

The assay method used was developed in connection with the study of a terramycin-like antibiotic obtained from *Streptomyces griseoflavus* no. 3560.⁵ This material has an ultraviolet absorption spectrum similar to that of terramycin and aureomycin. These antibiotics exhibit a characteristic diminution of the peak near 360 m μ when heated for 15 to 30 minutes in pH 7 phosphate buffer. For aureomycin the measurements were made at 370 m μ . Spectrophotometric methods for terramycin and aureomycin have just been published^{6,7} but our method has the advantage of using a pH 7 buffer and hence bioassays can be made on the same dilutions used for spectrographic assays in the range of 2 to 35 γ per ml. New standard curves or corrections have been found to be necessary in the presence of complexing agents or added cupric ion.

(5) Waksman, Kochi and Lechevalier, *Soc. Amer. Bact. Proc.*, P30, (1951).

(6) Hiscox, *J. Am. Pharm. Assoc. (Sci. Ed.)*, **40**, 237 (1951).

(7) Monastero, Neans, Crenfell and Hedger, *ibid.*, p. 241.

Also the heating period in the assay must be adjusted for special cases since a rise in optical density at 360 occurs on prolonged heating.

Half-lives were determined graphically on semi-log paper from two or more points. The rate of decomposition in all cases followed the unimolecular exponential pattern.

It is hoped that this work will have practical applications in the preparation of stable antibiotic solutions and result in reduction of the required dose when the antibiotics are administered orally. Animal experiments with the relatively non-toxic ethylenediamine tetraacetic acid will shortly be carried out.

DEPARTMENT OF MICROBIOLOGY
RUTGERS UNIVERSITY
THE STATE UNIVERSITY OF
NEW JERSEY AND THE NEW JERSEY
AGRICULTURAL EXPERIMENT STATION
NEW BRUNSWICK, NEW JERSEY

WILLIAM L. RUIGH
M. R. SESHADRI IVENGAR
E. BAILEY

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BOOK REVIEWS

Advances in Carbohydrate Chemistry. Edited by CLAUDE S. HUDSON, National Institutes of Health, Bethesda, Maryland, and SIDNEY M. CANTOR, American Sugar Refining Company, Philadelphia, Pennsylvania. Volume 5. Academic Press Inc., Publishers, 125 East 23rd Street, New York 10, N. Y., 1950. xi + 322 pp. 16 X 23 cm. Price, \$6.80.

Advances in Carbohydrate Chemistry may justly be considered to have come of age as an important weapon in the armamentum of the carbohydrate chemist, as well as a valuable reference work for teachers, students and research workers in related fields. The fifth volume consists of ten expert reviews of chemical, biochemical and industrial interest. Over 800 literature citations are included, but the work is by no means only a compilation of references. The scope of each review is sufficiently limited that the treatment is generally complete, critical and authoritative.

Some of the chapters warrant individual comment:

In the treatment of enzyme specificity Gottschalk has compiled and correlated data from which he develops "principles" which bear on the mechanism of carbohydrase action. While much of the material is thought-provoking, Gottschalk has overlooked pertinent information such as the stereochemistry of reactions at a carbon atom and the physical conformation of sugars, *e.g.* sucrose. His conclusions and speculations, based on arbitrary and questionable assumptions about the spatial relationships of enzymes to substrates, may be rather ephemeral for a volume of this type.

The essay on alpha amylase action by Caldwell and Adams will puzzle the reader in several respects. The time delay between submission (1947) and publication has been too great. Meanwhile, Myrbäck has discussed the same field in this same series (Vol. 3, 1948). No reference is made to Myrbäck's review, and there is a good deal of duplication. For example, Tables X and XII of Myrbäck's review are essentially identical with Tables XI and X in the current volume. It is most annoying that arguments in the text are based upon six legend-less figures, and there is no information either on the figures or in the text which enables one to identify or interpret the various curves without recourse to the original publications.

Nickerson's review on cellulose crystallinity will be read with interest not only by cellulose chemists but also by all who deal with crystalline or partly crystalline natural or

synthetic polymers. Correlation of the notion of crystallinity with physical and chemical behavior is presented in a clear fashion. It is hoped that the reader will not be confused on p. 107 where we are informed: "The cellulose molecule is estimated to be about 5 Å. in length."

Other chapters range in scope from the ivory tower of the methyl ethers of glucose (Bourne and Peat) to the brass tacks of the commercial production of crystalline glucose (Dean and Gottfried). On the whole this volume lives up to expectations and the standards set by previous members of the series. Undoubtedly many readers who have not already done so will place standing orders for succeeding volumes of the Advances.

