
NEW BOOKS

The Structure and Properties of Matter. By HERMAN T. BRISCOE, Professor of Chemistry, Indiana University. McGraw-Hill Book Company, Inc., 330 West 42d Street, New York City, 1935. x + 420 pp. 139 figs. 14.5 × 21 cm. Price, \$3.75.

The book is one which ought to be read by all those chemists who wish to learn of the achievements and progress in this field during the past quarter century. As the author states in the preface, "It is not his purpose to produce a treatise for the physical chemist who is well versed in mathematical and physical theory nor to compile a critical review of the work which has been done. Nor is it his purpose to write a 'popular' book on the subject for the person without a knowledge even of general chemistry and elementary physics. Instead, he has attempted to interpret from the chemist's point of view some of the facts and opinions concerning matter as they have been discovered or suggested from the time of Aristotle to the time of Bohr and Schroedinger." The topics discussed in the different chapters are as follows: atomic and molecular concepts, the periodic classification, the radioactive elements, the electron, the proton and other positive particles, the nucleus, structure of crystals, theories of valence, the classical quantum theory, the Bohr theory of the origin of spectral lines and its influence on conceptions of atomic structure, and finally the new quantum mechanics.

In each case, the underlying experimental observations and their interpretation are discussed clearly, in terms of simple mathematics and by the aid of well-chosen diagrams.

Each chapter is accompanied by a list of books, in English, dealing more specifically with the topics discussed. The advantage of having such lists of references would have been increased if the dates of publication had been given for each book.

On the whole the reviewer is very favorably impressed both with the choice of topics which the author has made and with the manner in which each of these topics has been presented. The book ought to prove helpful and stimulating to all those who have failed, for various reasons, to keep in touch with the most recent developments in the fields of atomic and nuclear physics.

SAUL DUSHMAN

Principles of Phase Diagrams. By J. S. MARSH, Physical Metallurgist and Associate Editor, Alloys of Iron Research. Foreword by John Johnston. McGraw-Hill Book Co., Inc., 330 West 42d St., New York City, 1935. xv + 193 pp. 180 figs. 15 × 23.5 cm. Price \$3.00.

Phase diagrams, which play such an important part in modern metallurgy and chemistry, can be theoretically interpreted by means of Gibbs' Phase Rule. However, a knowledge of the phase rule is not necessary for a working construction and interpretation of phase diagrams. Consequently the subject matter of this book may be divided into two parts, the first part treating of the thermody-

namics necessary for a theoretical analysis of the equilibria involved, the second part consisting of a treatment of the rules for constructing and interpreting diagrams.

The first two chapters present a theoretical discussion of the thermodynamics necessary for an understanding of the phase rule. The first chapter is a descriptive treatment designed for those who desire only a casual acquaintance with the matter. The second chapter is a mathematical presentation for the more advanced student.

The remainder of the book is devoted to the presentation and interpretation of two and three component diagrams. These are ideal diagrams rather than diagrams of actual systems. All possible systems are presented and the discussions are concise and accurate. The reader will find it not a reference book to diagrams of existing systems, but rather an invaluable aid in constructing and interpreting the diagram for any system for which he has the data. A few actual systems are presented.

The American physical chemist in particular and in general any one who has trained his mind to think in terms of the symbols used in "International Critical Tables" will be much disappointed to see the work content function, A , and the free energy function, F , blossoming forth as "Helmholtz Free Energy, F ," and "Gibbs Free Energy, G ," respectively. A new system of nomenclature for the equilibrium lines and points is presented. It is unfortunate that a table of symbols and a glossary are not included in a book which presents so many new symbols and terms.

The author's style is conversational and he has the happy faculty of making a statement in an unexpected manner. This lends interest to what might otherwise become tedious routine reading. He does not hesitate to make side excursions into material which might clarify the discussions.

