravano, M. Szwarc, H. A. Taylor and N. Thon. It is presented in the form of punched loose leafs, assembled under a paper cover and readily adaptable to the insertion of future additions. A typical table specifies the type of the reaction taking place. It then contains the formulas of the reactants, the medium in which the reaction takes place, the concentration of the reactants dealt with in the investigation abstracted, addenda if any, temperatures investigated, the kinetic rate law selected and the resultant rate constants and the activation energies. At the end of each table are to be found occasional comments, of a nature not suitable for inclusion in the table itself. Literature references are given for all data presented; they appear to be very complete. The main subdivisions of the volume are: Rearrangement—Isomerization; Condensation—Solvolysis; Exchange—Substitution; Elimination; Dissociation—Decomposition; Association—Addition and Oxidation—Reduction. Each part is subdivided further. Thus the first part has subheadings: Ortho—para conversion; Racemization; *cis-trans* isomerization; *syn-anti* isomerization, etc., each of these being further classified. The problem of finding literature data on any reaction listed in these tables is thus extremely facilitated. The present volume does not include all the reactions described in the literature. Thus, for instance, gaseous oxidation reactions are not covered. The reviewer has not been able to find several other more

specialized classes of reactions and it is to be presumed that these will appear in the promised supplements to the present volume.

The work was deliberately limited to the presentation of factual data. The speculations of the original investigators as to mechanisms involved were not included. As a reference source for factual material in the field of chemical kinetics, this volume is unique and will be indispensable to any chemist facing problems in chemical kinetics. The obvious weakness is the lack of information on the accuracy and reliability of the numerical data given. The most that the reviewer has been able to find in this direction are footnotes stating that the data of one investigator appear to be more accurate than those of another. This means that the study of the original publications is not always eliminated by the use of the present work. To be frank, however, the reviewer does not know of any brief tabular form of presentation that would give a truly reliable estimate of errors in the notoriously inaccurate field of chemical kinetics. The absence of error estimates is certainly preferable to unreliable estimates. The authors should be highly complimented on an outstanding job well done.

DEPARTMENT OF CHEMISTRY
HARVARD UNIVERSITY
CAMBRIDGE, MASSACHUSETTS

G. B. KISTIAKOWSKY

Progress in Organic Chemistry. Volume 1. By J. W. COOK (Editor), D.Sc., F.R.S., Regius Professor of Chemistry, University of Glasgow, Fellow of University College, London. Academic Press, Inc., 125 East 23rd Street, New York 10, N. Y. 1952. viii + 287 pp. 16.5 × 25 cm. Price, \$7.80.

This volume fulfills the objectives outlined in the Foreword by J. W. Cook. There are presented "in a concise but adequate form descriptions of recent developments in selected fields of organic chemistry," and "each of the contributors is an active worker in the field which he has reviewed." The eight chapters do not represent exhaustive treatises on the selected subjects; instead, they have the semblance of individual lectures. In this framework, the authors review the most important contributions to each subject, stress the more recent developments, and give their expert opinions as to the present state of each problem. The volume as a whole is enjoyable and interesting reading.

The chapter by Sir Robert Robinson, "Molecular Structure of Strychnine, Brucine and Vomisine," is most lucid. Leading, rather than complete references are given and the argumentation as to the structure of strychnine is developed without recourse to the many extraneous or merely corroborative facts accumulated during the years of research on this alkaloid. Especially interesting is the record of the historical development leading to the final revision of the strychnine structure. The chapter by H. Erdtman, "Chemistry of Some Heartwood Constituents of Conifers and their Physiological and Taxonomic Significance," is interesting not only because of the description of the chemistry of these heartwood constituents but also because of the excellent summary (pp. 54–59) of the genera, geographical distribution, and known heartwood and resin constituents of the conifers. This summary is also useful in pointing out the deficiencies in our knowledge at the present time by indicating which genera have not yet been properly investigated as to heartwood constituents.

