SCIENTIFIC BOOKS

MEDICAL PHYSICS

Medical Physics. Edited by OTTO GLASER. xlvi + 1744 pp. The Year Book Publishers, Inc. 1944. $18.00.

THIS volume represents a comprehensive attempt to describe those aspects of physics which are being utilized in medicine at the present time. There are over two hundred separate articles by contributors who are experienced workers and, in many instances, outstanding authorities in their respective fields. As the editor states, the volume was conceived as "a combination of an *encyclopedia,* sufficiently comprehensive to serve as a reference for all those whose occupations involve any aspect of medical physics; a *textbook,* adequately detailed in exposition to serve students; and a *working instrument,* in which may be found the data necessary for actual application of the principles of physics to medicine."

The subject-matter is too vast to describe or even outline in any detail. A few articles may be named to illustrate the considerable scope of the volume and the wide range of interest. For example, there are detailed sections on such basic subjects as bioelectricity (Beutner), cosmic rays (Wollan), growth (Wetzel), optics (Sheard), photoelectricity (Cashman), spectrographic analysis (Langstroth) and mathematical biophysics (Rashevsky). Of more specific interest are such articles as those on air conditioning and heating, biomechanics, urological methods and various surgical techniques.

The value of the volume is most apparent when it is considered from the viewpoint of the physician who is eager to understand the bases in physics of the phenomena he deals with, or from that of the medical investigator who needs a convenient guide book to physical methods and concise summations of data which are applicable to his work.

The clinician will find instructive material on such subjects as the arterial pulse, audiometers and hearing aids, mechanism of bronchial obstruction, dynamics of cerebrospinal fluid, the circulation, climatic factors in health and disease, electrocardiography, electro-encephalography, fever therapy, gastroscopy, work and failure of the heart, roentgenography, photochemistry of vision, etc.

But the volume will prove most useful, if not indispensable, to the medical investigator as a guide to physical methods and data. Thus there are comprehensive sections on biometric methods, the use of isotopes in biological work (together with a table of nuclear properties), photometry, spectrophotometry, centrifugation, cinephotomicrography, endoscopic photography, physical anthropology and other subjects of similar importance. There are also shorter articles on a variety of specific techniques and on the significance of data obtained by means of these techniques. Among these articles may be mentioned those on the blood cell count, blood volume, electrolyte and water equilibria in the body, electrophoresis, falling drop method, oxidation-reduction potentials, polarimetry, refractometery and volumetric and manometric methods for the measurement of cell respiration and other processes.

There are several features which facilitate use of this volume. The tables of contents are arranged both alphabetically and by medical subjects. Tables of symbols and abbreviations are present in the introduction. Substantial bibliographies are present at the end of each article and enable the reader to follow up his subject in greater detail. The author and subject indices are also very detailed.

There is little in this book which detracts from its general merit. Occasionally, there appears to be misplaced emphasis on subjects which are not strictly within the scope of the volume. For example, there is a rather large section on the chemistry of chlorophyll which, although of considerable interest in itself, does not appear pertinent to the main purpose of the volume. A number of others fall into this group, such as the articles on ecology, on the types of tables used in cystoscopy and on methods used in resuscitation.

In general, the volume appears to have fulfilled the purposes of the editor excellently. Although it is not a text-book in the usual sense, the student of physics or biophysics will find much which he may study intensively, and the medical material will serve to broaden his interests and outlook. For the medical and biological investigator, this volume will undoubtedly prove to be an essential and much used work of reference.

OSCAR BODANSKY

ENZYMES

Enzyme Technology. By HENRY TAUBER. vii + 275 pp. 46 figures. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. 1943. $3.50.

ACCORDING to the author, the purpose of this book is designed to present practical information concerning the role and use of enzymes in industry. A large number of subjects have been discussed briefly: Yeast production and utilization; the role of enzymes in brewing; mold fermentation; bacterial fermentation; the production of various enzymes; methods of estimating enzymes; enzymes in the medical field; breadmaking and dairy production; the enzymes of meat,

eggs, vegetables, fruits and grains. The use of enzymes in the textile and paper and the wine and dairy industries and other industries where enzymes are employed is given consideration.

