

It should be mentioned, also, that Horner, Hoffmann, Wippel and Hassel³ have determined the major product in each of the reactions of a series of *p*-Y-phenyltriphenylphosphonium halides with sodium hydroxide, and they found that the relative ease of elimination of groups parallels the anionic stability.

(3) L. Horner, H. Hoffman, H. G. Wippel and G. Hassel, *Chem. Ber.*, **91**, 52 (1958).

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BOOK REVIEWS

Chemie der Azofarbstoffe. By HEINRICH ZOLLINGER, Privatdozent an der Universität Basel. Birkhäuser Verlag, Elizabethenstrasse 19, Basel 10, Switzerland. 1958. 308 pp. 17.5 × 24.5 cm. Price, sFr. 36.25.

This approach to the chemistry of azo dyes has been made from the physical-organic chemist's point of view, which has been subordinate in the various books published about dye chemistry since the last war.

The material employed in the book is completely up-to-date and thoroughly documented. In keeping with the purely scientific nature of the text, reference to patents is very meager. In at least one instance, reliance on patent information has been independently verified (see ref. 44 on p. 79). Twenty-eight references chosen at random were found to be entirely accurate.

The material is easily read and the presentation is straightforward. No mechanism or theory is put forward or developed without adequate definition of the terms used. The organization of the topics discussed is logical and orderly. The first chapter is devoted to the concepts, definitions and methods of studying reaction mechanisms. The next six are concerned with diazo and diazonium compounds. Methods and mechanisms of diazotization, equilibria and isomerisms, and decomposition reactions of diazo and diazoamino compounds are thoroughly discussed. Chapters 8 and 9 present methods of preparing azo compounds and the mechanisms of the most important method, the coupling reaction. Chapter 10 should prove fruitful to the organic dye chemist since it explains the application of coupling theories to the technology of azo dyes. The next chapter (11) is the only one in which the subject matter is treated from a strictly organic point of view. It explains the nomenclature and classification of azo dyes from the technical aspect, and contains seven sections in which the chemistry of the most important classes is concisely but clearly explained and illustrated. There is also an interesting table of the most important developments in the azo dye industry, presented in chronological order. Chapter 12 deals with the relation between constitution and properties of azo dyes. There is an excellent general summary on structure and light absorption of organic compounds, and a discourse on the relation of color as seen by the eye to the spectral absorption curve. The tautomerism and acid-base equilibria of azo dyes are also discussed. It is a disappointment to this reviewer that a section on correlation of structure to light fading of azo dyes, which would seem to belong to this chapter, was not included. It is true that this particular aspect of dye chemistry is quite confused, but emphasis of this fact might have given impetus to a truly scientific study of light fastness. A valuable aid to the industrial dyer would have been the inclusion of a section concerned with structure and ease of reduction, which is important in such applications as discharge printing. Chapter 13, which presents the chemistry of metallic complexes, is indeed timely because of the growing importance of the relatively new, so-called "neutral dyeing" complexes for nitrogenous fibers. The nature of the complex bonds, and the equilibrium, stability and stereochemistry of the complexes are nicely portrayed. No doubt, the last two chapters in the book will be considered by some as not properly belonging here because their scope is greater than the use of only azo dyes. These are concerned with

the use of dyes on various fibers and the physical chemistry of the dyeing processes. However, certainly no harm is done and, if the book is to be used as a text, the condensed treatment employed will, for many purposes, eliminate references to more lengthy and cumbersome treatises.

A few minor criticisms, which do not detract seriously from the general usefulness of the book, are to be noted. The indexing appears to be incomplete; for example, structural formulas for triphenodioxazines appear twice in the text, but no reference to them is found in the index. Also, reference to reports based on captured German documents is rather loose; for example, reference 20 on page 115 is given simply as "FIAT-Report 1313." Since this latter is a three-volume work of about 1400 pages, the reader might find it annoying to ferret out the desired information without more specific instruction.