The chapter by H. H. Brockmann presents the fascinating story of "Photodynamically-Active Natural Pigments" and the interesting example of the establishment of the structure of hypericin by means of comparison of the detailed ultraviolet absorption of this pigment and its derivatives with those of related model compounds. S. F. Birch provides a satisfactory coverage of the variety of processes available for making "Chemicals from Petroleum." The chapter on "Acetylene Chemistry," by B. C. L. Weedon, is especially good in the sections on cyclooctatetraene, acetylenic glycols and alcohols, acetylenic ketones and vitamin A. In the chapter on "Drugs Inhibiting Symptomatic Stimulators," F. Bergel and M. W. Parkes have gathered together related pharmacological and chemical information which has hitherto been treated either in too fragmentary or too exhaustive a manner. Where correlations can be made between structure and pharmacological action, these have been stressed by the authors, who have also

pointed out that the challenge of attaining wholly reliable structure-activity relationships has still to be met in the future. The chapter on "Free Radicals as Intermediates in Organic Reactions" is brief, but faithful to the stated purpose of the author, D. H. Hey, as summarizing "in a systematic form some of the more important facts of the chemistry of free radicals." Discussion of the more practical aspects of the chemistry of free radicals (polymerization, drying of oils, etc.) has been excluded. In the final chapter of the first volume in what promises to be a useful series, I. A. Preece ("Starch and its Products of Amylolytic Degradation") has discussed the present status of the components of starch and the chemical nature of the starch-splitting enzymes.

THE NOYES CHEMICAL LABORATORY
UNIVERSITY OF ILLINOIS
URBANA, ILLINOIS

NELSON J. LEONARD

Solubilities of Inorganic and Organic Compounds. A Compilation of Solubility Data from the Periodical Literature. Supplement to the Third Edition Containing Data Published during the Years 1939-1949 Inclusive. By **ATHERTON SEIDELL**, Ph.D., U. S. National Institutes of Health, and **WILLIAM F. LINKE**, Ph.D., New York University. D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, N. Y. 1952. iii + 1254 pp. 17 × 23.5 cm. Price, \$12.50.

The appearance of the Supplementary Volume to the Third Edition of "Solubilities" will be welcomed by all chemists. In the inorganic section, covering 567 pages, the elements are arranged in the alphabetical order of their chemical symbols. References but not data are given for the melting points of many compounds. This section was compiled by Dr. Seidell.

The compounds in the organic section, covering 253 pages and compiled by Dr. Linke, are arranged according to the increasing number of carbon atoms in the formula.

A chapter by Alfred W. Francis of the Socony-Vacuum Laboratories includes 240 pages devoted to ternary aqueous systems separating into two liquid layers, 59 pages covering ternary non-aqueous systems and a few pages describing quaternary aqueous and non-aqueous systems. This chapter is followed by a tabular index of aqueous systems.

Roger G. Bates of the National Bureau of Standards has contributed a chapter on "Recent Contributions to the Theory of Electrolyte Solubility," with 142 references.

There is an Author Index, an Organic Compound Index and an Inorganic and Metal-Organic Cross Reference Index for locating results not found by searching the alphabetically arranged tables.

It would be too much to expect that all the solubility data in the literature would be included, especially if buried in a paper which gives no hint of their presence. The reviewer noted the omission of the solubilities of the chlorides of lithium, sodium and potassium in three alcohols, determined by Caley and Axilrod (*Ind. Eng. Chem., Anal. Ed.*, 14, 242 (1942)). On pages 160, 161, 567, the words "ceric" and "cerium" are misspelled in several instances, but in general few errors are apparent.

The book is substantially bound and clearly printed on good paper. It should find a place in all chemistry libraries and in many private libraries.

