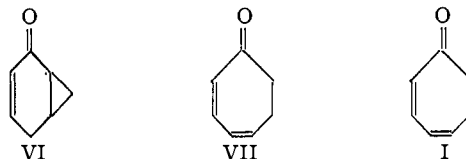


**SYNTHESIS OF TROPONE VIA A NORCARENONE →  
CYCLOHEPTADIENONE REARRANGEMENT**

Sir:

In view of the widespread interest in the field of tropones and tropolones, certain value should be attached to any selective synthetic route which shows promise of generality and versatility. Such a route is illustrated below by a new preparation of tropone (I) itself.<sup>1</sup> From the available 3,5-dihydroxybenzoic acid<sup>2</sup> we have obtained, by Raney nickel catalyzed hydrogenation in aqueous sodium hydroxide, 3,5-diketohexahydrobenzoic acid (II), m.p. 178.5–180° (Calcd. for C<sub>7</sub>H<sub>8</sub>O<sub>4</sub>: C, 53.86; H, 5.16. Found: C, 53.60; H, 5.33). Treatment of the acid under esterification conditions with ethanol afforded the ethyl enol ether ethyl ester (III) of II, b.p. 125–126° at 0.4 mm., *n*<sub>D</sub><sup>25</sup> 1.4923 (Calcd. for C<sub>11</sub>H<sub>16</sub>O<sub>4</sub>: C, 62.25, H, 7.61. Found: C, 61.76, H, 7.36). Reduction of III with lithium aluminum hydride followed by mild acid hydrolysis<sup>3</sup> gave 5-hydroxymethyl-cyclohexen-2-one (IV), λ<sub>max</sub> 226mμ, which was isolated and purified as the 2,4-dinitrophenylhydrazone, m.p. 147.0–148.5°, λ<sub>max</sub> 252 mμ, ε 15,800; 374 mμ, ε 26,600 (Calcd. for C<sub>13</sub>H<sub>14</sub>N<sub>4</sub>O<sub>6</sub>: C, 50.97, H, 4.61. Found: C, 50.94, H, 4.90). The *p*-toluenesulfonate, m.p. 75–75.7° (V), of IV (Calcd. for C<sub>14</sub>H<sub>16</sub>O<sub>4</sub>S: C, 59.98, H, 5.75. Found: C, 60.21, H, 5.54), on being stirred with dilute aqueous sodium hydroxide, readily yielded, *via* norcaren-3-one (VI),<sup>4</sup> the rearrange-



ment product, cycloheptadien-2,4-one (VII), λ<sub>max</sub> 292 mμ, ε 5400 (characterized by catalytic hydrogenation to cycloheptanone). The ketone VII, without isolation, was converted by selenium dioxide dehydrogenation to *tropone*, which was identified by the complete agreement of its characteristic ultraviolet absorption spectrum with that already reported,<sup>1</sup> as well as by the preparation of two salts, the monopicrate, m.p. 99.0–100.3° (Calcd. for C<sub>13</sub>H<sub>9</sub>N<sub>3</sub>O<sub>8</sub>: C, 46.65, H, 2.84, N, 12.54. Found: C, 46.45, H, 2.98, N, 12.88) and the picrylsulfonate, m.p. 268–270°. The melting points reported for these salts are 99–100°<sup>1a</sup> and 266–267°<sup>1b</sup> respectively. In practice one need isolate only three intermediates, II, III and V, each of which can be obtained in a yield of 60% or better.

In view of Doering's reported transformation<sup>5</sup> of tropone to 2-aminotropone (VIII) by means of hydrazine or hydroxylamine, the above approach would thus appear to embrace tropolones as well, since the parent of this class may be obtained by hydrolysis of VIII.<sup>6</sup> The application of this overall scheme to the synthesis of natural products containing the tropolone ring is in progress in this Laboratory.