WARREN W. EWING

The Nitrogen System of Compounds. By EDWARD CURTIS FRANKLIN, Stanford University. American Chemical Society Monograph. Reinhold Publishing Corporation, 330 West 42d Street, New York, 1935. 339 pp. 15.5 × 25.5 cm. Price, \$7.50.

In the introduction to this monograph the nitrogen system of compounds is defined essentially as follows. Excepting fluorine, oxygen is the most powerfully negative of the elements and it is reasonable to ascribe to oxygen a dominating role in all its compounds, excepting its fluoride, and to regard these substances as constituting an oxygen system of compounds. Just as reasonably, these compounds may be considered as derivatives of water and therefore as members of a water system. Next to oxygen in the order of negativity stands nitrogen and thus it is reasonable to consider all compounds of nitrogen, excepting oxides and fluorides as members of a nitrogen or ammonia system. "The object of this monograph is to outline what we have chosen to call the nitrogen system of compounds and to bring to the attention of chemists the re-

markable extent to which the compounds of nitrogen simulate in their properties and behavior the analogous compounds of oxygen" (p. 11).

The monograph very successfully achieves its stated object. It opens with a chapter on the properties of liquid ammonia followed by two on simple reactions in liquid ammonia and the nitrogen system of bases, acids and salts. The fourth chapter on nomenclature is very necessary, for much use is made of systematic names in expressing analogies between compounds of the nitrogen system and those of the oxygen system. In general, a systematic name may be expected to serve one or both of two purposes: first, to describe as clearly, concisely and completely as possible a chemical formula; second, to suggest directly the chemical and physical properties of the substance named. The nomenclature in this monograph is not intended primarily to serve the first of these purposes and certainly fails to do so. The names are in many instances both cumbersome to use and difficult to translate into specific formulas. The second purpose is the one intended and is achieved to a rather marked extent.

Chapter five concerns augmentation and reduction in liquid ammonia. "Augmentation" is a term coined by the author to express oxidation in the most general sense of the term. This chapter and other sections of the book touching on the same material are of genuine value in conveying an insight into the broader significance of the familiar concepts of acid, base, oxidation and reduction. The remaining twenty-eight chapters present an extensive classification of types of compounds in accordance with the nitrogen system, and contain an exhaustive catalog of individual cases with examples of reactions analogous to those of the oxygen prototypes. Many reactions of ammonia and amines are interpreted in terms of such analogies. Some of the classifications included are ammono bases and basic nitrides, ammonobasic salts, ammono carbonic acids, aquo-ammono nitric acid, ammono hypochlorous acids, acid anammonides, ammono alcohols, ammono ketone-alcohols, ammono ketone-ethers, and aquo-ammono sulfonic acids.

The work is of exceptional value as both an inspiration and a warning. It presents clearly, in detail and with extensive experimental backing, the very real advantages of the point of view of systems of compounds and provides a classic model for use in extending this point of view to systems based on other elements.

It also reveals the equally real limitations to this point of view. The reader cannot fail to note the large number of simple nitrogen system analogs of familiar oxygen compounds which are non-existent and which investigators have been unable to prepare. Confusion may arise because a given compound may be considered the analog of more than one type of oxygen compound. Thus acetoneitrile may be considered as an acid anammonide (p. 191) and also as a ketone of the ammonia system (p. 284). At least a few of the analogies may be suspected of artificiality as, for instance the designation of nitrogen from decomposition of diazo compounds as "nitrous anammonide" (p. 190). It may also be noted that the extension of this point of view to elements less negative than nitrogen would doubtless prove less rather than more satisfactory.

It is unfortunate that a more complete indexing of compounds under their ordinary names has not been attempted. In the case of many substances the only information included in the body of the text is the ordinary name and the name or classification under the nitrogen system. Such information can serve but two purposes; to present specific examples of the various nitrogen system classifications and to aid the reader in determining just how a given compound is classified under the nitrogen system. The second purpose is defeated by the incomplete indexing; unless the reader knows in advance how the compound is classified he cannot, in many instances, find where it is mentioned in the monograph except by reading through page by page.

