

Further peaks were observed at 9.53, 7.3, 6.82, 6.65, 5.99, 5.76, 3.4 and 2.9 $\mu$ . These data are in good agreement with the infrared analysis of the triacetyl derivative of natural sphingosine recently reported by Mislow.<sup>2</sup>

As a preliminary study of this route we carried out the above sequence of reactions on ethyl palmitoylacetoacetate and obtained the expected di-

hydrosphingosine in good over-all yield. A synthesis of the latter involving  $\alpha$ -phenylhydrazono- $\beta$ -oxo-stearic acid has been realized previously.<sup>5</sup>

(5) Crosby, Thesis, University of Illinois, 1948.

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## BOOK REVIEWS

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**Flow Properties of Disperse Systems. Volume V of Deformation and Flow Series.** Edited by J. J. HERMANS, Professor of Physical Chemistry, University, Leiden. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1953. xi + 445 pp. 16.5  $\times$  23.5 cm. Price, \$9.90.

This volume comprises reviews on a variety of topics, by a number of authors, all of European origin. It therefore reflects the state of rheological thought in Europe, and while invaluable for this presentation perhaps does less than justice to work in this field done in this hemisphere. The disperse systems discussed include all types from coarse suspensions to macromolecular solutions such as the proteins. R. Roscoe in a short section has given a lucid account of most of the phenomena such as dilatancy, thixotropy and rheopecty encountered in suspensions. E. G. Richardson describes the flow characteristics of emulsions and also contributes a section on liquid sprays, a subject which received much study during the war years. The chapters on smoke and atomization of liquids written by H. L. Green of the British Chemical Defence Experimental Establishment likewise have military application and give the present state of theoretical knowledge in these subjects. The theory of dilute solutions is covered in sections by Ch. Sadron and J. J. Hermans, the former dealing with impenetrable rigid particles while the latter gives the statistical approach to the rheological behavior of flexible, long-chain molecules. J. J. Hermans has contributed also a chapter on gels, their swelling and elastic behavior, which, while valuable in itself, seems somewhat out of place in this volume. The behavior of foams is described by R. Matalon, while Mrs. B. S. Neumann treats the interesting but little understood flow phenomena encountered with powders of finely divided materials such as clay, flour and cement.

This is a well documented book, carefully written and would seem to be an essential for any worker in the field.

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G. BROUGHTON<sup>1</sup>

(1) Deceased September 10, 1954.

**Progress in the Chemistry of Fats and Other Lipids.** Edited by R. T. HOLMAN, Associate Professor of Physiological Chemistry, Hormel Institute of Minnesota, W. O. LUNDBERG, Director, Hormel Institute of Minnesota and T. MALKIN, Reader in Organic Chemistry, University of Bristol. Academic Press, Inc., Publishers, 125 E. 23rd Street, New York 10, N. Y. 1954. vii + 347 pp. 16  $\times$  24.5 cm. Price, \$9.80.

Although the structure of fats had been known long before the structure of proteins or carbohydrates was elucidated, it is only recently that there has been an upsurge of interest in lipid substances. This interest is reflected in the increasing number of current books on this subject. The second series of "Progress in the Chemistry of Fats and Other Lipids" presents a review of the recent work in the whole range of fat chemistry and biochemistry. The editors are

to be complimented on the diversity and scope of the areas covered, which include the following topics: The Polymorphism of Glycerides by T. Malkin, 50 pp., Autoxidation of Fats and Related Substances by Ralph T. Holman, 48 pp., Nutritional Significance of the Fats by Harry J. Deuel, Jr., 94 pp., The Surface Properties of Fatty Acids and Allied Substances by D. G. Dervichian, 50 pp., Urea Inclusion Compounds of Fatty Acids by H. Schlenk, 25 pp., Infrared Absorption Spectroscopy in Fats and Oils by D. H. Wheeler, 24 pp., and Countercurrent Fractionation of Lipids by H. J. Dutton, 34 pp.

The practice of assigning a particular subject to a specialist in the field is continued in Volume 2. Thus, Malkin presents a strong argument for existence of four solid forms of triglyceride rather than the three proposed by Lutton. It is unfortunate that Lutton's views were not mentioned in greater detail. It also seemed to this reviewer that since Holman's views on the autoxidation of fat differ from those of Hilditch, a brief review of Hilditch's theories might have been included. Deuel's chapter on the Nutritional Significance of Fats is very well done, the presentation is balanced by the inclusion of both sides of controversial issues. The wide scope of material is well classified and well written. The last four chapters provide valuable reference material—the chapter on Urea Inclusion Compounds seemed particularly timely.

The physical aspects of this volume are, indeed, satisfactory. The book is attractively and durably bound, with the title in gold print. The printed text is clear and easily readable. Only one error in spelling was noted. Each chapter contained many helpful sub-titles. I felt that a table of contents at the beginning of each chapter would have been desirable.

Volume II of Progress in the Chemistry of Fats and Other Lipids is certainly to be recommended to all scientists interested in the chemistry and biochemistry of lipids.

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**Cell Chemistry, In Honor of Otto Warburg.** Edited by DEAN BURK, Foreign Member, Max Planck Institute for Cell Physiology, Berlin-Dahlem (Germany), and Head of Cytochemistry Section, National Institutes of Health, United States Public Health Service, Bethesda, Md. (U.S.A.). Elsevier Press, 402 Lovett Blvd., Houston, Texas. 1953. 362 pp. 17.5  $\times$  25.5 cm. Price, \$7.50.

This is a "Festband" in the German tradition. It was published originally as Volume XII, Numbers 1 and 2 of the journal, *Biochimica et Biophysica Acta*, 1953. Its title is perhaps more descriptive of Warburg's activity than it is of the contents of the book, being as it is a collection of thirty-seven articles and having as its only unification some contact with Warburg, either as a teacher or scientist.

The subject matter of these essays, although primarily biochemical in nature, varies all the way from straight organic and physical chemistry through a major collection of biochemical contributions into cellular physiology and

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.

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**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.

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**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.

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