(1) Two syntheses of tropone have been reported: (a) W. von E. Doering and F. L. Detert, *THIS JOURNAL*, **73**, 877 (1951); (b) H. J. Dauben, Jr., and H. J. Ringold, *ibid.*, **73**, 876 (1951).

(2) A. W. Weston and C. M. Suter, "Organic Syntheses," Vol. 21, John Wiley and Sons, Inc., New York, N.Y., 1941, p. 27.

(3) J. P. Blanchard and H. L. Goering, *THIS JOURNAL*, **73**, 5863 (1951).

(4) The mechanism of this rearrangement (*cf.* R. W. L. Clarke and A. Lapworth, *J. Chem. Soc.*, **97**, 11 (1910)) will constitute the subject of a separate publication.

(5) W. von E. Doering, Abstracts of American Chemical Society Symposium, June, 1953, p. 3.

(6) W. von E. Doering and L. H. Knox, *THIS JOURNAL*, **73**, 837 (1951).

DEPARTMENT OF CHEMISTRY  
UNIVERSITY OF WISCONSIN  
MADISON, WISCONSIN

EUGENE E. VAN TAMELEN  
GEORGE T. HILDAHL

RECEIVED OCTOBER 5, 1953

## BOOK REVIEWS

**La Chimica Delle Fermentazioni. Microbiologia—Enzimologia Chimica E Tecnica Delle Fermentazioni.** Second Edition. By VIRGILIO BOLCATO, Incaricato Nell' Università di Pavia. Nicola Zanichelli, Editore, Bologna, Italy. 1952. xxi + 665 pp. 18 × 25.5 cm. Price, Lire 5000 Nette.

This book is intended to bring up-to-date the first edition written in 1944–1945, which suffered from the unavailability of foreign literature. The book is written in simple Italian, so that it can be read by anyone familiar with one of the romance languages. The subject matter is presented at the level of the biochemistry graduate student. It is divided into four parts, including elements of general microbiology (89 pages), enzymology (161 pages), the chemistry of fermentations (173 pages) and the technical aspects of industrial fermentations (190 pages).

Certain sections of the book dealing with biological oxidations and chemistry of fermentations are well covered. Historical development of various major lines of work, associating names with particular contributions has also been

treated well. However, the author has endeavored to cover such a very wide range of subject matter that it is inevitable that some of the material suffers from incomplete treatment. For example, the coverage of more recent literature and patents since 1945 could be better. Discussion of microbiological production of antibiotics, vitamin B<sub>12</sub>, riboflavin and steroids is neglected. The book does not contain a substantial treatment of the vitamin and growth factor requirements of microorganisms, nor of the use of microorganisms for vitamin and amino acid assays. Some of the industrial fermentations described by the author might still be in use in Europe but are obsolete in this country.

The author, an authority in his field, is to be commended for having assembled such a tremendous amount of closely related material in rapidly growing fields. We believe that the book should prove of value to both the academic and technical workers in Italy, even when the subject matter is available in several fine books in the English language.

JULIUS BERGER  
JOHN T. PLATI

**The Chemistry of Synthetic Dyes.** Volume II. By K. VENKATARAMAN, Director, Department of Chemical Technology, University of Bombay. Academic Press, Inc., 125 East 23rd Street, New York 10, N. Y. 1952. xv + pages 705-1442. 17 × 23.5 cm. Price, \$15.00.

A comprehensive text dealing with the chemistry of the synthetic dyes has been badly needed for many years, for, previous to the issuance of Volume I of the present work, no single treatment has been available in English since the last (1933) edition of "Cain and Thorpe."

The second (and final) volume of Dr. Venkataraman's work fully upholds the high promise of the first. Chapters are devoted to the di- and triphenylmethanes, xanthenes and acridine dyes, phthalocyanines, cyanines and miscellaneous substances such as color formers in photography and fluorescent and luminescent dyes. In addition, there are chapters dealing with the Constitution of Dyes in Relation to Substantivity, and the Identification Analysis and Evaluation of Dyestuffs, including Chromatography.

