BOOK REVIEWS

Principles of Radiation Dosimetry. By G. N. WHYTE, National Research Council, Ottawa, Canada, and Queen's University, Kingston, Ontario. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. vii + 124 pp. 15.5 × 23.5 cm. Price, $7.00.

As the applications of ionizing radiation increase, so the need also increases for technologists in chemistry and related fields to make radiation measurements or to assure themselves of the adequacy of radiation dosage measurements made by others. Fulfilling the proper experimental conditions for adequate measurements of this type is often a surprisingly stringent and complicated task, much more so than one could easily assume from the apparent simplicity of the dosage unit, the rad, in which such measurements are usually reported.

The book under review assumes an elementary but quantitative knowledge of physics, and is concerned primarily with the interaction of radiation and matter and in developing the physical principles involved in measuring radiation dosage from external X-ray and γ-ray sources. It is in no sense a handbook on measurement techniques. Rather it serves, as far as actual measurement methods are concerned, as a commentary upon various experimental techniques for characterizing radiation sources and measuring radiation doses from them. It points out strong and weak points of various radiation measuring procedures and collects information, not otherwise easy to come by, on conditions that must be fulfilled to make adequate measurements. It is a book that deserves wide distribution and use.

Useful but less thorough discussions are given of radiation measurements of neutrons and external charged particle beams. Internal radiation sources are not discussed. The bibliography is limited almost entirely to English language sources.

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Finführung in die Elektronentheorie Organischer Verbindungen (Introduction to the Electronic Theory of Organic Compounds). By GEORG KARAGOUNIS, Apl. Professor für Physikalische Chemie, an der Universität Freiburg I. Br. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1959. 195 pp. 13.5 × 20.5 cm. Price, DM. 24.—

This little paper-back book is based on a series of lectures delivered by the author in the recent past at the University of Freiburg.

Instead of being an introduction, it is in fact a rapid survey of such topics, among others, as: The Photoelectric Effect and the Dual Nature of Light; The Bohr Atom and Its Inadequacies; Quantum Theory; Wave Mechanics; Resonance; Molecular Orbital Theory; Hybridization; Color and Constitution; Chemical Reactivity from the Standpoint of Electron Theory; Nuclear Magnetic Resonance and Chemical Structure.

The author is skillful in presenting the mathematical background needed to understand the various topics, and he is at his best in showing the applications to chemical concepts. However, it must be borne in mind that his lecture audiences had the necessary prerequisites in physics, mathematics and chemistry to be able to follow his discussions. The reader must be similarly prepared or be willing to study the books recommended by the author.

Inconsistencies in the book can be adduced to absent-mindedness, haste or careless proof-reading. For example, in a number of structural formulas, nitrogen is represented with five equivalent valence bonds, and benzene derivatives at times are pictured as simple hexagons. On page 164 two formulas are not clearly identifiable, and the distribution of charge on the atoms is omitted.

Terseness is to be expected in so small a volume, but to state merely that hydrazobenzene rearranges into benzidine without an explanation, is poor exposition. The treatment of chemical theory shows many evidences that the book is a somewhat expanded version of the author's lecture notes. Footnote 3, page 135, is obviously an informal notation which was not meant to be copied as written.

A generation or so ago when a German scientific work appeared with the word *Einführung* in its title, one could be fairly certain that it would be a solid, two or three volume work. Professor Karagounis owes the public the pleasure of reading such an Einführung in die Elektronentheorie Organischer Verbindungen.

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Aromatic Substitution. Nitration and Halogenation. By P. B. D. DE LA MARE, M.Sc. (N.Z.), D.Sc. (Lond.), Reader in Chemistry, University College London (University of London), and J. H. RIDD, B.Sc., Ph.D. (Lond.), Lecturer in Chemistry, University College London (University of London). Academic Press Inc., 111 Fifth Avenue, New York 3, N.Y. 1959. vii + 252 pp. 16 × 25.5 cm. Price, $9.00.

Aromatic substitution is treated in all beginning and advanced organic texts and treatises, but, with a few exceptions, the treatments are usually perfunctory, mainly qualitative, and tend to stress essentially orientation and substituent effects. There has been a decisive need for a monograph which would present the actual development in the field, not its status of twenty years ago or an idealized picture of orientation. Such a book has now been written, and the reader is assured an up-to-date version of aromatic substitution, because the authors, both at University College London, have worked actively in the field and have made significant contributions to its advancement.

There is so much material to be covered that actually only two substitution reactions have been chosen for discussion—nitration and halogenation—a wise choice, when a choice had to be made, because these have been the most thoroughly studied kinetically, mechanistically and with regard to substituent effects. However, a mere listing of these two reactions does not do justice to the contents of the book. Of the 18 chapters, seven are devoted to these two reactions, and include separate chapters on preparative methods, mechanisms, substituent effects, nitrosation and substituting agents in halogenation. Two earlier chapters discuss the qualitative electronic theory and methods for investigating reaction mechanisms, the latter with particular emphasis on substitution. Chapters 11 to 15 deal with aromatic rearrangements, and with nitration and halogenation in biphenyl and related compounds, in bi- and polycyclic systems, in non-benzenoid aromatic hydrocarbons and in heterocyclic compounds. Chapters on electrophilic displacements of groups other than hydrogen in nitration and halogenation, molecular-orbital calculations of aromatic reactivity, and linear free energy relationships in direct substitution reactions conclude the book.

The book's most outstanding feature is not only its up-to-dateness in terms of coverage (the literature is covered through 1958), but its thoroughly modern point of view and the stress on quantitative and on kinetic results, whenever these are available. There is a minimum of unnecessary speculation, and very often the need for further investigations is pointed out. One becomes aware of the fact that here is a field where there exists much qualitative information, but relatively little precise quantitative data, although such data are being accumulated at a faster rate now than at any time in the preceding two decades. The book is not meant to be exhaustive or encyclopaedic, and there is no unnecessary padding, to which a field with so many qualitative observations lends itself, but a remarkable amount of work of current interest is covered. Topics such as the structure of the transition state in different substitution reactions, the significance of kinetic isotope effects, the possible intervention of complexes in substitution, certain