BOOK REVIEWS

Biochemistry in Relation to Medicine. By C. W. CARTER, M.A., B.M., B.Ch., Fellow of Queen's College, Oxford, and R. H. S. THOMPSON, M.A., B.Sc., D.M., Professor of Chemical Pathology, Guy's Hospital Medical School, University of London; formerly Fellow of University College, Oxford. Longmans, Green and Co., Inc., 55 Fifth Avenue, New York, N. Y., 1949. xi + 442 pp. 14 × 20.5 cm. Price, $5.00.

This book was designed for medical students and emphasizes those aspects of biochemistry which are directly applicable to medicine, including chapters on tests of liver, kidney, pancreatic and gastric function. Laboratory experiments are included at the end of each section or chapter. The arrangement of material is unusual. There is no chapter or section dealing directly with digestion, absorption of foodstuffs, or blood, although certain aspects of each of these topics are covered in other chapters (Enzymes, Hemoglobin and Allied Pigments, Electrolytes of the Body, Acid-Base Equilibrium, Bile, Plasma Proteins). The chemistry and metabolism of lipides are discussed in a single short chapter. Carbohydrate chemistry and metabolism are covered in separate chapters but metabolism of proteins and amino acids is not treated in an individual section. Although most of the chapters are well written, the organization would appear to make coordination difficult for the average student.

The chapters on chemistry are not adequate. They cover the material from a descriptive approach with little or no attempt to relate chemical properties of individual compounds to the fundamental reactions of the functional groups involved. They contain numerous errors or misleading statements (incorrect structures for sphingomyelin (p. 52), cerebrosides (p. 53), ergothioneine (p. 72), trigonelline (p. 275), lumichrome (p. 276), biotin (p. 281); the statement that "unnatural isomers which normally will be present in the racemic mixture"...; lecithin written with a covalent bond connecting phosphorus and nitrogen (p. 51) and the basicity of a quaternary nitrogen or the guanidine group never mentioned). In several instances older, now disproven ideas are given together with the currently accepted view. In the case of the un-ionized *versus* the "zwitterion" formulation for amino acids, it is not altogether clear which the authors prefer since they present both on page 68 and on page 91 use the un-ionized formula. Certainly in this case introduction of the "historical error" can only confuse the student. In other instances (absorption of fat (p. 56), oxidation of fatty acids (p. 58), structure of nucleic acids (p. 69)), discussion of outmoded views may not confuse but does occupy valuable space. Histidine is not listed as a dibasic amino acid and norleucine and hydroxyglutamic are still included as naturally occurring. The biuret test is said not to be given by amino acids (p. 83) (serine and threonine do).

Although this book contains several excellent sections, the deficiencies in the chapters on chemistry of carbohydrates, lipides and proteins are too serious to rate it highly as a textbook for beginning students.

H. E. CARTER

Metabolism and Function (In Honor of Otto Meyerhof). By D. NACHMANSOHM, Editor. Elsevier Publishing Co., Inc., New York, N. Y., 1950. 348 pp. Price, $6.00.

This book contains a collection of 38 papers dedicated to Otto Meyerhof on the occasion of his 65th birthday and was originally published as Volume 4, pages 1–348, of the *Biochimica et Biophysica Acta*. Aside from the introduction and the chapter by A. V. Hill, which includes a few personal remarks on the influence of Meyerhof's work on the development of Physiology and Biochemistry, the entire volume is given over to original papers written by students of Meyerhof or workers who have had close association with him or his work. Some of the papers are written in German or French but most of them carry a summary in each of the three languages. Seldom has one volume carried contributions from a more illustrious group of workers on cellular metabolism.

This book serves not only as a tribute to a great scientist but as a review of important new developments in metabolism and as an introduction to the work in progress in thirty or more of the leading laboratories in this field. For students of metabolism the book will be a necessary reference but even for those less well acquainted with physiology it will supply stimulating reading.