Individual subjects are well and faithfully treated. The smoothly written text is copiously documented so that the reader is easily able to refer to original sources if he desires. Misprints and errors seem to be astonishingly few in number. The book is well indexed (the index covers Volume I as well) and is attractively printed, bound and priced. In short, it can be warmly and unreservedly recommended as a unique source of information to dye chemists and to those working in related fields.

RESEARCH LABORATORIES  
EASTMAN KODAK COMPANY  
ROCHESTER, NEW YORK

LESLIE G. S. BROOKER

**Organic Chemistry—An Advanced Treatise.** By HENRY GILMAN (Editor-in-Chief). John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1953. 15.5 × 23.5 cm. Volume III, x + 580 pp. Volume IV, x + 35 pp. 581-1245. Price, \$8.75 each.

The authors, editors and publishers of these new volumes deserve high praise for the service they have rendered to organic chemistry. A dozen additional, important phases of the broad field have been added with the same objectives and the same high standards as the first two volumes.

Many organic chemists will appreciate Paul D. Bartlett's non-mathematical treatment of "The Study of Organic Reaction Mechanisms," the first chapter in Volume III. His excellent discussion is illustrated by numerous examples drawn particularly from the field of alcohols and carbonyl compounds. No one who has occasion to use infrared or ultraviolet spectra should fail to read "Applications of Infrared and Ultraviolet Spectra to Organic Chemistry" by Foil A. Miller. This chapter also provides an exceptionally lucid general background discussion. "Lipids," by J. C. Cowan and H. E. Carter, is divided into Fats and Phospholipids, each section written by one of the authors. Together, these constitute a fine review of this important field. H. W. Grimmel has written a comprehensive chapter on "Organic Dyes." One might wish that space had permitted a more extensive discussion of some of the interesting reactions involved in their preparation. "Some Aspects of Chemotherapy" by H. R. Ing is a masterful presentation of antibacterial agents, antimalarials, trypanocidal agents and arsenicals. The author wisely chose this approach over a general discussion of the entire field. A chapter, "Antibiotics" by Lee C. Cheney, completes Volume III. General readers and students, who might be overawed by the Penicillin Monograph, will find these extensive studies presented here in a digested form. Inevitably, however, the chapter is already out of date with respect to the newer antibiotics.

In Volume IV, "The Terpenes" are ably discussed in an extensive chapter by Richard H. Eastman and Carl R. Noller. The terpenes and diterpenes, in particular, receive the major emphasis. Even after limiting the broad field, Richard H. Wiley has covered an enormous amount of territory in his chapter, "Heterocyclic Chemistry." Well over 600 references to the original literature, together with an extensive list of general references, add greatly to its value. "Reactions of Organic Gases under Pressure," by W. E. Hanford and D. E. Sargent, excludes hydrogenations in order to concentrate on the many recent develop-

ments in this relatively new and important field. William A. Walter's chapter, "Oxidation Processes," is a splendid discussion from both the theoretical and practical points of view. Volume IV also includes shorter, well-written chapters on "Starch" by W. Z. Hassid and the "Chemistry of Explosives" by George F. Wright.

No single reviewer could hope to do justice to the diversified subjects covered by these two volumes. Faced with the alternatives of a brief mention of each chapter, or a more extensive review of a selected few, the former course has been chosen, in order to indicate the scope of Volumes III and IV. Where this reviewer felt qualified to judge the chapters critically, they were uniformly excellent. Henry Gilman and his Editorial Board have succeeded in providing altogether fitting companion pieces for Volumes I and II of "Organic Chemistry."

