

growth. We haven't the competence to review each of these thirty-seven articles nor have we even the space to list their titles. However the range of subjects covered and the collection of illustrious men which covered them is perhaps the truest reflection of the scientific contribution and the influence of the man in whose honor they were written.

The list of Warburg's contributions to science on pages 13 and 14, beginning with his first publication in 1904 on the "Splitting of Racemic Leucine Ethyl Ester by Pancreatin," and ending (only the list) in 1953 with "Chemical Constitution of the Hemin of Iron-Oxygenase," is indeed an impressive one. On reading the essays themselves, one has somewhat of the feeling that the authors of these essays may have either actually seen, or at least in their mind's eye visualized, this list of Warburg's publications. For one gets the impression that this celebration volume may very well prove to be the vehicle for the announcement of a number of other contributions to science which may one day take their place beside those of the man in whose honor they were written.

The introductory essay on Warburg himself, written by his close associate and editor of the volume, Dean Burk, gives a very enlightening picture of the man in two or three pages. It is certainly a book to be retained in the personal libraries of all biochemists and of every scientist having any interest in the development of science as a whole. A perusal of it would be an introduction into modern cell biochemistry for the beginners. Dr. Burk is to be congratulated in having brought together such a collection.

DEPARTMENT OF CHEMISTRY  
UNIVERSITY OF CALIFORNIA  
BERKELEY, CALIFORNIA

MELVIN CALVIN

**Compounds with Condensed Thiophene Rings.** By H. D. HARTOUGH, formerly Socony-Vacuum Laboratories, and S. L. MEISEL, Socony-Vacuum Laboratories, Paulsboro, New Jersey. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. xv + 515 pp. 16 × 23.5 cm. \$16.50.

This volume is a continuation of Hartough's "Thiophene and its Derivatives," and discusses the chemistry of heterocyclic systems containing the thiophene ring fused with other rings. Slightly more than half of the book is devoted to the two best known systems, thianaphthene and dibenzothiophene. Thianaphthene derivatives have been investigated intensively as intermediates in the synthesis of thioindigo dyes, and dibenzothiophene has also been studied in some detail. The remainder of the book contains a discussion of the more complicated polycyclic systems containing a thiophene ring, and lists all of these systems (including some most recondite and questionable ones) which have been reported.

The discussion of each class of compounds is accompanied by a table listing all of the compounds of each type which have been prepared along with their physical properties. This encyclopedic coverage has not been extended to the thioindigo dyes, because of the inordinately large number which have been described or claimed.

The first chapter contains a discussion of some theoretical problems which arise in considering substitution reactions in thianaphthene and dibenzothiophene; although there might be a difference of opinion about the validity of some of the arguments, the chapter serves a useful function in introducing the detailed material which follows. The authors have maintained an interest in theoretical problems and a reasonably critical viewpoint on their material throughout the book.

Some comparison of the present volume with the sections in the Elderfield treatise on thianaphthene and dibenzothiophene (written by David Fukushima) may be in order. The Fukushima treatment undoubtedly gives a clearer synopsis of the general behavior and properties of these systems for the general reader than could be gained from the

present volume without a good deal of very close reading. However, the Hartough and Meisel volume, because of its detailed and comprehensive treatment, will be much more valuable for the research workers in the field.

The qualities which marked the Hartough thiophene monograph are characteristic of the present treatise: clear organization and presentation, great care and thoroughness in the collection of material, a clear if not always elegant style, an interest in organic theory, and frequent references to areas where further research is desirable.

The complicated structural formulas and the text appear to be remarkably free from errors. The authors' customary critical judgment is lacking in presenting without comment structures on pages 371 and 384, which can be seen to be highly improbable on steric grounds. The reviewer wishes that the references had been placed at the bottom of the page, instead of being collected in a block at the end of the volume.

Research workers in the field of sulfur heterocycles are indebted to the authors for the care and energy with which this monograph has been prepared.

DEPARTMENT OF CHEMISTRY  
UNIVERSITY OF ROCHESTER  
ROCHESTER, N. Y.

D. S. TARBELL

**Organic Peroxides.** By ARTHUR V. TOBOLSKY, Frick Chemical Laboratory, Princeton University, and ROBERT B. MESROBIAN, Polymer Research Institute, Polytechnic Institute of Brooklyn. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. 1954. x + 197 pp. 15.5 × 23.5 cm. Price, \$5.75.

It was a distinct pleasure to read this handy volume as it constitutes a salient landmark in the development of free radical chemistry which is today of such great importance, both academically and industrially. It fills a very definite void in the chemical literature for nothing of its kind in extent has heretofore existed. As the authors point out in their introduction, Rieche's book appeared long ago (1931); it concerned itself primarily with synthesis and properties and hardly at all with kinetics and mechanisms. Since that time there have appeared noteworthy reviews but the present volume is much more extensive than any of these. It covers the field of organic peroxides very comprehensively. The material is presented in three primary sections. The first, comprising 55 pages, is devoted to "Preparation, Properties and Structural Classification of Organic Peroxides." (This also covers analytical procedures.) The second section of 65 pages discusses "Decomposition of Organic Peroxides" and covers well the literature on mechanisms and kinetics. The third division (30 pages) relates to the utilization of peroxides in polymerization and is entitled "Initiation of Vinyl Polymerization by Peroxide Decomposition." The volume concludes with four useful Appendices which give in tabular form "Physical Constants of Selected Organic Peroxides," "Explosive Nature of Peroxides," "Some Commercially Available Organic Peroxides" and "Catalyst Efficiency."

Sufficient of the literature prior to 1931 is given to provide a good background for the general subject and the volume concentrates in the main on the work of the last two decades, during which such rapid progress has been made. The text is very extensively documented and this reviewer could find no serious omissions and indeed no misstatements. The binding is sound, the format and type are clear, and but few typographical errors were detected. "Organic Peroxides" is heartily recommended not only to the specialist in this field (indeed for him it is a must), but also to those who wish to have at least a sound introduction to the general topic.

SHELL DEVELOPMENT COMPANY  
EMERYVILLE, CALIFORNIA

WILLIAM E. VAUGHAN