

The jacket points out that "the material contained in this book is, for the most part, the result of a series of lectures given under the Engineering Extension Program of the University of California in Berkeley during the summers of 1956 and 1957. This course, entitled 'A Survey of Nuclear Engineering for Management,' consisted of lectures presented by approximately twenty guest speakers—all specialists in the field." At least several of the eighteen chapters have been updated to about 1959. The presentation is directed toward the industrialist who has an engineering degree but has not been actively engaged in engineering for five to ten years. Accordingly, the general level of presentation is relatively unsophisticated. This should not detract from its value to most non-experts in nuclear reactors.

The book is divided into four parts, plus an introductory history of atomic energy by Edward Teller. Part I, *Nuclear Energy—Basics* and Part II, *Nuclear Energy—Applications*, are about one hundred pages each. Part III, *Nuclear Energy—Safety*, which includes a chapter on medical aspects of radiation, and Part IV, *Nuclear Energy—the Future*, are each about fifty pages in length. More than half of Part IV is devoted to a chapter on controlled-fusion power.

Parts I and II include chapters on fundamental principles of nuclear reactors, breeder and converter reactors, the production and processing of nuclear materials, economics of nuclear power, research reactors, sodium-graphite and organic-moderated reactors, and industrial uses of isotopes. There is a chapter dealing specifically with the Shippingport Atomic Power Station.

As a result of the multiplicity of authors there is some non-uniformity in presentation and some overlapping in coverage as well as areas of non-coverage. However, these are only minor drawbacks in a generally valuable book.

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The Enzymes. Second Edition, Completely Revised. Volume 4. Hydrolytic Cleavage (Part A). Peptide Bond Cleavage, Other C-N Bond Cleavage. Glycoside Bond Cleavage. Carboxyl Ester Cleavage. Edited by PAUL D. BOYER, Department of Physiological Chemistry, University of Minnesota, Minneapolis, Minnesota, HENRY LARDY, Institute for Enzyme Research, University of Wisconsin, Madison, Wisconsin, and KARL MYRBÄCK, Institute for Organic Chemistry and Biochemistry, University of Stockholm, Stockholm, Sweden. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. xx + 631 pp. 16 × 23.5 cm. Price, \$18.00.

Volume IV contains an interesting and useful collection of articles on specific hydrolytic enzymes. The treatment of the chemical and physical properties of these proteins is for the most part excellent. However, there is as yet not enough known about the catalytic properties of these enzymes to write an integrated book in this field. The Editors provide some cohesion by organizing this book into sections. These are introduced by the following chapters: "Peptide Bond Cleavage," "Other C-N Bond Hydrolyses," "Cleavage of O- and S-Glycosidic Bonds," and "Carboxyl Ester Cleavage." Each contains a brief and concise survey of the enzymes discussed in the respective sections.

The chapters entitled: "Carboxypeptidases A and B," "Leucine Aminopeptidase," "Pepsin," "Chymotrypsin," "Papain," "Thrombin," "α-Amylase" and "Lysozyme" are all authoritative, complete and up-to-date. A great deal has been done to ascertain the purity of the enzymes discussed in these chapters, and the work on the chemical and physical characterization of these proteins is impressive. Equally well written, but dealing with less well characterized enzymes are the chapters: "Bacterial and Mold Proteases," "Urease," "Arginase," "Penicillinase," "Adenylic Deaminase," "β-Galactosidase," "β-Amylase" and "Acetylcholinesterase." Included in these chapters, together with the usual review of the literature, are many satisfying discussions and provocative speculations. Among these is a discussion of the effect of substrate binding on acetylcholinesterase-catalyzed reactions, an account of the activation of procarboxypeptidase A, and speculations on the mechanism of action of leucine aminopeptidase, pepsin, α-amylase and β-galactosidase.

The following chapters describe for the most part semi-quantitative observations on enzymes of questionable homogeneity and poor characterization: "Invertase," "Cathepsins," "Glutaminase," "Plasmin," "Other Glucosidases," "β-Glucuronidase," "Hyaluronidases," "Neuraminidases," "Fatty Acid Esterases of Low Eserine Sensitivity and Related Enzymes," "Butyryl- and Propionylcholinesterases and Related Types of Eserine-Sensitive Esterases" and "Phospholipases."

The book is valuable in directing attention to rich areas of research of varying complexity, suitable for both the physical scientist and the biologist. Volume IV of "The Enzymes" belongs in every biochemistry and chemistry library. It is recommended to all enzymologists, to those interested in the special topics covered, and to all students of molecular biology.

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Organic Electronic Spectral Data. Volume I. 1946-1952. MORTIMER J. KAMLET, Editor. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1960. xiv + 1208 pp. 16 × 23.5 cm. Single copy price: \$28.50; Subscription price: \$25.00.

Organic Electronic Spectral Data. Volume II. 1953-1955. HERBERT E. UNGNADE, Editor. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1960. x + 919 pp. 16 × 23.5 cm. Single copy price: \$17.50; Subscription price \$15.00.

The systematic documentation of molecular spectra is becoming a problem of rapidly increasing magnitude, and electronic and vibrational spectra are now recognized as the principal physical characteristics of organic molecules. Much of this information is first reported as incidental detail in publications that are not written with the spectroscopic interest specifically in mind, and the difficulties in extracting the information from the original sources are such that the organic chemist often finds it quicker to determine the spectrum anew. This of course is only possible if he has the reference compound on his laboratory shelf, and laboratory shelves have limited capacities.