CHEMOTHERAPY DIVISION  
STAMFORD RESEARCH LABORATORIES  
AMERICAN CYANAMID COMPANY  
RICHARD O. ROBLIN, JR.  
STAMFORD, CONNECTICUT

**Fortschritte der Chemie Organischer Naturstoffe** (Progress in the Chemistry of Organic Natural Products). Ninth Volume. By L. ZECHMEISTER (Editor), California Institute of Technology, Pasadena. Springer Verlag, Molkereibastei 5, Wien 1, Austria. 1952. xi + 535 pp. 17 × 23.5 cm. Price: Brosch, \$18.80; Ganzleinen, \$19.60.

After perusal of the present volume the undersigned finds himself wholeheartedly in agreement with the praise accorded to the "Fortschritte" by the previous reviewers for the uniformly high quality of the individual contributions, its international character, and its broad objectives, which provide coverage of the biological as well as the organic-chemical aspects of certain fields. Once again Dr. Zechmeister has been successful in persuading a number of outstanding organic chemists and biochemists to report on the advances recently made in areas of research close to their own interests.

The volume opens with two reviews on closely related subjects, "Synthetische Chemie der Carotinoide" by H. H. Inhoffen and H. Siemer, and "Synthesis and Properties of Vitamin A and Some Related Compounds" by J. G. Baxter. That the former theme should have received authoritative and lucid treatment in the contribution of the German authors will not surprise those familiar with the conspicuous success the Inhoffen school had in its recent synthetic ventures in this field, and with the senior author's gift for clear and facile expression. The article by Baxter likewise gives a fine exposition of the synthetic problem, but devotes comparatively more space to historical and experimental details, and moreover supplies an abundance of ultraviolet, bioassay and other characterizing data, a feature which no doubt will be welcome to workers concerned with this group of compounds. P. Meunier, in "Les Antivitamines," addresses himself to the task of critically evaluating the wealth of facts concerning vitamin antagonists and inhibitors which have been brought to light in the past decade, in considerable part through the efforts of his own school. Connoisseurs of the work and writings of A. Stoll will not be disappointed in the contents and style of his admirable essay on "Recent Investigations on Ergot Alkaloids." Anyone who has followed the gradual elaboration of the structure of these complex and unstable substances in the experimental papers of Jacobs and Craig, and of Stoll and his co-workers will lay this masterful résumé aside with the feeling that "Finis" has been written here at long last to an exciting chapter of alkaloid chemistry unfolding through fifty years of intensive effort often beset with failure but ultimately rich in accomplishment. The concluding sections, as if to emphasize that little remains to be added to the body of established facts, give a very complete and definitive description of the individual alkaloids, their isomers, dihydroderivatives and synthetic relatives, in terms of their physical, chemical and pharmacological properties. The following review, "Die Alkaloide der Menispermaceae-Pflanzen" by M. Tomita presents an up-to-date account of a field in which H. Kondo and his school (including the author) have for many years played a leading role. Though this material, except for some very recent additions, is accessible in most

current texts on alkaloid chemistry, the condensation achieved here, mainly by the device of discussing the structural and stereochemical problems involved in general rather than in specific terms, will attract the reader who wishes to orient himself quickly on the subject, while the specialist will find the article useful mainly for refreshing his memory on the botanical derivation and structure of the individual alkaloids catalogued in the central section. Much the same can be said of the mode of treatment adopted by F. M. Dean in his excellent survey of "Naturally Occurring Coumarins," except that here explicit details on structure proof and synthesis are included in the special part.

The remaining four articles deal with purely biochemical topics: "The Biosynthesis of Proteins and Peptides, including Isotopic Tracer Studies," by H. Borsook; "The Enzymes of Nucleoside Metabolism," by Herman M. Kalkar; "Nucleosides and Nucleotides as Growth Substances for Microorganisms," by W. S. McNutt; and "Some Current Concepts of the Chemical Nature of Antigens and Antibodies," by Dan H. Campbell and N. Bulman. Knowing well how difficult it is to achieve complete lucidity when it comes to correlating and evaluating in print the enormously involved and diversified facts emerging from research in fields like these, this reviewer can only express his admiration for the way in which these authors have acquitted themselves of their respective tasks.

