
BOOK REVIEWS

Progress in Biochemistry. A Report on Biochemical Problems and on Biochemical Research since 1939. By FELIX HAUROWITZ, M.D., D.Sc., Professor of Chemistry, Indiana University, Bloomington, Indiana. Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y. 1950. xii + 405 pp. 16 × 23.5 cm. Price, \$7.50.

The objective of this book is to inform students and teachers of science as well as workers in cognate, particularly medical, fields concerning the advances made during a decade in which biochemistry has experienced unprecedented development. The magnitude of the task will be apparent even by the most casual reference to the various series now devoted to summarizing periodically the outstanding developments in particular areas of biochemistry. The Annual Reviews of Biochemistry, of Microbiology and now of Plant Physiology, Advances in Protein Chemistry, Advances in Carbohydrate Chemistry, Enzymology, etc.—some of which were started in the period under review—and numerous symposia all show the great range which the author has set out to cover. The author has, therefore, made a notable contribution in covering so wide a field so concisely.

Since the subject covered is already so vast, it may seem unreasonable to regret some omissions. The author's stated policy, according to his preface, was to treat mainly of human and animal biochemistry. This is justifiable when the definitive work has been done on these organisms. It is to be regretted, however, when it ignores or deals inadequately with subjects in which the definitive work stems from plant biochemistry. For example, a brief chapter on mineral metabolism makes no reference to the advances in our knowledge of "trace" elements of "micronutrients" and it is robbed, thereby, of its general interest. To treat in a mere two pages of the equilibria of ions in organisms without any reference to the large amount of work on plants seems hardly informative. Although there is a brief chapter on assimilation, the references to photosynthesis are so brief that they hardly give an adequate picture of the notable advances made during the period in question. Compared to these omissions, the attention given to the controversial work on the carotenoids of *Chlamydomonas* and their supposed role in its reproduction is surprising. At various points in the book, the author refers to substances upon which "the organism" is dependent or reactions which "the organism" is either able or unable to carry out. The identity of this unique or ubiquitous "organism" is not made clear, but it should be obvious that the attention of the author is mainly fixed upon heterotrophic organisms, and higher animals in particular. This being so, it is a pity that the title and the scope of the work was not more restricted.

The book comes into its own when it deals chapter by chapter with the major biochemical constituents, their structural formulas, reactions and roles in intermediary metabolism. The treatment of proteins and protein metabolism constitutes nearly one fifth of the book, is comprehensive and well documented with references. Chapters on carbohydrates, fatty acids, carotenoids, steroids, hormones, vitamins and growth factors, antibiotics, nucleic acids, give to the reader concisely a viewpoint on the present state of knowledge in these fields. Separate chapters deal with the enzymes which are not concerned with oxidation-reduction systems and those which are so concerned.

In addition, the borderline between physical chemistry and biochemistry is represented by chapters on isotopes and their use, and on thermodynamics and kinetics in biochemistry and intermolecular forces in living matter. These chapters touch on such topics as activation energies, entropy, exergonic and endergonic reactions and in chap-

ters on muscle contraction and nerve excitation, there is an opportunity to consider how the energy released by biochemical processes is applied to specific purposes.

The brief chapter on cytochemistry introduces, or at least mentions, a wide variety of fundamental problems in biological chemistry: the nucleus and the cytoplasm in relation to their content of desoxyribonucleic acid and of ribonucleic acid respectively; growth in terms of protein synthesis and of self-duplicating units; the idea that the proteins of growth are in their unfolded rather than globular state; genes, mutations and biochemical genetics; malignant, as an aspect of abnormal, growth; viruses, and bacteriophages are all briefly mentioned. A short chapter on biochemical methods concludes the book.

Many, therefore, will find in this concentrated digest of progress in biochemistry through one of its most prolific decades a very useful source of reference and an introduction to the salient facts over a very wide field of biochemical knowledge. The style is clear and concise, most of the chapters being well supported by references.

A curious error occurs on p. 150 where methionine is said to give rise to γ -aminobutyric acid in the body instead of to α -aminobutyric acid. The point is important since it is now known that both acids occur free in nature, though the γ -aminobutyric acid is presumed to arise from glutamic acid, not methionine.