C. A. ELVEHJEM

Electron Microscopy. Technique and Applications. By RALPH W. G. WYCKOFF, Laboratory of Physical Biology, Experimental Biology and Medicine Institute, National Institutes of Health, Bethesda, Md. Interscience Publishers, Inc., 215 Fourth Ave., New York 15, N. Y. (Interscience Publishers Ltd., London), 1949. 248 pp. 202 illustrations. 15.3 × 22.8 cm. Price, $5.00.

No one is better qualified to write a book on this subject than its author. After making an enviable reputation, first in the use of X-rays in crystal structure analysis and then in the use of the ultracentrifuge in biological studies, he has taken up the subject of electron microscopy and applied it to the investigation of biological structures with such skill that he is now the world's leading authority in the field.

In this book he first describes and compares available electron microscopes and discusses in valuable detail the technique of their use, including the all-important preparation of samples. He then deals with applications to suspensions, viruses, corpuscular and fibrous proteins, etc., showing appropriate electron micrographs and interpreting their significance. In a final chapter on "The Structure of Macromolecular Solids," he illustrates and discusses the close-packing of rodlike and spheroidal protein molecules, correlating these results with established principles of crystallography. As the author notes, the pattern of close-packed spheres, observed in some of his protein crystal photographs is the same as that in Sir Lawrence Bragg's strikingly similar photographs of uniformly sized bubbles on liquid surfaces, used by the latter to illustrate the structure and behavior of metal crystals.

The illustrations in this book are masterpieces, especially the 166 electron micrographs taken by the author. These are not only beautiful examples of what electron microscopy can do, each one tells a story much more satisfactorily and convincingly than could be done by words alone. The reproductions are excellent.

The reviewer heartily recommends this volume to all interested in this new tool aud the new knowledge it is giving us about structure in the in-between range of sizes—between the range conveniently studied by X-ray diffraction and that easily accessible to optical techniques.

MAURICE L. HUGGINS

Partition Chromatography (Biochemical Society Symposia No. 3). Edited by R. T. WILLIAMS and R. L. M. SYNGE. Cambridge University Press (American Branch), 51 Madison Avenue, New York 10, N. Y., 1949. 103 pp. 12 figs. 15.5 × 24.5 cm. Price, $1.50.

A symposium on partition chromatography held in London in October, 1948, forms the basis for this group of

papers published in pamphlet form by the Biochemical Society. The collection of reviews, with bibliographies which are in part brought up to date through July, 1949, provides a very useful monograph for those interested in the chromatographic separation of organic compounds. The contributors to the symposium are British investigators who have participated in the well known development of new chromatographic methods stemming from the stimulating concept of partition (liquid–liquid) chromatography introduced by A. J. P. Martin and R. L. M. Synge in 1941. The volume deals with column methods as well as with the now famous paper chromatograms. The first article in the series, following the introduction by Dr. Ernest Baldwin, is by Dr. Martin on the theory of chromatographic separations. The closing contribution is a summary by Dr. Synge of the general principles and applicability of the methods.

Specific applications are dealt with under the following headings: Studies on Protein Structure, by F. Sanger; Studies on Amino-acid and Protein Metabolism, by C. E. Dent; Carbohydrates, by S. M. Partridge; Anthocyanins, Flavones, and Other Phenolic Compounds, by E. C. Bate-Smith; Organic Acids, Purines, and Pyrimidines, by S. R. Elsden; and Stationary Phases other than Pure Water, by A. A. Levi.

The variety of organic compounds in the above table of contents emphasizes the broad utility and significance of the experimental approach initiated by the authors of this volume. The writers have included many suggestions for lines of investigation which may prove practical in extending the newer chromatographic techniques to still other classes of compounds. It is pointed out that the subject is still a rapidly developing one. New and improved methods are continually being introduced. The theory of chromatographic processes is also becoming more clearly formulated. The term "partition (liquid–liquid) chromatography" may not be the correct title for many of the experiments described in this monograph. The relative roles of adsorption and liquid–liquid partition are frequently difficult to define. In practice, the question is not too critical since, as Synge points out in his summary, most chromatographic separations can be expressed in terms of one common principle, namely, that the movement of a substance is determined by its distribution between *mobile* and *stationary* phases, whatever may be the set of mechanisms involved. On the theoretical side, as well as on the practical side, this small volume presents an excellent summary of the rapid and fruitful development of this field during the past ten years.

