
NEW BOOKS

The Mathematics of Physics and Chemistry. By HENRY MARGENAU, Associate Professor of Physics, and GEORGE MOSELY MURPHY, Assistant Professor of Chemistry, Yale University. D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, N. Y. xii + 581 pp. Illustrated. 15.5 × 23.5 cm. Price, \$6.50.

Through their preparation of this textbook presenting the applications to physics and chemistry of several fields of mathematics Professors Margenau and Murphy have made a significant contribution to the training of physicists and physical chemists. There has been a need, particularly evident in smaller universities, for a text such as this to serve as the basis for a "practical" course in mathematics to follow the customary advanced calculus courses.

Chapters are devoted to thermodynamics, ordinary differential equations, special functions, vector analysis, coordinate systems, calculus of variations, partial differential equations of classical physics, eigenvalues and eigenfunctions, mechanics of molecules, matrices and matrix algebra, quantum mechanics, statistical mechanics, numerical calculations, linear integral equations and group theory.

In the selection of material to include, the authors were apparently strongly influenced by their own interest in quantum mechanics. This, however, does not constitute any major criticism of the authors since they could not hope to abstract, to everyone's satisfaction, the entire field of mathematics as it relates to physics and chemistry. The material treated is in general more applicable to problems encountered in academic research than to problems of industry. A few of the topics which may deserve more attention are: linear systems, transforms, approximate and asymptotic evaluations of integrals, and elementary theory of acoustics and of hydrodynamics.

Chemists should find very useful that portion of the chapter on thermodynamics devoted to the determination of thermodynamic derivatives by the method of Jacobians.

The authors have frequently compromised in rigor of derivation to maintain an emphasis on the applications. Some illustrative problems are worked as examples, others, often supplementary to the text material, are included as student exercises. Typographical errors were fairly numerous in the first printing.

This book has been enthusiastically received by graduate students of physics, chemistry and mathematics, although not without criticism of certain sections. It has certainly stimulated interest in the topics covered.

PAUL C. CROSS

Outline of the Amino Acids and Proteins. Edited by MELVILLE SAHYUN, Vice-President and Director of Research, Frederick Stearns and Company, Detroit, Michigan. Reinhold Publishing Corporation, 330 West Forty-Second Street, New York, N. Y.; 1944. xi + 251 pp. Illustrated. 23.5 × 15.5 cm. Price, \$4.00.

This book is designed as an elementary text on the proteins and consists of twelve chapters written by various investigators. After an introduction by one of the masters of modern protein chemistry, C. L. A. Schmidt, the following chapters occur: 1. Discovery of the Amino Acids (Sahyun), 2. Proteins: Occurrence, Amino Acid Content and Properties (Schmidt), 3. Protein Structure (Bull), 4. Hydrolysis of Proteins (Sahyun), 5. Synthesis and Isolation of Certain Amino Acids (Carter and Hooper), 6. Methods of Analysis for Amino Acids and Proteins (Greenberg), 7. Relation of Amino Acids and their Derivatives to Immunity (Heidelberger), 8. Relation of Amino Acids to Biologically Important Products and the Role of Certain Amino Acids in Detoxication (Quick),

9. Metabolism of Proteins and Amino Acids (Cahill), 10. Intermediary Metabolism of Individual Amino Acids (Cahill), 11. Nitrogen Equilibrium and the Biological Value of Protein (Cahill and Smith), 12. Amino Acids and Proteins in Nutrition (Womack and Kade). An appendix on U. S. patents (Laurence) issued on amino acids and related compounds is included, a feature of value to the industrial protein chemist. A good subject index completes a book which is well-printed, well-bound, and remarkably free of typographical errors.

Whether the book fulfills its purpose as an introduction to the study of the proteins is open to some doubt. It is an illustration of the old saying that it is far more difficult to write a lucid elementary text on any subject than a more advanced treatise. From a purely pedagogic standpoint, one of the basic necessities of an introductory text is a sense of continuity and of logical development. Such a result is hardly achieved in a book written by numerous individuals, widely separated by geography and by different approaches and backgrounds, no matter how competent each individual is in his own field. In this respect, at least, only chapters 9, 10, and 11 taken together are successful in conveying a sense of unity in presentation. Although the more advanced treatise may frequently be best presented by a group of experts, such a cooperative effort is less effective in an elementary text such as this.