The printing, paper, and binding of the book are of high quality.

Dr. Zollinger's book is a must for the azo dye research chemist and is suitable as a text, especially at the graduate level. It is hoped that this treatise, together with the recent books of a more organic and technological nature, will stimulate American colleges to offer courses in dye chemistry.

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Outlines of Enzyme Chemistry. Second Edition, Revised and Enlarged. By J. B. NEILANDS, Department of Biochemistry, University of California, and PAUL K. STUMPF, Department of Agricultural Biochemistry, University of California. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1958. xii + 411 pp. 15.5 × 23.5 cm. Price, \$8.50.

In view of the rapid accumulation of new information and continual modification of research trends in the field of enzymology, the prompt appearance of a new edition of even an elementary textbook of enzymology such as "Outlines of Enzyme Chemistry" is very welcome. The second edition retains the character and general organization of the first, but has been expanded approximately 30 per cent. Most chapters show judicious revision with only minor expansion, but greatly enlarged discussions or new chapters are offered in several areas of current research interest or rapid recent development.

The book, with 27 chapters, is organized into four sections, of which the first two are concerned with general principles and the physical chemistry of enzymes. The first section includes brief but valuable chapters of general and historical introduction, enzyme isolation methods, criteria of purity and characterization of enzymes. The physical chemical aspects of enzymology are given extended, lucid treatment at a fairly elementary level, with separate chapters devoted to chemical and hydrogen ion equilibria, metal-ion equilibria, kinetics, effects of substrate concentration, of pH, and of temperature, action of inhibitors, energetics-oxidation-reduction, specificity of enzymes, and mech,

anisms of enzyme action. The third section, which classifies and describes types of coenzymes and enzymes, represents a useful, well-organized synthesis and summary of a large, diverse body of information and proposed classification schemes. Separate chapters are devoted to discussion of respiratory enzymes and of proteolytic enzymes. The fourth section, which deals with metabolic patterns at the enzyme level, begins with a very brief review of methodology in studies on metabolic processes and of the biological localization, organization and regulation of enzyme systems. Subsequent chapters survey some of the pathways of carbohydrate and fatty acid metabolism, oxidative phosphorylation, and the biosynthesis and metabolic functions of nucleotide derivatives. The extensively revised final chapter by Roger Stanier reviews succinctly the current knowledge and experimental approaches in the area of protein synthesis.

This book is well-written, clear and comprehensible to readers with a reasonable knowledge of chemistry and biochemistry. The coverage is deliberately uneven, with concentration on general properties of enzymes and with comparatively brief coverage of specific enzymes and of only selected areas of metabolism; the result is an emphasis on fundamental material of general significance which can later be applied by the student to specific cases. While the body of the text thus avoids the character of a catalog of specific enzymes, the appendix lists some 500 enzymes, together with a few properties and a key literature reference for each.

"Outlines of Enzyme Chemistry" will serve well its intended purposes: to introduce the senior undergraduate and beginning graduate student to the general field of enzymology, and to provide basic background material in enzymology for research workers in other fields.

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The Theory of the Properties of Metals and Alloys. By N. F. MOTT, M.A., F.R.S., and H. JONES, Ph.D. Dover Publications, Inc., 920 Broadway, New York 10, N. Y. 1958. xiii + 326 pp. 14.5 X 21.5 cm. Price, \$1.85.

The above book is a paper bound reprint of the original published in 1936. The type size is large, and the quality of the printed page unusually good.

This volume covers, on an advanced quantum mechanical level, topics such as thermal properties of the crystal lattice, electron theory of metals, cohesion, crystal structure, magnetic properties, and electrical resistance. Many advances have been made in the science of metals since 1936, and hence some portions of the book would look different if they were rewritten today. Pauling's viewpoint on the intermetallic bond, for example, is not treated. Notwithstanding, the majority of subjects are introduced in a manner that will not be out of date for some time to come. The book is well worth the low price at which it is offered.

