

provocative ideas, for speculations on the yet undeveloped aspects or concepts of a particular field or for the anticipation of possible future trends. It is to be hoped that the editors continue to solicit papers along these lines, and they are to be congratulated for their success with this volume.

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Physical Organic Chemistry. By JACK HINE, Professor of Chemistry, Georgia Institute of Technology. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, New York. 1956. xiv + 497 pp. 16 X 23.5 cm. Price, \$9.00.

Any new book on physical organic chemistry will inevitably be compared with the two major modern classics of the field, Hammett and Ingold. In the reviewer's opinion, the present volume bears these comparisons very well indeed. While it may lack the authoritative and personal character of these works, it has an admirably critical and objective approach of its own. It is not surprising that this approach is most evident in treatments of fields in which the author has first-hand experience; rather it is gratifying that almost as high a standard is maintained throughout. One may disagree occasionally with a conclusion, but one can be sure that it was reached only after careful consideration of the evidence.

The book begins with a section entitled "Basic Principles" which includes discussions of molecular structure, acids and bases, and a brief chapter on kinetics. The major portion of the text is devoted to the different classes of polar reactions, among them being displacements, eliminations, additions, reactions of the carbonyl group, rearrangements and aromatic substitution. There is also a chapter on acid-base catalysis. A good deal of attention is given to linear free-energy relationships. The third section takes up the production of free radicals and their reactions. A final chapter on "four-center" reactions deals with processes such as the Claisen rearrangement and Diels-Alder additions.

So much work on reaction mechanisms has been done during the last ten years that writing a book of manageable size must involve a great deal of selection. It is therefore inevitable that any reader will find a pet topic or two given short shrift. Dr. Hine has nevertheless succeeded in covering most of the important aspects of the field. He achieves this in part by an emphasis on recent work at the expense of historical development. A count on Chapter 5 (Nucleophilic Displacements) revealed that about a third of the references were dated 1950 or later, and in some of the chapters the proportion is even higher. This emphasis enhances the immediate value of the book, but may cause it to date somewhat faster than one with a longer perspective. The chapter on carbonium-ion rearrangements, for example, gives the impression that bridged intermediates are of considerably greater importance than they now appear to be. In spite of its broad coverage the text is by no means superficial, one of its most valuable features from the pedagogical point of view being the detailed treatment given to certain selected reaction mechanisms.

Only a small number of typographical errors could be found and, with a very few exceptions, misleading or incorrect statements are absent. The claim on page 216 that "—the principle of microscopic reversibility requires that the dehydration of *t*-butyl alcohol by aqueous acid involve as its rate-controlling step the formation of the pi complex" overstates the case. The principle merely gives the *path* of the reverse reaction once that of the forward reaction is known. This still allows the rate-controlling step of the dehydration to be formation of the carbonium ion. One might wish that reaction rates had been more consistently discussed in terms of transition-state stabilities. The author is clearly aware of the implicit assumption involved in relating product stability to rate, since he points out on page 143 (and elsewhere as well) that "—it is the transition-state stability which is of fundamental importance." Later, however, he treats Saytzeff-type orientation in eliminations as a consequence of product stability, with only an oblique reference to the transition state later in the chapter. The distinction is one which the mature reader will

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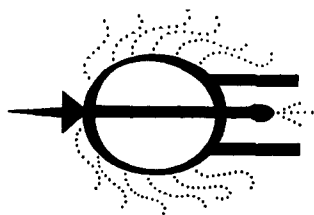
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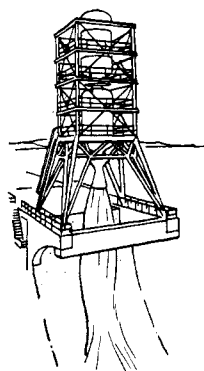
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supply for himself, but it is doubtful that the student will.

These minor shortcomings do not detract from the general high standard of the presentation. This book can be thoroughly recommended to the student as a sound introduction to the field and to the experienced worker as a stimulating and up-to-date review.