Another prime requisite for an introductory text is a minimum of emphasis on controversial topics and here the book, with the exception of a few points in chapter 3, is largely successful. The reviewer was somewhat puzzled to find in this chapter some stated disagreements of opinion with other investigators which only the professional, not the beginning student, is capable of resolving. In the final paragraph of this chapter the vigorously worded castigation of the theories of other workers and the good advice to maintain a skeptical attitude would have been more effective if an exception had not been noted for the author's own efforts; the appropriateness of such professional amenities for student instruction might be questioned.

Although the book as a whole does not entirely meet the purpose intended, certain of the chapters are competent vignettes of the status of special subjects, are well-written and lucid, and as such are separately useful for limited introductory studies. These are chapters 1, 5, 6, 8, 9, 10, and 11. There are notable omissions, even in these chapters, but inclusiveness was not intended. The use of photographs with brief biographies of noted protein chemists is an ornament to the book.

JESSE P. GREENSTEIN

Systematic Inorganic Chemistry. By DON M. YOST, Professor of Inorganic Chemistry, and HORACE RUSSELL, Jr., Instructor in Chemistry, California Institute of Technology. Prentice-Hall, Inc., 70 Fifth Avenue, New York, N. Y., 1944. xx + 423 pp. 78 figs. 15.5 × 23.5 cm. Price, \$6.00.

The title of this book may lead the reader to expect a treatise covering the whole field of inorganic chemistry. Instead the authors have confined their discussion to the chemistry of the non-metallic elements of the fifth and sixth groups: nitrogen, phosphorus, oxygen, sulfur, selenium and tellurium. This has been a wise choice, allowing them to deal with a reasonably homogeneous area and to apply a systematic treatment. Emphasis has been placed upon the critical selection of fundamental material rather than upon an exhaustive coverage of the literature. In view of the fine reputation of the senior author for sound work in this area, the reader may have

considerable confidence that the book presents an up-to-date summary of the behavior of the selected elements.

The pattern followed by the authors is one well calculated to show the expansion which is in progress in the field of inorganic chemistry due to the application of the new physico-chemical techniques which have become available since the beginning of this century. Not only is there an adequate presentation of the usual descriptive chemistry of the systems but the pertinent spectroscopic, structural, thermodynamic, chemical kinetic and nuclear properties are also considered.

The thermodynamic and kinetic treatment is especially complete and the authors have succeeded admirably in demonstrating how such an approach can lead to a clearer understanding of the field. In many cases, however, one wishes that they had been more thorough in pointing out the limitations involved in the interpretation of the kinetic data.

Much excellent structural work has been given but a considerable body of such material has been neglected, and there is little effort made to correlate structural data for the compounds with the nature of the atoms involved. Unfortunately the authors choose, in general, to rely on structural formulas of the classic type and avoid discussion of electronic distribution. In particular, in the passages dealing with the oxyacids they give outmoded formulations involving much double bonding of oxygen to the central atom, ignoring the idea, now generally accepted, that such double bonding is not realized in many of the inorganic oxyacid systems. For example, in the structural formulas given on page 388 for the sulfate and thiosulfate ions such double bonding is written and one is led to assume that the oxygen atoms coordinated to the central sulfur atoms are not structurally equivalent. Actually there is now a considerable weight of evidence which points to the equivalence of these oxygen atoms. The authors also do not take into account adequately our present knowledge of the characteristic coordination numbers in oxyacid systems. They give a structural formula for metavanadic acid involving a coordination number of three for vanadium, which is very improbable. In the extended discussion of the metaphosphates they fail to work out a rational concept of this condensed system by capitalizing on what is known about the coordination numbers in other phosphate and other condensed oxyacid ions. The structural discussion in the chapter on peroxides includes many dubious postulates. Electronic considerations are mentioned only infrequently, and, while the principle of resonance is suggested a few times, it is not handled adequately.