A search of the decennial and annual indexes of "Chemical Abstracts" is the classical method of extracting spectral data from the literature. Prior to 1958, "Chemical Abstracts" listed all types of molecular spectra collectively under the single heading "Spectra," but, at the suggestion of the Commission on Molecular Structure and Spectroscopy of IUPAC, a more detailed form of indexing has now been adopted. Beginning with Volume 52, "Chemical Abstracts" classifies spectra into subsections "infrared," "visible and ultraviolet," "Raman," etc. While the "Chemical Abstract" index and the "Chemisches Zentralblatt" index provide machinery for the extraction of spectral data from the literature, they do not adequately meet the requirements of the chemical spectroscopist. He needs a more concentrated source reference and preferably one which is immediately available beside his spectrometer. For vibrational spectra this problem presents extreme difficulty. The necessary information is too complex to be presented in numerical form without resort to digital tapes or punched cards. The storage of infrared data therefore calls for electronic or mechanical storage systems or bulky graphical presentation. It is difficult to visualize how the systematic collation of vibrational spectra can ever be achieved in book form; catalogs and atlases of infrared spectra will unavoidably be limited to selected groups of compounds.

Electronic spectra of liquids and solutions are much simpler and the characterizing features of the most complex spectra (e.g., phenanthrene) can be recorded by about 24 pieces of information (12 band positions and 12 intensities). A complete summary of the electronic spectra of organic compounds, in the ranges currently useful to organic chemists, is therefore a practical possibility. In the volumes which we are reviewing, Dr. Kamlet and Dr. Ungnade, with the assistance of some fifty collaborators, have brought together data based on a review of 50,000 electronic spectra extracted from 10,000 references. This was initially started in 1956 as a volunteer co-operative project, and a year later it was incorporated as Organic Electronic Spectral Data

Inc. and is now a continuing organization. Volume III, covering 1956–1957, is in preparation under the Editorship of Dr. L. A. Kaplan and Dr. O. H. Wheeler; abstracting for Volume IV (1958–1959) is almost complete and work is already in progress on Volume V. Speaking conservatively, we may therefore expect that the series will be brought up to date in about five years. This represents a monumental achievement, and should act as a spur to those concerned with the documentation of other physical constants of organic compounds, and as an example of what can be done by a group of willing collaborators with good leadership.

The compounds are organized on a molecular formula index system which conforms closely with that used in the "Chemical Abstracts" Formula Index. With a few exceptions the compound names also conform with "Chemical Abstracts" nomenclature. The phase, solvent, *pH* and other experimental conditions are clearly listed in a separate column followed by the wave lengths and intensities of the absorption maxima, shoulders and inflections. The wave lengths are commonly reported to three significant figures in millimicrons. The intensities ($\log \epsilon$) follow the band positions in parentheses. Where the original references provide only a curve, without supplementary numerical data, the maximal band positions were estimated and these are distinguished by underlining. In the final column the references are listed by an eight-digit code system which is easily learned and simple to apply in practice. The editors take pains to emphasize that the spectra are not selected for accuracy, and data may be included even if known to be incorrect. This is done on the grounds that the information may be valuable in demonstrating the operation of otherwise unknown chemical or photochemical transformations. This seems justifiable where several references are listed for the same compound so that comparison is possible. In other cases it is probably expedient. The book only claims to be a literature summary; the ultimate judgment about the validity of the data remains with the man who uses and interprets the individual spectra.

The editors do not claim total coverage of the literature, but the journals searched include 19 published in North America, 40 in Western Europe, 10 in Eastern Europe and the U.S.S.R., and 7 from other countries. This seems a fair statistical and geographical distribution and undoubtedly includes the major portion of the relevant literature. One would hope, however, that the ultimate aim of complete coverage of the world literature will be achieved and when additional journals are added, the back issues of these journals should be searched to 1946. In addition to recognized scientific journals, spectra from the A.P.I. Research

Project No. 44 are included. Many excellent ultraviolet spectra of aromatic compounds, which were published in 1951 by Friedel and Orchin in atlas form, are not included, and to be of maximum value the abstracting system must remain flexible enough to deal with special cases of this kind. A casual inspection of any issue of "Current Chemical Papers" reveals the wide range of journals in which publications on electronic spectra find a resting place. As long as the abstracting system remains selective, the chemical spectroscopist must avoid the temptation to regard these volumes as definitive summaries of the complete literature. In this respect their very convenience constitutes a danger.

The year 1946 as the starting point was selected by the editors as coinciding with the introduction of photoelectric methods for the routine recording of electronic spectra. The reviewer knows of at least one collection of eighty spectra of aromatic compounds, obtained with the Beckman DU spectrophotometer, that was published in 1945, and much of the earlier photographic work, particularly that obtained with the Hilger Spekker photometer, is still not obsolete. The very early work (1910–1935) is well documented in "The International Critical Tables," the "Tables Annuelles des Constantes et Données Numériques," and the "Landolt-Börnstein Tabellen (Fünfte Auflage)." The years 1936–1937 were surveyed by Ellinger (*Tabulae Biologicae*, 12, 291 (1937); 16, 265 (1938)). It is therefore the period 1938–1946 for which a gap remains in our documentation of electronic spectra. This is covered in part by Herchenson's useful monograph "Ultraviolet and Visible Spectra—Index for 1930–1954," published by Academic Press Inc. (1956). This volume, however, reviews only about 30 journals from American and Western European sources. Perhaps, when the immediate pressure is off, the editors of Organic Electronic Spectral Data, Inc., may be prevailed upon to prepare Volume 0 covering 1935–1946.

The first volume is very fittingly dedicated to the late Prof. E. A. Braude who, after a brilliant career at the Imperial College of Science and Technology in London, died in 1956 at the early age of thirty-four. In his short period of active scientific life, Professor Braude made major contributions to our understanding of the relations between the molecular structure and electronic spectra of organic compounds. This is succinctly summarized in a dedicatory preface by Sir R. P. Linstead and Dr. F. C. Nachod.

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