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Chemical Publications. Their Nature and Use. Third Edition. By M. G. MELLON, Ph.D., Sc.D., Professor of Analytical Chemistry, Purdue University. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y. 1958. x + 327 pp. 15.5 X 23.5 cm. Price \$7.00.

Three decades ago it was not uncommon for a student of chemistry to finish college having an acquaintance with his chosen field which did not extend beyond the covers of his textbooks. Naturally, then, his introduction to graduate study was hampered by the necessity of learning the techniques and tricks of literature searching and study. Professor Mellon realized this long ago and his first "Chemical Publications" book in 1928 was a helpful guide for many students, although few colleges then could find a place in a

crowded chemical curriculum for another course in Chemical Literature.

At first glance and even on continued reading, this is not an orthodox sort of textbook, but the subject itself is not susceptible to an orthodox text treatment. Chapters 1 to 10 present an introduction to the history and forms of publishing chemical information, the latter classified as primary sources (periodicals, institutional publications, patents and miscellaneous), secondary sources (index-abstracting-review periodicals, bibliographies, reference works, monographs and textbooks), and tertiary sources (guides, lists and directories). These chapters do not and could not read like an absorbing novel, but the facts and information are there in well-organized superabundance. Chapter 11 is entitled "Making Searches in the Chemical Literature," and gives a systematic, instructive, usable outline of how to look for desired information on a topic, whether brief or extensive, narrow or broad in scope. Chapter 12, "Library Problems," comprises a series of library search projects for class use, ranging from a simple study and report on a periodical, to more complex assignments on general and special topics.

As noted earlier, the whole subject is not capable of a smooth, easy-reading, fascinating treatment, and the prospective user should not have any such expectations. This third edition has not been altered in any major way, but minor changes, additions and improvements are numerous. There is available no better introduction to the field, and Professor Mellon's latest revision will continue to aid chemistry students in a better approach to chemical literature, as it has for thirty years.

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Fortschritte der Chemie Organischer Naturstoffe (Progress in the Chemistry of Organic Natural Products). Volume XVI. Edited by L. ZECHMEISTER, California Institute of Technology, Pasadena. Springer-Verlag, Molkerbastei 5, Wien I, Austria, 1958. vi + 226 pp. 16 X 23.5 cm. Price, \$9.50.

The latest member of this series is the smallest one yet to appear, but certainly no less interesting or varied in content than the preceding ones. In the current volume, K. Freudenberg and K. Weinges discuss "Catechine, andere Hydroxy-flavane und Hydroxy-flavene," giving a short, straightforward review of these compounds on the basis of structural classifications. "Recent Progress in the Chemistry of the Aconite-Garrya Alkaloids" is a clear exposition by K. Wiesner and Z. Valenta of the structural investigation of these remarkably complex alkaloids. E. E. van Tamelen summarizes the elucidation of structure and reactions of some 24 antibiotics in "Structural Chemistry of Actinomycetes Antibiotics." J. Bonner discusses the recent additions to our knowledge of "Protein Synthesis in Plants," and, finally, H. Kuhn gives a lucid review, largely of his own work, "The Electron Gas Theory of the Color of Natural and Artificial Dyes: Problems and Principles."

Even more than its predecessors, this volume illustrates how dependent progress in the field of natural products is on varied kinds of research: the beautiful biochemical techniques that are beginning to reveal how proteins are synthesized, quantum-mechanical calculations which quantitatively predict the absorption of dye molecules, and the intelligent use of almost every physicochemical tool known in unravelling the labyrinthine structures and rearrangements of the aconite alkaloids. On the other hand, the rich array of structural variation found even among the Actinomycetes antibiotics, which includes polypeptides, cyclic sulfides and disulfides, aliphatic azoxy and diazo compounds, modified sugars, nitrated and chlorinated aromatic rings, optically active allene, and 12-, 14 and 17-membered rings, reminds us how much the chemist owes to the ingeniously constructed products of nature, which continue to demand his fullest effort of technique and theory.

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