

Reviews of Recent Books

Phosphorus Metabolism. A Symposium on the Role of Phosphorus in the Metabolism of Plants and Animals. Volume II, edited by William D. McElroy and Bentley Glass, The Johns Hopkins Press, Baltimore, 1952, pp. 930, \$11.00.

The papers and discussions presented at the second Symposium on Phosphorus Metabolism held at The Johns Hopkins University in June 1952 are published in this volume. The subjects include aspects of phosphorus metabolism not covered in the first Symposium. The major headings are: mechanisms of phosphate assimilation, under which are discussed acid-soluble phosphates in both animal and plant metabolism; the role of phosphate in amino acid and protein metabolism and in metabolism of lipids; the chemistry and metabolism of nucleic acids; the role of phosphate in the metabolism of photosynthetic and chemoautotrophic organisms; the influence of hormones on phosphate metabolism; and phosphate metabolism in specialized tissues.

A total of 41 papers is included, with an 89-page summary by Dr. Glass. The papers consist of reviews ranging in length from three to forty pages by writers whose authority has been established by important contributions to the field discussed. The emphasis is on current work, and in many of the subjects covered activity is so intense that a summing-up and integration is indeed a welcome aid to the many workers who must acquire and maintain a thorough knowledge of the developments in these important areas. Throughout the volume, a substantial amount of unpublished work is included. Discussions from the floor add to the interest of the presentations and often provide insight concerning the implications and new directions of thought.

Those interested in nutrition and growth will find much included that directly applies to these fields. There are, for example, papers dealing with recent developments in the chemistry and biosynthesis of nucleic acids. The discussion of the relationships between synthetic reactions, glycolysis, and respiration in cancer tissue provides insight into similar regulations in normal tissues. The description of the ingenious and plausible hypothesis proposed by Ling to explain resting potential of muscle and its accumulation of specific ions by a process of selective adsorption dependent on the chemical state of the muscle proteins suggests numerous other applications of the same line of reasoning.

Those concerned with clinical aspects of nutrition also will find much of direct interest in the reviews

of bone metabolism, in those dealing with effects of parathyroid, thyroid, pancreatic (including the hyperglycemic factor), adrenal, and pituitary hormones on phosphorus metabolism, and in many others. However, in addition to its contribution to specific fields, the volume provides an astonishing amount of general information concerning metabolism that will make it a useful source of information for some years to come.

In a book as valuable as this, presenting such a large fund of information, a more comprehensive index would have been desirable. J.G.R.

Progress in the Chemistry of Fats and Other Lipids. Volume I, edited by R. T. Holman, W. O. Lundberg, and T. Malkin, Academic Press, New York, 1952, pp. 186, \$7.00.

This book is a critical and up-to-date survey of the subject and consists of five sections each covering a particular phase of lipid chemistry. All sections are well and authoritatively written and should be of interest to those concerned with the chemistry of the fats and lipids.

The first section, "The Molecular Structure and Polymorphism of Fatty Acids and Their Derivatives" by T. Malkin of the University of Bristol, is concerned primarily with methodology and interpretation of data. An excellent discussion of the meaning and interpretation of the x-ray data of fatty acids, the related esters and hydrocarbons is included. Polymorphism of fatty acids and their ethyl esters is also discussed.

Werner Bergmann of Yale has presented a well-written section on "Sterols." Included are properties of the individual sterols, methods for isolation, sources of material, and a great deal of characterization data. In addition, there is a section concerning the conversion of sterols to vitamin D. Other sterols are not discussed. This section should be a valuable aid to those interested in obtaining an overall picture of the chemistry of sterols.

The section on the "Structure and Properties of Phosphatides" by P. Desnuelle of the University of Marseille is adequate in that it covers very well the lecithin, cephalin, and inositol lipids, together with some information about the sphingolipids. However, it does not mention the use of glacial acetic acid for fractionation of the soybean lipids, as published by Carter.

Ralph T. Holman of the Hormel Institute has reviewed the recent progress in the chromatography of

lipids and has included sufficient background information to acquaint the non-expert reader with the general problems in the field. Included are discussions and results of elution analysis, frontal analysis, displacement analysis, and partition chromatography as applied to the field of fatty acids and related products.