DEPARTMENT OF CHEMISTRY
IOWA STATE COLLEGE
AMES, IOWA

DEXTER FRENCH

Histamine Antagonists. By FREDERICK LEONARD AND CHARLES P. HUTTRER, Warner Institute of Therapeutic Research, New York, N. Y. Chemical-Biological Coordination Center Review No. 3. National Research Council, Washington, D. C., 1950. 122 pp. 17 X 24.5 cm. Price, \$1.50.

The first one-third of this review (39 pages) covers pharmacological properties, mechanism of activity, evaluation, chemistry, structure-activity relationships and clinical data on histamine antagonists. With the exception of the section on clinical data, the review appears complete. Detailed procedures have been omitted but adequately indexed; *e.g.*, the section on chemistry gives the important reactions used for synthesis of histamine antagonists and refers the reader to original papers for detailed procedures. The section on structure-activity relationships is well organized and for many workers will be the most valuable part of the review. It would be outside the scope of this review to devote more space to clinical results.

The second two-thirds of the review consists of tables of compounds tested, showing the structure, activity and references for each. The compounds have been classified as alkylenediamines, aminoalkyl ethers, alkylamines, haloalkylamines, aminoketones and secondary alcohols, aminoalkyl esters and unclassified compounds. By means of personal communications, the authors have been able to in-

clude many compounds concerning which there is no published information.

The chief use of this review will be as a reference for the synthetic organic chemist and pharmacologist working in the field of medicinal chemistry.

DEPARTMENT OF BIOLOGICAL CHEMISTRY
UNIVERSITY OF ILLINOIS COLLEGE OF
MEDICINE
1853 W. POLK STREET
CHICAGO 12, ILLINOIS

S. B. BINKLEY

why are similar data for other monomers ignored? The last three monographs cover literature through 1950, but the first three stop at the end of 1947. This deficiency seems inexcusable in a loose-leaf type of book printed by the method used.

GENERAL ELECTRIC RESEARCH LABORATORY
SCHENECTADY, NEW YORK FRANK R. MAYO

Monomers, Section II. Edited by E. R. BLOUT, Chemical Research Laboratory, Polaroid Corporation, Cambridge, Massachusetts, and H. MARK, Institute of Polymer Research, Polytechnic Institute of Brooklyn, Brooklyn, New York. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1951. vii + 257 pp. 17 × 24 cm. Price, \$5.00.

Acrylic Acid. By John T. Clarke, Massachusetts Institute of Technology, Cambridge, Massachusetts. **Esters of Acrylic Acid.** By John T. Clarke, Massachusetts Institute of Technology, Cambridge, Massachusetts. **Esters of Methacrylic Acid other than Methyl Methacrylate.** By Richard S. Corley, Polaroid Corporation, Cambridge, Massachusetts. **N-Vinylcarbazole.** By Kurt C. Frisch, Chemical Department, General Electric Co., Pittsfield, Massachusetts. **Vinyl Ethers.** By C. E. Schildknecht, General Aniline and Film Corporation. **Vinylpyridine.** By Harry Frisch, Brooklyn, New York.

This collection of separately bound pamphlets on monomers essentially expands Beilstein moderately for the indicated substituted ethylenes and brings it more or less up to date. Similar short monographs on eight other substituted ethylenes appeared previously and were reviewed by H. T. Neher in *THIS JOURNAL* in May, 1950, p. 2313. The present set includes errata for the first set and a revised introduction and table of contents for both sets, which are to fit into a single loose-leaf binder. In the present reviewer's opinion, those chemists who have a major interest in the preparation, purification and polymerization of common types of monomers will find this collection of information to be a real convenience, but few other chemists will be interested.

Each monograph takes up the preparation, physical properties, determination, toxicology and polymerization of certain monomers. Treatments of miscellaneous other reactions of monomers show wide variations, as do the authors' judgments of what material should be included and what should be only cited in other sections. Some chapters suggest that their authors were thoroughly familiar with their subject matter through practical experience. Their authors concentrated on the most important facts and methods, and gave trade names of specific polymers; the chapters on N-vinylcarbazole and vinyl ethers, therefore, seemed best. Some other chapters suggested that the authors' experience came mostly from a literature search, with the result that situations which are confused in the literature are still confused in this collection, and that less critical selection was exercised. The statement that use of an inhibitor is "absolutely essential" in the distillation of all acrylic esters is buried under "Miscellaneous Preparations." The chapters on acrylic and methacrylic esters each contain tables of about a hundred known esters with literature references and some physical properties. To the present writer's knowledge, such tables are a unique contribution of this work. The tables on the specific reactions and derivatives of vinylpyridines might well serve as models for other chapters, but the treatment of polyelectrolytes in the same chapter seems irrelevant.

