

The organizational framework of the material by property and by substance compensates in part for the absence of an index. The arrangement of substances within sections is based on a scheme derived from the periodic system. Similar but not identical schemes are employed in the Gmelin "Handbuch," in "Selected Values of Chemical Thermodynamic Properties" (NBS Circular 500), and in "Selected Values of Properties of Chemical Compounds" (Manufacturing Chemists Association Research Project, Carnegie Institute of Technology). Universal acceptance of a single scheme would be advantageous.

The binding and apparent durability of the volumes are above average. The paper is good and the type legible. The tables are well arranged and not crowded. The numerous graphs, although small, are clear and always present experimental data as well as smooth curves. The comprehensive presentation of the original values from the literature and pertinent references is one of the greatest values of this and other volumes of the series.

The literature "cut-off" dates for the five sections of Volume II, Part 6 range from January 1, 1956 to April 4, 1958. Thus, part of the coverage of this active area of science is already four years behind the times. This is not a reflection on the diligence of the editors. The complete revision of a compilation covering all of physical science and technology is a massive undertaking. New editions are necessarily infrequent and long in preparation. The first part of the sixth edition appeared in 1950; the last part will appear in the 1960's. The rate of increase of numerical data makes it improbable that another revision in the same form will be attempted. Science should be grateful for the present monumental revision of Landolt-Börnstein as a holding action in the struggle to keep up with the flow of data produced by modern research. New methods are urgently needed for rapid and continuing evaluation and consolidation of the numerical data of science and technology.

OFFICE OF CRITICAL TABLES
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GUY WADDINGTON

Advances in Inorganic Chemistry and Radiochemistry
Volume 1. H. J. EMELÉUS and A. G. SHARPE, Editors,
University Chemical Laboratory, Cambridge, England.
Academic Press Inc., 111 Fifth Avenue, New York 3,
N.Y. 1959. xi + 449 pp. 16 × 23.5 cm. Price, \$12.00.

There is a modern trend to publish scientific review articles in books issued annually instead of in review journals. Since a new book has an appeal which the familiar review journals have lost, publications of reviews in book-form presumably increases the scope of a scientist's reading. There are, however, disadvantages to publishing reviews in book-form. Review journals are widely subscribed to by libraries and individuals, articles may be submitted without invitation, and journals have the policy of making reprints available. Reprints allow one to have copies of particular articles for easy reference without being accompanied by a large volume of other material, which represents additional expense to the scientist. Journals are usually sponsored by a scientific society and have continued to be published through periods of economic stress. The present policy of publishing technical reviews in book-form does tend to spread the scientific literature into what is effectively a large number of specialized review volumes. The reviews presented in the present volume are typical of the ones found in review journals.

The editors have selected a set of reviews for this volume that should attract interest in the series. In general the reviews are on subjects pursued actively in recent years and are of interest to research workers in inorganic chemistry. A brief summary will be given of the contents of this volume.

The articles *Compounds of Aromatic Ring Systems and Metals* by E. O. Fischer and H. P. Fritz, Munich, Germany (60 pages), covers the recent research on ferrocene and allied compounds. The preparation, chemical properties and structure are covered in detail along with a discussion of six- and seven-membered ring compounds. The review of W. Rudorff, Tuebingen, Germany, on the *Graphite Intercalation Compounds* (43 pages), discusses another system of compounds in which an atom or molecule is bound to a layer of carbon atoms composing the graphite structure.

Graphite oxide, graphite halogen compounds, the intercalation compounds of alkali metals and graphite salts are treated. Aside from the basic inorganic chemistry of these compounds, the article should be of interest to those using graphite in various technical applications. Both of the above articles should be of general interest to chemists.

Two reviews are devoted to structural chemistry. *Recent Studies of the Boron Hydrides* by W. N. Lipscomb, University of Minnesota (39 pages), deals with the structure of boron hydrides, and is written for the specialist interested in these structural problems. T. C. Waddington of Cambridge, England, *Lattice Energies and Their Significance in Inorganic Chemistry* (64 pages), is a detailed review of the methods of calculating lattice energies, and a summary of the results. This field is highly developed and the review should have a long-standing value in future years. The last comprehensive review of this subject was that of Sherman in 1932. The reviewer feels that this article is of primary interest in the solid state field, and the author's purpose might have been served better by publication in a review journal.