In the final section, H. J. Harwood of Armour and Company has presented a very excellent discussion of fatty acid derivatives. Included are amides, amines and alkylammonium compounds, nitriles, hydrazines and hydrazonium salts, isocyanates, acid chlorides, acid anhydrides, aldehydes, ketones, and derivatives of the hydrocarbon chain. The discussion largely concerns the higher fatty acids.

One of the outstanding features of this book is the large number of references. As a whole, the book accomplishes its purpose and should be a welcome addition to the field of lipid chemistry. M. H. McC.

Biochemistry and Human Metabolism by Burnham S. Walker, William C. Boyd, and Isaac Asimov. Williams and Wilkins Co., Baltimore, 1952, pp. 812, \$9.00.

The plan of presentation and the organization of the subject matter in this textbook represent the modern point of view in the teaching of biological chemistry. The *dynamic concept* of biochemistry is gradually replacing the classical *static* approach. The book is divided into the five major categories of the chemistry of the living organism: structure, control, growth, metabolism, and pathology.

The emphasis in the section on structure is on the chemistry of the proteins, with a very excellent review of the modern methods of protein chemistry and the nature of the protein molecule. Of special interest is the chapter on tissue chemistry which reviews the existing knowledge of the biochemistry of connective and supporting tissue, skin and its appendages, adipose tissue, muscle and muscle contraction, nerve tissue, and sense perception. These subjects are generally neglected in biochemistry courses although manifestations of disease and mechanisms of drug action are usually reflected by alterations in these tissues. In no instance are biochemical fundamentals sacrificed for elaborate reviews of spectacular recent developments.

The incorporation of the chapters on enzymes and hormones into a section entitled *Control* integrates the factors which catalyze single biochemical reactions or which regulate complete patterns of metabolic processes into a unit. Thus the phenomena of control and biological organization on a chemical basis are given positions of fundamental importance. Further support is given to the concept of integrated biochemical control by including a chapter titled "Hormone-Enzyme Relationships." Although the authors cite several well-known examples of interrelationship, they conclude that "the few glimmers of light, that are now beginning to appear, while

interesting and hopeful, are far from sufficient to illuminate even a corner of the subject."

The section on growth includes chapters on the chemistry of nucleoproteins, cancer, reproduction, and heredity. Although discussions of the chemistry of cancer, reproduction, and heredity have usually been relegated to advanced courses in biochemistry, an understanding of the fundamental cellular chemistry involved here would permit a fuller appreciation of these subjects when considered later in medical studies and practice. The authors have presented the chemistry of cancer as an alteration or breakdown in cellular chemical organization. The discussion of heredity emphasizes the chemical mechanism of cell division and the chemical nature of the blood group substances.

Beginning with the section on metabolism, the authors have correlated the normal metabolic processes with well-known pathologic alterations in metabolism. In this way, by demonstrating the biochemical defect in certain more common metabolic pathologies, they have emphasized the clinical significance of fundamental biochemistry. The subjects discussed are: Carbohydrates and Diabetes, Lipid Metabolism and Ketosis, Proteins and Starvation, Electrolytes and Water, Edema and Shock, and finally, Respiration and Acidosis. In addition, in the chapter on Food and Diet, the biochemical aspects of malnutrition and food requirements are introduced. The early introduction of nutrition into the medical curriculum is important because too often this vital phase of medicine is overlooked or only briefly surveyed during the clinical years. It also provides the student with a more integrated view of the nutritional and physiological well-being of the patient.

The last section, pathology, in addition to a chapter on vitamins furnishes the student with a brief introduction to the concepts of immunochemical specificity and metabolite antagonism. Here again a biochemical foundation is constructed upon which to develop ideas in pathology, pharmacology, and medicine.

This book has been written for medical students but is highly recommended to all physicians who wish to review fundamental biochemistry in its application to medicine. **CARL ALPER**

Food Science, edited by E. C. Bate-Smith and T. N. Morris, Cambridge University Press, London and New York, 1952, pp. 319, \$3.00.

Food Science is a collection of lectures by authorities in each of the subjects covered. The various topics are not all equally treated because the lectures were given in a summer course in food science arranged by the University of Cambridge.