CHEMISTRY DEPARTMENT
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

HOBART H. WILLARD

The System of Mineralogy of James Dwight Dana and Edward Salisbury Dana, Yale University 1837-1892. Volume II. Halides, Nitrates, Borates, Carbonates, Sulfates, Phosphates, Arsenates, Tungstates, Molybdates, etc. Seventh Edition. Entirely rewritten and greatly enlarged by **CHARLES PALACHE**, the late **HARRY BERMAN** and **CLIFFORD FRONDEL**, Harvard University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1951. xi + 1124 pp. 15.5 × 23.5 cm. Price, \$15.00.

Dana's "System of Mineralogy" has long been a must as a reference book for mineralogists. The sixth edition was

published in 1892, and the first volume of the 7th edition appeared in 1944; the intervening half century has been so eventful in the fields of chemical mineralogy and crystallography as to make the compilation of new material a profound undertaking. That the results have been outstandingly successful is a tribute to the perseverance and sagacity of the authors.

A major change in the present edition lies in the classification method, which has been revised to conform with crystal chemistry. To each principal species have been assigned three or four classification numbers which define the chemical composition and the crystallography; thus, witherite (BaCO_3) is class 14 (anhydrous normal carbonates), type 1 (formula A (XO_3)) and group 3 (aragonite structure); its classification is 14.1.3.2 whereas that of aragonite (CaCO_3) is 14.1.3.1. The obvious advantages of such a classification are simplicity and logical grouping. The indexing at the end of the book depends on the popular name of the species; in addition, each chapter is prefaced by an index on the basis of chemical formula, so it becomes simple for either a chemist or a mineralogist to find the desired information.

For each species, the following data are given (where available): chemical formula, optical crystallography, X-ray data, crystal habit, twinning and cleavage, optical data, chemical analysis and tests, occurrence, alterations, artificial preparation, hardness, origin of the name, and reference. The optical data have been revised to conform with the X-ray data, and many new drawings are included. Brief class discussions are presented.

The bibliography is apparently complete and current; in addition, there are included many recent and hitherto unpublished results obtained in the Harvard laboratories. The printing is good, and misprints are scarce.

Volume I contained elements, sulfides, sulfo salts, and oxides; Volume III will contain silica and silicates. It is hoped that Volume III will show the same thoroughness and interest in the work on the part of the authors that are characteristic of the first two volumes.

GATES AND CRELLIN LABORATORIES OF CHEMISTRY
CALIFORNIA INSTITUTE OF TECHNOLOGY RICHARD MARSH
PASADENA 4, CALIFORNIA

BOOKS RECEIVED

September 10, 1952-October 10, 1952

- E. CLAR. "Aromatische Kohlenwasserstoffe-Polycyclische Systeme." Second Edition. Springer-Verlag, Reichpietschauer 20, Berlin W 35, Germany. 1952. 481 pp. DM 69.-.
- B. E. CONWAY. "Electrochemical Data." Elsevier Publishing Company, 402 Lovett Blvd., Houston, Texas. 1952. 374 pp. \$8.75.
- G. F. D'ALELIO. "Fundamental Principles of Polymerization—Rubbers, Plastics, and Fibers." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1952. 517 pp. \$10.00.
- D. J. HUGHES, Chairman, Advisory Group. "Neutron Cross Sections." A Compilation of the AEC Neutron Cross Section Advisory Group. Office of Technical Services, Department of Commerce, Washington, D. C. 1952. 186 pp. \$1.00.
- I. M. KOLTHOFF AND JAMES J. LINGANE. "Polarography." Second Edition. Volume II—Inorganic Polarography, Organic Polarography, Biological Applications, Amperometric Titrations. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1952. Pp. 423-953. \$11.00.
- H. R. KRUYT (edited by). "Colloid Science." Volume I—Irreversible Systems. Elsevier Publishing Company, 402 Lovett Blvd., Houston, Texas. 1952. 389 pp. \$11.00.
- G. K. ROLLEFSON AND R. E. POWELL (edited by). "Annual Review of Physical Chemistry." Volume 3. Annual Reviews, Inc., Stanford, California. 1952. 416 pp. \$6.00.