While admitting that the limited appeal of this work may not warrant a polished job, the reviewer calls attention to the following points: This collection is a clear reproduction of typewritten manuscripts. There is evidence of some free-hand drawing in formulas, and compounds such as diethylamine and vinylcarbazole are written as both one word and as two on the same page. Some bibliographies give inventors' names with patent references; some also give assignees, and some give neither. There is no consistency in subdividing chapters or topics. If infrared data are worth including for vinyl ethers, and ultraviolet for vinylpyridines,

The Solubility of Nonelectrolytes. Third Edition. American Chemical Society Monograph No. 17. By JOEL H. HILDEBRAND, Professor of Chemistry, University of California, and ROBERT L. SCOTT, Assistant Professor of Chemistry, University of California. Reinhold Publishing Corporation, 330 West 42nd Street, New York 18, N. Y. 1950. x + 488 pp. 16 × 23.5 cm. Price, \$10.00.

The third edition of this well known book is over twice the length of the second edition, published in 1936. The extension of the topics and the inclusion of a number of new topics has necessitated considerable revision and what amounts to an almost complete rewriting of the former editions.

In the first edition, published in 1924, Hildebrand interpreted the deviations from Raoult's law of liquid mixtures of non-electrolytes by the use of van der Waals forces and "polarities." It is very much to Hildebrand's credit that this point of view, originally qualitative, is essentially the same as that employed today. The earlier vague concept of "polarity" was clarified by Debye's theory of dipole moments, and the forces between uncharged molecules were more clearly understood after London's important contribution in 1931. These theories led to a more quantitative treatment in the second edition, published in 1936.

The present edition includes a résumé of the theories of dipole interaction of Onsager and Kirkwood, hindered rotation and Kirkwood's g-factor, and Eyring's theory of liquids. The important contributions of Lennard-Jones and Guggenheim are summarized. The recent accurate experimental studies which have made possible the evaluation of the entropies and free energies of mixing are discussed in some detail. High polymer solutions in which the sizes and shapes of molecules have large influences on the properties are the subject of a new chapter. Other chapters, not included in the former editions, on Multicomponent Systems, Mixtures of Gases, Solid Solutions, Surface Phenomena, Chemical Equilibrium and Reaction Rates are contained in the third edition. A glossary of symbols, and excellent subject and author indexes enhance the value of the work.

This treatise is packed with useful information, present in a brief, often too brief, a manner. It is the most authoritative work on the subject, and should be of great influence in stimulating further research in this difficult field. This reviewer thinks that the present edition should have a broader title since the work discusses many properties of non-electrolytic solvent mixtures at concentrations far from saturated solutions.

DEPARTMENT OF CHEMISTRY
YALE UNIVERSITY
NEW HAVEN, CONN.

HERBERT S. HARNED

Scientific Russian. By JAMES W. PERRY, Associate Professor, Modern Language Department, Massachusetts Institute of Technology. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York. 1950. xxix + 816 pp. 15.5 × 23.5 cm. Price, \$7.50.

This new text was prepared with the objective of teaching, by classroom or self study, a reading knowledge of scientific and technical Russian. In addition, it is sufficiently complete and well indexed to serve as a reference volume.

The author begins with a discussion of technical Russian terms of foreign origin and indicates similarities to the English, French and German. Vocabulary is enlarged in this manner and gradually the elements of grammar and sentence structure are brought in. Each lesson comprises a section on grammar with examples of its use. This is followed by a reading exercise on some scientific topic such as "On Vitamins," "The Nature of the Neutron," "Internal Combustion Engines," etc. A definite effort is made to

assist the student in learning correct pronunciation: accent marks are placed on almost every word in the exercises. In addition to the vocabularies, an extensive table of contents, index, and list of Russian abbreviations have been provided.

The book is written in a manner well suited to present a difficult subject. The student of technical Russian should find it easily adaptable to his needs. Linguistic difficulties are faced squarely, and this book will not provide a short-cut solution to the problem of the occasional Russian translation that confronts scientists at times. The reading selections are of timely interest, and there is a definite effort made to give a feel for the Russian idiom.

Misprints and erroneous scientific statements are unusually few. The book is pleasingly styled, and seems fairly priced. It should prove useful to a wide spectrum of technical and scientific workers.

RESEARCH LABORATORY
GENERAL ELECTRIC COMPANY
SCHENECTADY, NEW YORK

Z. D. SHELDON

The Chemistry of the Nonbenzenoid Hydrocarbons. Second Edition. By BENJAMIN T. BROOKS, Consulting Chemist, New York, N. Y. Reinhold Publishing Corporation, 330 W. 42nd Street, New York 18, N. Y. 1950. xiv + 615 pp. 16.5 × 23.5 cm. Price, \$12.00.

The first edition of this book appeared in 1922 and made a strong plea for the same systematic study of the chemistry of the hydrocarbons derived from petroleum as had been accorded those derived from coal in the preceding half century.