The chapter on foods in the United Kingdom is not limited to that area. It presents a challenge to all food technologists. The possibility of enlarging

our sources of food supplies through knowledge of technology makes the reading of this section instructive. The principal foodstuffs, including meat, fish, eggs, fresh fruits and vegetables, and cereals, are discussed, and the information included will spare long hours of work uncovering recent research.

Spoilage of foods is dealt with from the point of view of chemical and biological mechanisms. The preservation of food is covered in another chapter. Recent research on the destruction of protein and vitamin content during the various processing procedures have not been overlooked. The chapter on micro-organisms as sources of protein and fat is one of growing interest, and reports of work done during the last war when food shortages were being experienced are most interesting. The illustrations include 16 plates which are unusually helpful.

The book is a valuable addition to the literature, since there are not many of its kind to be found. This symposium on quality and preservation of food should prove a most valuable up-to-date reference book not only for the food technologist but also for the dietitian and nutritionist. The title, *Food Science*, was carefully chosen, for the subject is presented in a broad way which will interest those engaged in other fields of science. S.M.B.

Freezing and Drying edited by R. J. C. Harris, Hafner Publishing Co., New York, 1952, pp. 206, \$3.00.

This monograph is a very complete collection of data presented at a symposium, held under the auspices of the Institute of Biology, on the industrial applications of freeze drying of biological materials and the design of equipment. It consists of 19 reports presented at 4 sessions by eminent workers in the field.

The first session describes the equipment used in the manufacture of blood products, other parenteral biologicals, and food products. The fundamental aspects of the design of freeze drying equipment and the criteria for satisfactory drying with respect to vacuum and temperature requirements are discussed.

The second session is devoted to the application of low temperatures and freeze drying procedures to the preservation of mammalian cells and tissues. The viability of tissues after treatment is a function of the rates of freezing and thawing, the degree of desiccation, and the duration of freezing. Slow freezing is found to be more desirable than rapid freezing for survival of certain tissues. In rapid freezing there is danger of vitrification, which results in tissue damage.

The third session presents a discussion of the

freeze drying of bacteria, viruses, and antisera. The viability of bacteria after treatment depends, particularly, upon the presence of a protective colloid and reducing substances in the suspending medium, and also on the degree of desiccation and absence of oxygen. Since the methods do not work equally well for all organisms, a routine procedure has not been defined.

The fourth session describes experiments on tissue fixation by freeze drying. The advantages of this procedure over the chemical method are that there is no appreciable immediate protein denaturation; dissolution effects by organic solvents with consequent loss of tissue are avoided; and cytoplasmic constituents are preserved and not translocated. This procedure is especially desirable in the preparation of tissues for electron microscopy and cytochemical analyses.

The freeze drying technique is being applied more frequently in tissue laboratories for research and diagnostic purposes, in the food industry, and in the manufacture of biologicals. This monograph provides an introduction to this important new development in biological technology. CARL ALPER

Books received for review by the *Journal of Clinical Nutrition* are acknowledged in this column. As far as practicable, those of special interest are selected, as space permits, for a more extensive review.

Year Book of Endocrinology, 1952, edited by G. S. Gordon, The Year Book Publishers, Chicago, 1953, pp. 400, \$5.50.

Annual Review of Medicine, Volume 4, edited by W. C. Cutting and H. W. Newman, Annual Reviews, Inc., Stanford, 1953, pp. 452, \$6.00.

Advances in Food Research, Volume IV, edited by E. M. Mrak and G. F. Stewart, Academic Press Inc., New York, 1953, pp. 457, \$9.00.

Essentials of Physiological Chemistry (fourth edition) by A. K. Anderson, John Wiley & Sons, Inc., New York, 1953, pp. 480, \$5.00.

Handbook of Dietetics for Nurses by C. F. Harris. Ballière, Tindall & Cox, London, and The Williams & Wilkins Co., Baltimore, 1953, pp. 196, \$4.00.

Refining of Oils and Fats for Edible Purposes by A. J. C. Andersen, Academic Press Inc., New York, pp. 204, \$7.00.

Holt Pediatrics (twelfth edition) by L. Emmett Holt, Jr., and R. McIntosh, Appleton-Century-Crofts, Inc., New York, 1953, pp. 1485, \$15.00.