STANFORD MOORE

Molecules and Crystals in Inorganic Chemistry. By A. E. VAN ARKEL, translated from the 3rd Dutch edition by J. C. Swallow. Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y., 1949. ix + 233 pp. 14 × 22 cm. Price, $3.85.

The intended audience for this book, so the preface states, is students in their first year of science or medicine. Certain concessions are made to such students by the avoidance of simple calculus, but on the whole the book seems too involved for most beginning students. It seems unfortunate that the main result of an attempt to be simple is occasionally to make the book somewhat too superficial for the graduate student or senior, for whom the book has real merit.

This book is essentially an attempt to explain the great bulk of inorganic chemistry in terms of the ionic bond. The author achieves no little success in this direction. Some of the discussions are quite good and worthy supplements to other treatments of the chemical bond. Inevitably, however, other arguments are pushed too far, and a number of chapters end in the admission that ionic bonds will not explain all chemical behavior.

On p. 184 of a 230 page book the covalent bond is introduced, and covalent character in ionic bonds is given as the cause of many of the anomalies which appeared when bonds were treated as completely ionic. This subject is not pursued very far, and most teachers will feel that the presentation is one-sided.

The author is at his best in presenting the concept of the ionic bond, the nature of ionic crystals, the dependence of structure and certain chemical and physical properties upon the cation–anion radius ratios. In some of these subjects the presentation is clear enough that the author probably achieves his goal of making the qualitative ideas understandable to the beginning science student.

R. E. RUNDLE

Isotopic Tracers and Nuclear Radiations with Applications to Biology and Medicine. By WILLIAM E. SIRI, Division of Medical Physics, Department of Physics and Radiation Laboratory, University of California, (Berkeley). With contributions by Ellsworth C. Dougherty, Cornelius A. Tobias, James S. Robertson, Rayburn W. Dunn and Patricia P. Weymouth. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 18, N. Y., 1949. xiii + 653 pp. Illustrated. 16 × 23.5 cm. Price, $12.50.

Of the three parts of which the book is composed the first (259 pp., including the Seaborg–Perlman table of isotopes) is devoted to a concise survey of the fundamentals of nuclear physics and chemistry. Such topics as properties of nuclei, γ-rays, β-particles, protons, deuterons, α-particles, neutrons, fission reactions and decay processes are discussed. Part II (237 pp.) is devoted to the techniques of nuclear science. Included are discussions of the theory and operation of mass spectrographs, counters of various types, ionization chambers, the electrostatic generator, cyclotron, synchrotron and betatron. The preparation of samples for counting, standardization of radioactive samples, the principles underlying the use of radioelements as tracers and the safe handling of radioactive materials are also covered. The last section (49 pp.) presents a brief survey of applications to biology and medicine of the available radio and stable isotopes. The book concludes with a bibliography (91 pp.) containing some 1785 references to general and original research papers dealing with the applications of about 50 elements, including the common stable isotopes used as tracers, arranged by elements. Numerous reference tables and graphs of ranges, cross sections, decay schemes, etc., are also included.

Topics are well correlated and the whole is well written even though a number of authors have contributed various chapters. While there are a few errors, they are in general fairly obvious to the reader. Occasionally graphs or figures are given with no reference to them in the text. One gains the impression from reading Part I that it has been condensed from more detailed material.

The book is a storehouse of information and cannot fail to be of great value to investigators in these fields. The cost of the book would seem to be excessive.

EDWIN O. WIIG

BOOKS RECEIVED

April 10, 1950—May 10, 1950

ROBERT C. ELDERFIELD (edited by). "Heterocyclic Compounds." Volume I. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1950. 703 pp. $11.00.

RICHARD FRANK GOLDSTEIN. "The Petroleum Chemicals Industry." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1950. 449 pp. $8.50.

KALERVO RANKAMA AND TH. G. SAHAMA. "Geochemistry." The University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. 1950. 912 pp. $15.00.