Three contributions to radiochemistry are presented. H. Taube's, University of Chicago, *Mechanisms of Redox Reactions of Simple Chemistry* (53 pages), is a review of electron transfer reactions in solution, a subject that is being actively studied. This article is tedious reading and directed at the specialist. It contains many ideas that should stimulate future work. The paper on *Szilard-Chalmers Reactions in Solids* (47 pages), by G. Harbottle and N. Sutin, Brookhaven Laboratory, U.S.A., reviews comprehensively the work in this active field. The theoretical understanding of the phenomenon is emphasized and the discussion is illustrated with experimental results. *Activation Analysis* by D. H. F. Atkins and A. A. Smales, Harwell, England, (30 pages), is very well organized. Trace analysis by the activation method is a branch of analytical chemistry that is rapidly expanding and the method will be exploited in the future. The present review serves as an introduction to the subject and is illustrated with applications of interest to the experienced analyst. The treatment could serve as a basic reference in this subject for a course in analytical chemistry.

A review of the *Phosphonitric Halides and Their Derivatives* by N. L. Paddock and H. T. Searle, Birmingham, England (36 pages), discusses a series of inorganic compounds with properties similar to organic compounds. The presentation is written in an interesting manner, and includes a good summary of the physical and chemical properties and a discussion of the structures. The review of R. J. Gillespie and E. A. Robinson, London, England (38 pages), on the *Sulfuric Acid Solvent System* presents an interpretation of the solvent reactions of sulfuric acid derived from solubility, cryoscopic, conductometric and spectroscopic measurements. The review is well written and summarizes the work of the authors on this subject.

DEPARTMENT OF CHEMISTRY

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A Guide-Book to Biochemistry. By KENNETH HARRISON,
Lecturer in Biochemistry in the University of Cambridge.
Cambridge University Press, 32 East 57th Street, New
York 22, N. Y. 1959. viii + 150 pp. 14 × 22 cm.
Price, \$3.50.

This short book covers in skeleton form such topics in Biochemistry as energy, production, enzymes, proteins, oxidation, photosynthesis, carbohydrate metabolism, fat metabolism, protein metabolism and the control of metabolism. A short appendix has been added to include the structural formulas of various molecules (usually cofactors) which are represented in the text only by names or abbreviations.

The book is intelligently planned and well written, but suffers to some extent from an uneven treatment of important subjects. The high spots of cellular metabolism, including the electron transport system, are very clearly presented. However on the one hand the pentose cycle for glucose-6-phosphate oxidation may be given in more detail than is necessary, while on the other hand the topics of protein synthesis and nucleic acid metabolism, which are fascinating frontiers of present day Biochemistry, are dealt with

in a very cursory manner. In the chapter on the control of metabolism, the role of the hormones is hardly touched upon. A fair number of names of investigators have been included along with their contributions to Biochemistry but in spite of this the founder of modern enzyme chemistry, J. B. Sumner, has not been mentioned in the chapter on enzymes.

It is somewhat difficult to decide exactly for whom this book is primarily intended. One might wonder whether it is somewhat oversimplified from the standpoint of the student of Science while still remaining beyond the grasp of the layman. It could however be useful to any beginner in Biochemistry as an aid in quickly acquiring a bird's eye view of cellular metabolism before becoming lost in details. This would no doubt be particularly true for undergraduates and a fair proportion of medical students.

Outside of the field of cellular metabolism the book has little to offer. If future editions appear it might be desirable to add a certain amount of new material dealing with other areas of Biochemistry, since a short volume of this sort can no doubt fill a real need provided that the field is adequately covered.

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Annual Review of Nuclear Science. Volume 9. Co-editors: EMILIO SEGRÈ, University of California, and LEONARD I. SCHIFF, Stanford University. Associate Editors: GERHART FRIEDLANDER, Brookhaven National Laboratory, and WALTER E. MEYERHOF, Stanford University. Annual Reviews, Inc., Grant Avenue, Palo Alto, California. 1959. vii + 625 pp. 16 × 23 cm. Price, \$7.00 (U.S.A.); \$7.50 (elsewhere).

Persons anxious to keep abreast with the wide variety of subjects included under the heading of nuclear science would do well to read the series, "Advances in Nuclear Science." Volume 9 is the most recent addition. It contains 15 chapters written by nineteen authors under the editorship of Emilio Segrè, University of California, and Leonard I. Schiff, Stanford University.