The appendix contains a valuable and suggestive chapter on manipulation of liquid ammonia with extensive references to the literature. A detailed description is given of the technique of handling ammonia at room temperature in closed tubes and should prove of extraordinary value to anyone interested in performing such experiments. This chapter might have been made more complete by including the technique of Kraus and his students for handling liquid ammonia at its boiling point and by mentioning the interesting possibilities of using liquid ammonia for certain purposes (halogen determinations and organic syntheses) in ordinary single-walled test-tubes, beakers and flasks.

CHARLES B. WOOSTER

Biochemical Laboratory Methods for Students of the Biological Sciences. By CLARENCE AUSTIN MORROW, Ph.D. Revised and Rewritten by WILLIAM MARTIN SANDSTROM, Ph.D., Assistant Professor of Agricultural Biochemistry, University of Minnesota. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, 1935. xv + 319 pp. Illustrated. 15.5 X 23.5 cm. Price, \$3.75.

The requirements of students whose work is in the general field of the biological sciences outside of the field of medicine for a laboratory text of biochemistry are well met by this new revision by Professor Sandstrom of Morrow's excellent text. Most of the available laboratory manuals are written from the point of view of the medical student. The present revision makes available a companion volume to the well-known text of Gortner.

Much new material has been incorporated; the revision has been carefully done; the book represents a rewriting rather than a revision; more recent developments are included. Typical of the shift of methods is the omission of the empirical Mett tube method for the determination of pepsin of the earlier edition and the substitution of a modern titration method for the liberation of amino groups by the pepsin, the Linderström-Lang titration. In view of the recent developments of enzyme chemistry, it seems unfortunate that methods for the determination of "erepsin" are retained and that no discussion either from the practical or theoretical viewpoint is given of trypsin-kinase or of the various polypeptidases and dipeptidases.

The order of presentation and the topics covered are essentially the same as in the earlier edition [THIS JOURNAL, 50, 1236 (1928)]. The book is a desirable addition to our group of laboratory texts in biochemistry.

HOWARD B. LEWIS

Kurzes Handbuch der Kohlenhydrate. Tollens-Elsner. (Brief Handbook of the Carbohydrates.) By DR. HORST ELSNER, Berlin. Fourth, revised edition. Johann Ambrosius Barth, Verlag, Salomonstrasse 18 B, Leipzig C 1, Germany, 1935. xxii + 627 pp. 16.5 × 24.5 cm. Price, RM. 39; bound, RM. 41.

The rapid progress made in the domain of carbohydrate chemistry during the last twenty years has necessitated a complete revision of the former Tollens' Handbook.

The present volume is a welcome addition to the literature in this field and provides a thorough, comprehensive, up-to-date review of the subject.

The research worker in particular will find here the latest and most reliable information on the configuration, physical and chemical properties of the carbohydrates and their derivatives carefully assembled and critically reviewed.

While the greater part of the treatise is concerned with the characterization, transformations and physical and chemical properties of the carbohydrates, at the same time an excellent critical account is given in the general introduction of recent developments in the carbohydrate field, and equally valuable information is given in the short discussion on optical behavior, analytical procedure, etc.

In the last hundred pages a clear and concise description is given of developments relating to anhydrides and polysaccharides.

The author is fortunate in having had the privilege of being able to submit the text to such distinguished authorities as Messrs. Helferich and Schlubach.

The volume can be recommended heartily to all interested in ascertaining the most recent data in carbohydrate chemistry.

HAROLD HIEBERT

BOOKS RECEIVED

April 15, 1935-May 15, 1935

PERRY A. BOND. "The Fundamentals of Chemistry." Farrar and Rinehart, Inc., Publishers, New York City. 411 pp. \$3.00

RAYMOND DEFAY. "Étude Thermodynamique de la Tension Superficielle." Gauthier-Villars et Cie., Éditeurs, 55 Quai des Grands-Augustins, Paris VI^e, France. 372 pp. Fr. 30.