In writing the second edition Dr. Brooks' task has been one of pruning and condensing from the vast body of literature, both publications and patents, built up in the intervening thirty years of contributions from academic research workers and from the many laboratories of the petroleum, organic chemicals and synthetic rubber industries. In this he has been generally successful, and almost no subject of first importance has been neglected. The style is clear and direct, and most of the subject matter will be readily understood by an advanced undergraduate. The literature through 1949 has been quite thoroughly covered, and the inclusion of references to important patents as well as published articles is gratifying. In fact the frequent reference made to current industrial practice will enhance the value of the book for most users.

The initial chapter, "The Natural Occurrence of the Paraffins," summarizes available evidence about the composition and the origin of petroleum, a fascinating subject with which most chemists will be relatively unfamiliar. The next five chapters deal with the physical properties of the paraffins, method of synthesis of paraffins and cycloparaffins, and the thermal decomposition, oxidation and reaction with chemical reagents of paraffinic hydrocarbons. Five chapters on olefins follow covering, respectively, their preparation and isomerization, polymerization, alkylation, oxidation and other chemical reactions. A short chapter on reactions peculiar to the dienes, trienes and polyenes is included. The chapter on acetylenic hydrocarbons is too short to cover the recent rapid developments in this field with any degree of thoroughness; but the reader is referred to the several treatises on acetylene chemistry which have appeared in the last few years. The concluding chapter on cycloparaffins is largely concerned with terpenes and other natural products.

The emphasis placed throughout the book on laboratory methods of synthesizing pure hydrocarbons is commendable and points up the fact that the author has written primarily for the organic chemist. Tables of physical properties appear frequently; but when thermochemical data are given, they are often out of date. Thus values for bond strengths are usually taken from the early compilation of Pauling rather than the recent ones of Pitzer and others. Quantitative kinetic data on such subjects as activation energies for hydrogen abstraction, of basic importance in understanding reactions proceeding *via* free radical mechanisms,

are almost wholly lacking. However, the author has exercised good judgment in assessing the place of theory in a book which is fundamentally of a descriptive nature. In considering such topics as isomerization, alkylation and engine knock he has concisely stated the views which are most widely accepted at the present time along with the supporting evidence. On the more controversial subjects such as oxidation mechanisms each of the important theories is summarized.

When such a wide variety of topics is covered, it is inevitable that misstatements of fact will occur, while even more frequently the interpretation and evaluation of work in fields which are still developing rapidly will be questioned. The reviewer, for example, considers the statement on page 109 that "The free radical theory of (thermal) cracking has not found general acceptance" to be much too broad without more detailed qualifying remarks than those accompanying it. On page 159 the statement that "In the study of hydrocarbon oxidations in flow systems, no evidence of an induction period is ordinarily observed" is completely contrary to fact.

The typography is generally good. On page 255 the use of the symbols for ions instead of free radicals in the decomposition of diacyl peroxides is confusing. The standard of accuracy in the index is unfortunately inferior to that of the text.

This book can be recommended to organic chemists and all technical people in the petroleum and petro-chemical industries who wish a lucid and comprehensive treatment of the synthesis and important reactions of aliphatic hydrocarbons.

CHEMICAL DIVISION
CELANESE CORPORATION OF AMERICA N. C. ROBERTSON
CLARKWOOD, TEXAS

BOOKS RECEIVED

June 10, 1951–July 10, 1951

- C. F. H. ALLEN, in collaboration with D. M. BURNES, JEAN V. CRAWFORD, F. W. SPANGLER, ELEANOR R. WEBSTER and C. V. WILSON. "Six-Membered Heterocyclic Nitrogen Compounds with Four Condensed Rings." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1951. 345 pp. \$10.00; special subscription price, \$9.00.
- M. L. ANSON, JOHN T. EDSALL AND KENNETH BAILEY (edited by). "Advances in Protein Chemistry." Volume VI. (with cumulative subject index for Vols. I-V). Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1951. 549 pp. \$9.50.
- ELIZABETH M. FRITH AND R. F. TUCKETT. "Linear Polymers." Longmans, Green and Co., Inc., 55 Fifth Avenue, New York, N. Y. 1951. 355 pp. \$3.50.
- J. W. MITCHELL. "Fundamental Mechanisms of Photographic Sensitivity." Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1951. 347 pp. \$9.50.
- F. A. ROBINSON. "The Vitamin B Complex." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1951. 688 pp. \$9.00.
- EUGENE G. ROCHOW. "An Introduction to the Chemistry of the Silicones." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1951. 213 pp. \$5.00.
- LÉON VELLUZ (Editor). "Substances Naturelles de Synthèse." Volume I. Masson et Cie, Editeurs, 120, boulevard Saint-Germain, Paris 6^e, France. 1951. 141 pp. br. 1200 fr; cart. 1800 fr.
- P. Vigoureux. "Ultrasonics." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1951. 163 pp. \$4.00.