Of the fifteen chapters in the book, only three are related to chemistry. There is a chapter on technetium and astatine in which the author discusses the available information on the various valence states of these elements and points out the difficulties of studying the chemistry of astatine. The chemistry of astatine has to be inferred from tracer experiments since the element has only short half-life isotopes, 8.3 hour At^{210} being the longest lived isotope. The second chemistry chapter describes solvent extraction in radiochemical separations. The applications of several chelating and ion association systems are mentioned and their uses in separating elements of interest to radiochemists in the atomic energy field are emphasized. The third chapter to deal with chemistry is the biochemical effects of ionizing radiation. Changes in carbohydrate, fat and protein metabolism caused by radiation damage are considered, as well as changes in enzymes and nucleic acids. The use of chemicals to heal or protect the body from radiation is briefly mentioned.

In addition to the chapters on chemistry, there are several chapters presented in a simple enough manner to be interesting to a large number of chemists. The chapter on the experimental clarification of the laws of beta radioactivity reviews many of the recent experiments which have affected our ideas of beta decay, e.g., non-conservation of parity, the deviation from one of the ratio of the square of the coupling constants for Fermi and Gamow-Teller radiations, and the polarization of the electron wave. The recent experimental results which have shed some light on the nature of the fission process are summarized in a comprehensive chapter on nuclear fission. The rather complicated field of plasma research and controlled fusion is summarized in an interesting review which describes some of the properties of plasmas, their instabilities, the basic types of machines which have been constructed to test some of the theories, and, finally, the present state of the field. The experience with fast subcritical, zero power, and experimental reactors in the U.S.A., Great Britain and the U.S.S.R. are reviewed in a chapter on fast reactors. In addition, there is a dis-

ussion of the influence of various parameters on fast reactors as calculated by multigroup transport theory and some of the engineering problems encountered in designing fast reactors.

Of less interest to chemists, but nevertheless excellent reviews, are chapters on nuclear photo-disintegration, pion-nucleon interaction, strange particles, high energy nuclear reactions, electronics associated with nuclear research, economics of nuclear power, vertebrate radiobiology, and cellular radiobiology.

The entire series, "Annual Review of Nuclear Science," is an excellent set of books summarizing the recent information in fields associated with nuclear science. Volume 9 is a valuable addition to the series, and is highly recommended to scientists interested in the subjects mentioned in the review. All the articles are well documented and the references serve as good bibliographies for those people interested in obtaining more detailed information about the subject being discussed.

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Technique of Organic Chemistry. Volume I. Physical Methods of Organic Chemistry. Part I. Third Completely Revised and Augmented Edition. Edited by ARNOLD WEISSBERGER. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. xii + 918 pp. 16 × 23.5 cm. Price, \$24.50.

The contents of this highly regarded reference work under the editorship of A. Weissberger have undergone a marked revision from the form in which they appeared in the Second Edition (1949). The general organization very closely resembles that of the earlier edition in that each editor of a section presents first the theoretical fundamentals of his subject in what is generally a clear-cut and concise manner. Following this are practical applications and in many cases, sample calculations. The reader may thus select a method applicable to his own problem and pursue further information in the long and up-to-date series of references.

The chapters now appear as: I, Automatic Control; II, Automatic Recording; III, Weighing; IV, Determination of Density; V, Determination of Particle Size and Molecular Weight; VI, Temperature Measurement; VII, Determination of Melting and Freezing Temperatures; VIII, Determination of Boiling and Condensation Temperatures; IX, Determination of Vapor Pressure; X, Calorimetry; XI, Determination of Solubility; XII, Determination of Viscosity; XIII, Determination of Properties of Insoluble Monolayers at Mobile Interfaces; XIV, Determination of Surface and Interfacial Tension; XV, Determination of Osmotic Pressure.

The chapters on Automatic Control, Automatic Recording, Weighing and Particle Size and Molecular Weight are completely new. The principles and theory of automatic control are given "in reasonably non-mathematical form" and examples are shown with special emphasis on temperature control.

Chapter II, Automatic Recording, is essentially very practical and should be useful, as after a brief analysis of recorder characteristics there is discussion of the commercial recorders now available with their special characteristics and sources of supply. Included are the circuit diagrams for many.

Chapter III, Weighing, is developed in minute detail, with nearly fifty pages on the knife-edge balance and several pages on weights and standardization. The reviewer would have welcomed here more detail on the newly appearing one-pan rapid-weighing balances.

Chapter IV, Density, has new material on molecular volumes, and volume changes on mixing. Uses and measurement of gas and vapor density are new.

Chapter V, Particle Size and Molecular Weight, has sixty pages devoted briefly to ten methods differing in principle, including about twenty-five variations. Each is treated rather briefly, therefore with some inevitable duplication with later chapters. Extensive references help to make up for any brevity of treatment.

Chapter VI, Temperature Measurement, covers about the same ground in the new edition as in the earlier one and there seem to be few new references.