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BOOKS RECEIVED

July 20, 1956–August 10, 1956

- F. F. Blicke and R. H. Cox, Editors. "Medicinal Chemistry." Volume III. "A Series of Reviews Prepared under the Auspices of the Division of Medicinal Chemistry of the American Chemical Society." Authors: T. P. Carney, P. L. DeBenneville, V. Papesch, E. F. Schroeder, A. Stempel, and J. A. Aeschlimann. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. 346 pp. \$10.50.
- E. Cartmell and G. W. A. Fowles. "Valency and Molecular Structure." Academic Press, Inc., 125 East 23rd Street, New York 10, N. Y. (October 1, 1956: 111 Fifth Avenue, New York 3, N. Y.). 1956. 256 pp. \$5.80.
- Paul H. Emmett, edited by. Contributing Authors: Robert B. Anderson, Ernst M. Cohn, Murray Greyson, L. J. E. Hoper, H. Steiner, and S. W. Weller. "Catalysis." Volume IV. "Hydrocarbon Synthesis, Hydrogenation and Cyclization." Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1956. 570 pp. \$12.50.
- O. Krischer. "Die wissenschaftlichen Grundlagen der Trocknungstechnik." "Trocknungstechnik." By O. Krischer and K. Kröll. Erster Band. Springer-Verlag, Reichpietschufer 20, West-Berlin W 35, Germany. 1956. 400 pp. Ganzleinen DM 46.50.
- J. Murray Luck, Editor, Frank W. Allen, and Gordon Mackinney, Associate Editors. "Annual Review of Biochemistry." Volume 25. Annual Reviews, Inc., Palo Alto, California. 1956. 794 pp. \$7.00.
- E. H. Erich Pietsch, Editor. "Gmelins Handbuch der Anorganischen Chemie. System-Nummer 28. Calcium." Part B, Section 1. Verlag Chemie, GmbH., Weinheim/Bergstr., Western Germany. (American Representative, The Gmelin Institute of Inorganic Chemistry, Dimitri R. Stein, 1074 Washington Avenue, Pelham Manor, N. Y.). 1956. 264 pp. \$34.99.
- E. H. Erich Pietsch, Editor. "Gmelins Handbuch der Anorganischen Chemie. System-Nummer 44. Thorium und Isotope." Verlag Chemie, GmbH., Weinheim/Bergstrasse, Western Germany. (American Representative, The Gmelin Institute of Inorganic Chemistry, Dimitri R. Stein, 1074 Washington Avenue, Pelham Manor, N. Y.). 1955. 406 pp. \$55.22.
- E. H. Erich Pietsch, Editor. "Gmelins Handbuch der Anorganischen Chemie. System-Nummer 60. Kupfer." Part A, Section 1, Verlag Chemie, GmbH., Weinheim/Bergstr., Western Germany. (American Representative, The Gmelin Institute of Inorganic Chemistry, Dimitri R. Stein, 1074 Washington Avenue, Pelham Manor, N. Y.). 1955. 710 pp. \$92.13.
- E. H. Erich Pietsch, Editor. "Gmelins Handbuch der Anorganischen Chemie. System-Nummer 60. Kupfer." Part A, Section 2. Verlag Chemie, GmbH., Weinheim/Bergstr., Western Germany. (American Representative, The Gmelin Institute of Inorganic Chemistry, Dimitri R. Stein, 1074 Washington Avenue, Pelham Manor, N. Y.). 1955. pp. 711-1465. \$101.98.
- Eugene I. Rabinowitch. "Photosynthesis and Related Processes." Volume II, Part 2. "Kinetics of Photosynthesis" (continued); Addenda to Volume I and Volume II, Part 1. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. pp. 1211-2088. \$18.50.
- W. Theilheimer. "Synthetic Methods of Organic Chemistry." Volume 10. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. 746 pp. \$25.25.