THE SQUIBB INSTITUTE FOR MEDICAL RESEARCH  
NEW BRUNSWICK, NEW JERSEY O. WINTERSTEINER

**A Theoretical Study of Interphase Mass Transfer.** By ROBERT W. SCHRAGE. Columbia University Press, 2960 Broadway, New York 27, N. Y. 1953. viii + 103 pp. 16 × 23.5 cm. Price, \$3.50.

The author, Robert W. Schrage, received the Clarke F. Ansley Award of 1951 for his dissertation submitted in candidacy for the degree of Doctor of Philosophy at Columbia University in 1950. This book represents the publication of this award dissertation and presents a rather critical review and some theoretical concepts of the factors influencing interphase transport between gases and liquids or solids. It is written in a straightforward, relatively simple manner and the assumptions made in predicting the nature of interphase transport are indicated. The nomenclature is consistent and few errors are apparent.

Primary emphasis is placed upon the application of the kinetic theory to the gas phase adjacent to an interface and the concept of the absolute rate of vaporization is employed as a basis for most of the derivations. Because the work is limited to relatively low pressures, the absence of rigorous treatment in connection with predicting the effects of pressure upon the thermodynamic properties of the phases does not appear to be serious.

In the primary or simple treatment of interphase material transport, the author considers effects of mass velocity on the gas phase side of an interface from the standpoint of the kinetics of a uniform gas. The discussion contributes to an understanding of the possible causes of non-equilibrium temperature and concentration differences at an interface as a result of a component flux. This treatment is extended to multicomponent systems with few simplifications. In the latter part of the book the author considers the effects of the adjacent interface on the molecular velocity distribution in the gas phase. Expressions are derived for the interphase transport process involving a one-component phase of mono- or polyatomic molecules. The author does not extend his more detailed treatment of pure substances to mixtures. A lack of directly applicable experimental data is indicated and further experiments and techniques are suggested.

Predictions are made in accordance with the author's simple theory of the deviations from equilibrium behavior that would be expected at an interface as a function of the component flux. The conditions chosen involve those of engineering importance that were studied by Gilliland and Sherwood and by Tucker and Sherwood. The author's theory indicates small deviations from equilibrium at pressures of one atmosphere but predicts deviations greater than 1% for situations commonly encountered in industrial vacuum processing equipment. The utility of the presentation would have been enhanced if the author had presented a few values of the predicted divergence from equilibrium

that would be expected under conditions commonly encountered in industrial and research practice.

It is believed that the author has made a contribution to a better understanding of interphase transport involving a gas phase at relatively low pressure. His clarity of presentation and simplicity of approach allow the subject matter to be easily assimilated.

CHEMICAL ENGINEERING LABORATORY  
CALIFORNIA INSTITUTE OF TECHNOLOGY W. G. SCHLINGER  
PASADENA, CALIFORNIA B. H. SAGE

**Kinetics and Mechanism—A Study of Homogeneous Chemical Reactions.** By ARTHUR A. FROST, Associate Professor of Chemistry, and RALPH G. PEARSON, Associate Professor of Chemistry, Northwestern University, John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1953. vii + 343 pp. 16 × 23.5 cm. Price, \$6.00.

This well-written text and reference book presents the basic concepts and methods of interpreting data in the field of chemical kinetics. It moves systematically and lucidly from a chapter on empirical treatment of reaction rates through some 200 pages of discussions of methods of handling of data, elementary processes, the kinetic theory of gases, transition-state theory, gas reactions, solution reactions, complex reactions, homogeneous catalysis and chain reactions to a final chapter of some 100 pages in which the various lines of evidence for the mechanisms of eight different reactions are considered in detail. Throughout the book the authors seek "to enable the student to understand exactly how much detail of reaction mechanism can be found from reaction kinetics and to understand what the limitations of the kinetic method of studying mechanism are."