F. C. STEWARD

The Alkaloids. Chemistry and Physiology. Volume I. Edited by R. H. F. MANSKE, Dominion Rubber Research Laboratory, Guelph, Ontario, and H. L. HOLMES, University of British Columbia, Vancouver, Canada. Academic Press, Inc., 125 East 23rd Street, New York, N. Y., 1950. viii + 525 pp. 15.5 × 23 cm. Price, \$12.00.

This volume is the first of a projected series of five, in which the editors plan to present a comprehensive survey of the chemistry and pharmacology of the alkaloids. The undertaking is a cooperative one, and finds its justification in the large amount of work still going on in the alkaloid field, as well as in the great revival of interest within the last two decades in heterocyclic chemistry in general.

The first chapter (Manske) contains a discussion of the distribution of alkaloids among the various plant families, and a brief description of the traditional methods of isolation and characterization of alkaloids. It is surprising to find no mention of such newer techniques as chromatography, countercurrent distribution, ion-exchange, and absorption spectroscopy, which have been used with conspicuous success in some cases, and will undoubtedly become more widely used in the future. The next chapter (James) deals with the alkaloids considered in relation to the plants in which they occur, a topic on which most chemists are not very well informed, and gives a particularly interesting account of experiments designed to determine the intermediates utilized by the plant in alkaloid synthesis. Although little progress has been made so far, it would appear that suitable tracer experiments might be particularly fruitful in this difficult field. A chapter of similar scope, dealing with the general pharmacology of the alkaloids, would have been a valuable addition to this volume, because, in spite of the promise implied in the title and preface, there is very little information on this point to be found in the later chapters.

The following classes of alkaloids are discussed in the succeeding chapters: pyrrolidine (Marion), senecio (Leonard), pyridine (Marion), tropane (Holmes) and strychnos (Holmes). The authors all obviously write from a thorough knowledge of the literature, and their essays give a

lucid account of the development of the accepted structures and the syntheses, where they have been accomplished, of the various alkaloids. Due, apparently, to exigencies of publication, the discussion of strychnine and brucine has not been based on the structure which now appears well established, although this structure is mentioned as a possible one. The two chapters by Holmes are followed by very extensive tables listing, by name and melting point, all the derivatives of the tropane and strychnos alkaloids which have been prepared.

In books of this type, I would welcome more of an attempt to relate the detailed chemistry of the compounds under discussion to the general body of chemical knowledge and theory; many of the reactions first discovered in alkaloid degradation or synthesis are of great practical and theoretical interest, and brief discussions of the theoretical or practical implications of some of the points mentioned would make the book much more stimulating.

The editors and authors have, however, performed a highly meritorious job in preparing this volume, and it will undoubtedly become a standard work of reference.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ROCHESTER
ROCHESTER, NEW YORK

D. S. TARBELL

Frontiers in Colloid Chemistry, Volume VIII. Edited by R. E. BURK, *Plastics Department, E. I. du Pont de Nemours and Company, Wilmington, Delaware*, and OLIVER GRUMMITT, *Morley Chemical Laboratory, Western Reserve University, Cleveland, Ohio*. Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y., 1950. x + 157 pp. 15.5 X 23 cm. Price, \$4.00.

The present Volume VIII concludes the publication of the annual series of lectures, "Frontiers in Chemistry," given at Western Reserve University. Although its title is "Frontiers in Colloid Chemistry," the chapters, save one, are more or less related to the subject of adsorption. General readers will find the texts informative and well written; those with a deeper interest in the several subjects will discover that with one very notable exception the discussions are not very well documented with data and generally representative bibliographies, as compared to prior volumes.

It is unfortunate that publication of the book has been delayed to a time which is nearly five years after the presentation of the lectures. One of the six chapters has been extensively rewritten to be indicative of what the writer might have said late in 1948, but the other reports seem to be substantially, although not entirely, unchanged. All deal with very active fields.

The chapter by Dr. H. S. Taylor, "The Role of Adsorption in Colloid Science," should be read and studied by everyone interested in this subject. It emphasizes a point of view which has been often ignored, namely, the non-uniform structure of many surfaces. It describes with precision both the successes and the failures of the Brunauer-Emmett-Teller theory and suggests what may happen to scientists who extend their conclusions beyond the range of applicability of mathematical theory.