LOUIS F. FIESER. "Experiments in Organic Chemistry." D. C. Heath and Company, 285 Columbus Ave., Boston, Mass. 369 pp. \$2.40.

WILLIAM FOSTER and HUBERT N. ALYEA. "A Laboratory Manual in General Chemistry." Fourth edition. Princeton University Press, Princeton, N. J. 177 pp. \$2.00.

BENJAMIN HARROW and CARL P. SHERWIN. "A Text-book of Biochemistry." W. B. Saunders Company, West Washington Square, Philadelphia, Pa. 797 pp. \$6.00.

A. A. IVANOV. "D. I. Mendéléiev dans ses Travaux Métrologiques." Institut de Métrologie et de Standardisation de l'U. R. S. S., Mejdounarodny 19, Leningrad, U. S. S. R. 80 pp. 1.50 rubles.

ALFRED KUHN, Editor. "Kolloidchemisches Taschenbuch." Akademische Verlagsgesellschaft m. b. H., Markgrafenstrasse 6, Leipzig C 1, Germany. 369 pp. RM. 19; bound, RM. 21.

N. S. KURNAKOV and B. N. MENSCHUTKIN, Editors. "Annales de l'Institut d'Analyse Physico-Chimique." Vol. VII. (In Russian.) Moscow, U. S. S. R. 314 pp.

C. G. MOOR and WILLIAM PARTRIDGE. "Aids to the Analysis of Food and Drugs." Fifth edition, revised and partly rewritten by John Ralph Nicholls. William Wood & Co., Mt. Royal and Guilford Aves., Baltimore, Md. 322 pp. \$1.50.

C. R. NOLLER, Editor-in-Chief. "Organic Syntheses." Vol. XV. John Wiley and Sons, 440 Fourth Ave., New York. 104 pp. \$1.75.

K. PLÖTZE. "Der Einfluss der Düngen auf den Pflanzenbestand des Dauergrünlandes." Verlagsgesellschaft für Ackerbau m. b. H., Dessauer Strasse 31, Berlin S. W. 11, Germany. 79 pp. RM. 2.40.

KARL RATHSACK. "Der Speisewert der Kartoffel." Verlagsgesellschaft für Ackerbau m. b. H., Dessauer Strasse 31, Berlin S. W. 11, Germany. 139 pp. RM. 7.50.

E. SAUER. "Kolloidchemisches Praktikum." Verlag von Julius Springer, Linkstrasse 23-24, Berlin W9, Germany. 112 pp. RM. 4.50.

F.-H. VAN DEN DUNGEN. "Acoustique des Salles." Gauthier-Villars et Cie., Éditeurs, 55 Quai des Grands-Augustins, Paris VI^e, France. 118 pp. Fr. 25.

CLARENCE J. WEST, Editor. "Annual Survey of American Chemistry." Vol. IX, 1934. Published for the National Research Council by Reinhold Publishing Corporation, 330 West 42d St., New York. 396 pp. \$4.50.

LUDWIG ZEHNDER. "W. C. Röntgen." Rascher & Cie., A.-G., Verlag, Limmatquai 50, Zürich 1, Switzerland. 198 pp. 5 Swiss francs.

"Annual Reports on the Progress of Chemistry for 1934." Vol. XXXI. The Chemical Society, Burlington House, Piccadilly, London, W 1, England. 424 pp. 11s. Postpaid.

"Travaux Thermométriques de l'Institut de Métrologie et de Standardisation de l'U. R. S. S. Mémoires Présentées à la VIII Conférence Générale des Poids et Mesures." Institut de Métrologie et de Standardisation de l'U. R. S. S., Mejdounarodny 19, Leningrad, U. S. S. R. 44 pp. 1 ruble.