Because the book is designed to be a basic text rather than a treatise, it does not contain a comprehensive bibliography of all investigations. It does, however, illustrate the generalized treatments of different types of reactions with well selected examples from the literature and includes many tables of data which are used for the purpose of comparing experimental results with theory. The majority of the examples involve organic compounds. Practice problems are included at the end of each chapter.

Among the topics which might be covered under the title of the present book but which have been excluded in order to meet reasonable space limitations are heterogeneous reactions, photochemical reactions and reactions induced by nuclear radiations and by nuclear processes. Likewise, the book contains no treatment of experimental techniques and equipment, although it does discuss methods for the treatment of data obtained from various types of chemical and physical measurements. Only incidental mention is made of the interesting results on electron transfer reactions and isotopic exchange reactions which have been obtained in the last few years through the use of tracer techniques.

The book is written with the well-defined purpose of presenting the basic theoretical methods and concepts of chemical kinetics clearly and accurately, with emphasis on their practical usefulness in elucidating reaction mechanisms. The authors accomplish this purpose in a concise, direct and readable fashion. The result is a valuable addition to the literature both as a text for graduate students and as a reference book for those who have occasion to use the methods of kinetics.

DEPARTMENT OF CHEMISTRY  
UNIVERSITY OF WISCONSIN JOHN E. WILLARD  
MADISON, WISCONSIN

**Insect Physiology.** By KENNETH D. ROEDER, Tufts College (Editor). John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1953. xiv + 1100 pp. 16.5 × 23.5 cm. Price, \$15.00.

The object of Dr. Roeder's book is, in his own words, "to summarize and evaluate the major trends in experimental research on insects." Within self-imposed limitations he has succeeded admirably. It would be obviously impossible to cover all the phases of observational and experimental insect physiology comprehensively in a single volume; no attempt to do so has been made here. The book is a

compilation of 32 chapters by specialists in carefully selected areas of physiological research. Each of the 15 contributors is a recognized authority and a leader in research on the subject matter of his chapter or chapters.

The major topics covered, and their authors, include: the integument (A. G. Richards), respiratory mechanisms and metabolism (G. A. Edwards), properties and composition of insect blood, and osmoregulation (John B. Buck), the hemocytes, pericardial cells and fat body (S. C. Munson), circulation (R. L. Beard), the structure, function and mechanism of the alimentary system, including digestion, absorption, excretion and intermediary metabolism (M. F. Day and D. G. Waterhouse), nutrition and accessory growth factors (W. Trager), excretion (R. L. Patton), the biochemistry of muscle (D. Gilmour), electric activity in nerves and ganglia, reflex activity and ganglion function (K. D. Roeder), vision, mechanoreception and chemoreception (V. G. Dethier), structure, mechanism and metabolism of flight (L. E. Chadwick), problems of insect behavior, including heredity, reproductive behavior, orientation, behavior patterns and their relationships to the environment, learning and social patterns (T. C. Schneirla), and, finally, embryonic and postembryonic development, regeneration and the role of hormones in molting and metamorphosis (Deitrich Bodenstern). The latter section comprises a lucid, stimulating and comprehensive review of the fascinating subject of insect morphogenesis. For each general topic of the book a thorough review of the literature is given. Many original observations, experiments and conclusions are presented, some of them published here for the first time. The free rein which the authors have had in developing their particular subjects has contributed largely to the value of this book.

The science of physiology today involves the study of an increasing variety of biological phenomena and concepts. To keep pace with the subject matter, an equally varied collection of techniques must be employed; new methods and techniques are constantly being added. It is no longer possible to present a balanced picture of work in this field in terms of one particular experimental approach or another. The authors of the present work have made use of skills from many branches of science in attempting to solve—or at least to define, which is often half the battle—the fundamental problems of insect physiology. As the peculiarities of tissues, organs, organ systems and whole organisms may require, the emphasis is on physical, chemical, biochemical or observational method. Although the chapters and sections have been well integrated, a certain amount of overlapping was unavoidable, as the editor points out in the preface. Intermediary metabolism is discussed under several different headings, such as metamorphosis and the functions of the gut. Similarly, in addition to being treated as separate topics, respiration and circulation are found in several other chapters in connection with such special subjects as cuticle permeability, flight, development and growth.