The treatments of the topics "Frontiers in Chromatographic Adsorption Analysis" and "Ion Exchange with Special Reference to Synthetic Resins" by Dr. H. H. Strain and Dr. R. J. Myers, respectively, are interesting and appropriate for lectures. These articles are extremely useful as an indication of the multiplicity of ways in which these techniques may be used. A beautiful example of a combination of the two approaches, the so-called "Ion Exchange Resin" series of articles in the November, 1947, issue of THIS JOURNAL, appeared too late for any mention.

Dr. V. R. Damerell contributed the report on "Sedimentation." For purpose of description it may be divided into two parts, the sedimentation of macromolecules and that of particulate matter. The first section does not

appear to be a well balanced account of the field. It is the impression of the reviewer that the ultracentrifuge has had its most extensive application and greatest success in physical-chemical investigations of the proteins. The account of the second field, one in which the lecturer has been active, is suggestive of the means by which observations of sedimentation velocity may give size and size distribution data of finely divided solids for which other sizing methods may be impractical.

The final two sections, "Colloidal Electrolytes, Wetting Agents, and Detergents" and "Organization of Crystals and Micelles of Soap: Solubilization and Detergency" by Dr. J. W. McBain, are reviews in which the material is taken largely from contributions of the author and his school. The first lecture is built about the familiar conductance-concentration and osmotic coefficient-concentration curves for soap solutions. In the second one the lamellar micelles, both as such and in their significance for solubilization, are described and the controversy with Hartley is revived. It has seemed to the reviewer that the McBain-Johnson data (page 150) cited as evidence against the Hartley micelle can be well explained by the assumption of the presence of any globular, though not necessarily spherical, micelle. The war years brought tremendous advances in emulsion polymerization and through them information about micelle form and solubilization. Reports descriptive of these advances became available after the manuscripts in review had been written.

J. W. WILLIAMS

BOOKS RECEIVED

August 10, 1950-September 10, 1950

- JEROME ALEXANDER (collected and edited by). "Colloid Chemistry. Theoretical and Applied." Volume VII. Reinhold Publishing Corporation, 330 W. 42nd Street, New York 18, N. Y. 1950. 736 pp. \$15.00.
- J. F. DANIELLI. "Cell Physiology and Pharmacology." Elsevier Publishing Company, Inc., 250 Fifth Avenue, New York 1, N. Y. 1950. 156 pp. \$3.00.
- G. MALCOLM DYSON. "A Manual of Organic Chemistry for Advanced Students. Volume One. The Compounds of Carbon, Hydrogen, Oxygen and the Halogens." Longmans, Green and Co., Inc., 55 Fifth Avenue, New York, N. Y. 1950. 984 pp. \$12.50.
- F. RADT (edited by). "Elsevier's Encyclopaedia of Organic Chemistry." Series III, Carbocyclic Condensed Compounds. Volume 12B Naphthalene. A. Compounds Containing One Naphthalene Nucleus. Hydroxy Compounds. Elsevier Publishing Company, Inc., 250 Fifth Avenue, New York 1, N. Y. 1950. 1283 pp., contents, subject, and formula index included. Subscribers to the complete work \$78.00; subscribers to Series III only \$91.00; single volume \$104.00.
- FREDERICK D. ROSSINI. "Chemical Thermodynamics." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1950. \$6.00.
- J. TIMMERMANS. "Physico-Chemical Constants of Pure Organic Compounds." Elsevier Publishing Company, Inc., 250 Fifth Avenue, New York 1, N. Y. 1950. 693 pp. \$12.50.
- A. TRAVERS. "Notions Modernes sur L'Atome et La Valence." Librairie Vuibert, Boulevard Saint-Germain, 63, Paris 5, France. 1950. 208 pp. 800 fr.
- ROGER J. WILLIAMS, ROBERT E. EAKIN, ERNEST BEERSTECHEER, JR., AND WILLIAM SHIVE. "The Biochemistry of B Vitamins." American Chemical Society Monograph No. 110. Reinhold Publishing Corporation, 330 W. 42nd Street, New York, N. Y. 1950. 741 pp. \$10.00.