There is also a chapter on "Vitamin-destroying Enzymes" and a chapter on "Microbiological Methods for the Estimation of Vitamins."

Many of these subjects are not discussed in sufficient detail, and in some cases the author has not confined himself to the original objectives.

In Chapter VI—"The Production of Enzymes and Methods of Their Estimation"—methods for the preparation of diastatic enzymes from molds, bacteria and pancreas and also proteolytic enzymes are given, whereas the preparation of yeast enzymes, malt diastase and a number of other preparations are described in other chapters. A more reliable index of the contents within the chapter would be helpful to the reader. The only methods included in this chapter cover proteolytic activity, lipolytic activity and a method for saccharogenic amylase activity. Some of the other methods are given in the chapters describing specific enzymes in more detail. It is believed that it would have been helpful to the reader to group the chapters containing material on the amylases, as this procedure would have made possible a more unified treatment of the subject.

The models of Hanes for the structure of the starch molecules are given. It is believed that it is now quite well established that starch consists of straight-chain amylose and the branched-chain amylopectin, consequently the simple Haworth structure does not represent the most recent conceptions of starch structure. The author seems to have confused the starch liquefying property of α-amylase and the as yet unverified amylophosphatase of Waldschmidt-Leitz and Mayer.

The author has brought together a number of recent developments in the less well-known fields, such as the manufacture of leather, pectin, lactic acid and the retting of flax, which will be of interest to the student.

A discussion of the microbiological assay methods for the six B vitamins is given in the last chapter.

The book should prove to be a useful contribution to the growing field of enzyme technology. The scope of the book is rather broad and, consequently, the treatment given each subject is in many cases too brief, but the reader can cover the field more thoroughly by making use of the excellent collection of references given at the end of each chapter.

The printing of the book is satisfactory and the errors are relatively few. The binding is suitable for a book of this type.

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QUANTUM CHEMISTRY

Quantum Chemistry. By HENRY EYRING, JOHN WALTER and GEORGE E. KIMBALL. 390 pp. New York: John Wiley and Sons. 1944. $5.00.

"IN so far as quantum mechanics is correct, chemical questions are problems in applied mathematics. In spite of this, chemistry, because of its complexity, will not cease to be in large measure an experimental science, even as for the last three hundred years the laws governing the motions of celestial bodies have been understood without eliminating the need for direct observation." This quotation from the preface expresses well the authors' point of view. The presentation is directed to the graduate student level on the assumption of the standard training in physics, mathematics and chemistry. It is excellent. The material is well arranged and each subject lucidly and thoroughly presented. The number of errors is small for the type of material presented. The reviewer has found about a dozen, of which all are typographical in nature. Separate chapters are devoted to the differential equations involved in ordinary quantum mechanical problems, radiation theory, the general principles and applications of group theory, statistical mechanics and electric and magnetic phenomena. A set of carefully selected references is given in an appendix for each of the major subjects treated. The historical development of the quantum theory is described in the first chapters with a clear tracing of the transition from the "old quantum theory" to the "wave mechanics," authoritative references to classical papers being given. The fundamental postulates of the quantum theory then are stated with no attempt to rationalize away their wonderful mystery. The more difficult points are treated patiently and carefully. The properties of the spin operators and their eigenfunctions are presented only after a thorough treatment of the general angular momentum operators. The rather irritatingly complicated derivation of the second order perturbation equations ordinarily given is alleviated somewhat. It is a pleasure to find group theory in its fundamental and applicable forms treated in a book on beginning quantum mechanics. The same remark applies to the chapter on statistical mechanics. In short any one who masters this book certainly will have gained a good acquaintance with theoretical chemistry and physics.

The book does not fulfil, however, a widely recognized need for a general presentation of the more qualitative aspects of the quantum chemistry. Certain techniques exist and are used generally for applying quantum principles to ordinary problems. In general these center around the Uncertainty Principle and the Correspondence Principle, the first of which is