The volume has an attractive format. Much of the voluminous record is presented in well-organized tables and graphs so that the text may be devoted more to discussion. In general this discussion is lucid and stimulating, although a few passages suffer from careless proof reading.

On the whole, the authors have made a very important contribution and they are to be congratulated on their success, not only in summarizing the present state of knowledge in the field but also in suggesting many interesting possibilities for future developments. The book will be valuable as an advanced textbook for the classroom and also as a sound reference for the mature chemist.

A. W. LAUBENGAYER

Advances in Protein Chemistry. M. L. ANSON and JOHN T. EDSALL, Editors. Vol. I. Academic Press, Inc., 125 East 23rd Street, New York, N. Y., 1944. 16 × 23.5 cm. xi + 341 pp. Illustrated. Price \$5.50.

It is the plan of the editors of "Advances in Protein Chemistry" to supply in a series of books a collection of

review articles in protein chemistry which will give a survey of the work which has been done, with the results critically evaluated so that "as the reviews accumulate, they will provide a useful and comprehensive picture of the changing and growing field of protein chemistry, and a stimulus to its further development."

The first volume of this series contains nine articles which will be found interesting to anyone who works with proteins. The subjects and authors of these articles are as follows: Lipoproteins, by Erwin Chargaff; Structural Proteins of Cells and Tissues, by Francis O. Schmitt; Some Contributions of Immunology to the Study of Proteins, by Henry P. Treffers; The Interaction between the Alkali Earth Cations, Particularly Calcium, and Proteins, by David M. Greenberg; The Purification and Properties of Certain Protein Hormones, by Bacon F. Chow; Soybean Protein in Human Nutrition, by Donald S. Payne and L. S. Stuart; Nucleoproteins, by Jesse P. Greenstein; The Proteins of Skeletal Muscle, by Kenneth Bailey.

In each of these fields important advances have been made in recent years, and these advances have been summarized by the authors in a generally satisfactory manner. The articles on Structural Proteins of Cells and Tissues, with reproductions of excellent electron microscope photographs, and on Nucleoproteins are especially interesting, in part because of the great recent progress in these fields.

The book is well printed, except for the effect of the wartime poor quality of the paper. The only errors noted by the reviewer are in the two figures in the chapter on Immunology.

This new series is to be welcomed as an important addition to the body of chemical literature in a most important and active field.

LINUS PAULING

BOOKS RECEIVED

March 10, 1945–April 10, 1945

STUART R. BRINKLEY. "Introductory General Chemistry." Third Edition. The Macmillan Company, 60 Fifth Avenue, New York, N. Y. 645 pp. \$4.00.

WARE CATTELL, Editor. "The Washington Scientist." Volume I, No. 1, February, 1945. Science Press, Washington, D. C. 23 pp. Subscription, \$3.00. Single copies, \$0.30.

HORACE G. DEMING AND SAUL B. ARENSON. "Exercises in General Chemistry and Qualitative Analysis." Fifth Edition. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y. 297 pp. \$2.00.

KAI O. PEDERSEN. "Ultracentrifugal Studies on Serum and Serum Fractions." Almqvist and Wiksells AB, Upsala, Sweden. 178 pp. 10 Swedish crowns (about \$2.50).

BORIS SOKOLOFF. "The Story of Penicillin." Ziff-Davis Publishing Company, 540 North Michigan Avenue, Chicago, Ill. 167 pp. \$2.00.

SELMAN A. WAKSMAN. "Microbial Antagonisms and Antibiotic Substances." The Commonwealth Fund, 41 East 57th Street, New York, N. Y. 350 pp. \$3.75.

MARY ELVIRA WEEKS. "Discovery of the Elements." Fifth Edition, Revised and Enlarged. Mack Printing Company, Easton, Pennsylvania. 578 pp. \$4.00.

"Reports of the Biochemical Research Foundation of the Franklin Institute." Volume VII, 1942-1943. Director, Dr. Ellice McDonald, Newark, Delaware. 592 + pp.