It should be mentioned that a large amount of information on insect pharmacology and toxicology has been included. The mode of action of chemical agents, such as hormones, enzyme inhibitors and drugs, is discussed in many contexts. According to the editor this was done to provide a link between physiology and biochemistry on the one hand, and physiology and applied entomology on the other.

Throughout the book runs a vein of uncertainty. The relationships of physiological conditions in insects to those obtaining in other animals are based largely on assumptions, analogies or guesses. Far from deserving any criticism, this uncertainty reflects the great and rapid progress insect physiologists are making. As Dr. Roeder says, "The student of insect physiology is primarily a comparative physi-

ologist who recognizes that insects are peculiarly well suited to certain types of experimentation and to the solution of certain general problems. At the same time he shares with entomologists an interest in insects *per se*. He also feels that the physiological point of view has much to contribute in the fields of insect control."

As a standard reference the book will be invaluable to students and research workers in both insect and general physiology, and in general, systematic and applied entomology. It is clearly written and printed, ably edited and well illustrated with some 250 photographs, drawings, diagrams and graphs. There is a very complete cross-referenced index, and a bibliography of over 100 pages. Unfortunately, space limitations have prevented giving more than paraphrased titles. This long and eagerly awaited book is a major contribution to physiological and entomological literature.

CHEMICAL-BIOLOGICAL COORDINATION CENTER  
NATIONAL RESEARCH COUNCIL G. CONGDON WOOD  
WASHINGTON, D. C.

---

## BOOKS RECEIVED

September 10, 1953—October 10, 1953

- A. ALLAIS, J. MATHIEU, A. PETIT, P. POIRIER, AND L. VELLUZ. "Substances Naturelles de Synthèse." Volume VII. Masson et Cie, Editeurs, 120, Boulevard Saint-Germain, Paris VI<sup>e</sup>, France. 1953. 157 pp. Broche Fr.; Cartonnettoile 2200 Fr.
- J. W. COOK (Editor). "Progress in Organic Chemistry." Volume 2. Academic Press Inc., 125 East 23rd Street, New York 10, N. Y. 1953. 212 pp. \$7.00.
- CHARLES C. PRICE (Editor-in Chief). "Organic Syntheses." An Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. Volume 33. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1953. 115 pp. \$3.50.
- G. K. ROLLEFSON (Editor) AND R. E. POWELL (Associate Editor). "Annual Review of Physical Chemistry." Volume 4. Annual Reviews, Inc., Stanford, California. 1953. 493 pp. \$6.00.
- FREDERICK D. ROSSINI, KENNETH S. PITZER, RAYMOND L. ARNETT, RITA M. BRAUN AND GEORGE C. PIMENTEL. "Selected Values of Physical and Thermodynamic Properties of Hydrocarbons and Related Compounds." Carnegie Press, Carnegie Institute of Technology, Pittsburgh, Pennsylvania. 1953. 1050 pp. \$7.00.
- THE STANDING COMMITTEE ON COMBUSTION SYMPOSIA. "Fourth Symposium (International) on Combustion (Combustion and Detonation Waves)." The Williams and Wilkins Company, Baltimore 2, Maryland. 1953. 926 pp. \$7.00.
- HOWARD E. SWANSON AND RUTH K. FUYAT. "Standard X-ray Diffraction Powder Patterns." Volume II. National Bureau of Standards Circular 539. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. 1953. 65 pp. \$0.45.
- HOWARD E. SWANSON AND ELEANOR TATGE. "Standard X-ray Diffraction Powder Patterns." Volume I. National Bureau of Standards Circular 539. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. 1953. 95 pp. \$0.45.