Book Reviews

The Chemistry of Carboxylic Acids and Esters. Edited by SAUL PATAI, The Hebrew University, Jerusalem, Israel. Interscience Publishers, John Wiley and Sons, Inc., 605 Third Ave., New York, N. Y. 1969. xiv + 1155 pp. 16 × 23.5 cm. $41.50.

This volume is the sixth in a series of advanced treatises under the general editorship of Professor Saul Patai which discuss the chemistry of functional groups. There are 18 chapters by 24 authors. The purpose of each chapter is to cover in depth "important recent developments and material not previously covered in primary reviews." Most chapters meet this criteria with references generally up to mid-1966. Two chapters, one on the formation of the carboxyl group and one on its radiation and photochemistry, originally planned for this volume, were not included.

Chapter 1 (M. Simonetta and S. Carra, 52 pages) discusses general and theoretical aspects of the COOH and COOR groups including geometry, heats of formation, ionization, and spectral properties. Space limitations require that many of these topics be covered very lightly and a serious reader would want to consult other sources as well.

Chapters 4, 5, 7, and 10 deal primarily with synthesis and typically contain more references to the older literature than the others. Chapter 4 (R. P. A. Sneeden, 38 pages) deals with the synthesis of carboxylic acids and derivatives from organometallic compounds with numerous references to the extensive review literature. Chapter 5 (V. F. Kucherov and L. A. Yanovskaya, 36 pages) discusses the synthesis of di- and polycarboxylic acids and esters. Since most of the methods it reviews are also applicable to monocarboxylic acids, serious overlap with the other synthetic chapters may have been expected. Such is not the case, in part because one important chapter on the formation of the carboxyl group failed to materialize. Chapter 7 (L. D. Bergelson and M. M. Shemgakin, 46 pages) deals exclusively with the many applications of phosphorus ylides. It contains numerous references to the Russian literature. The synthesis and use of isotopically labeled carboxylic acids forms the basis of Chapter 10 (M. Zielinski, 52 pages). There are many examples illustrating their application to mechanistic organic chemistry. None of these chapters discusses the synthetic use of organoboron compounds.

Two chapters (6 and 17) are devoted to physical, chemical, and spectroscopic characteristics and characterization. Chapter 6 (L. Eberson, 84 pages) discusses acidity and hydrogen bonding, and Chapter 17 (T. S. Ma, 52 pages) discusses analysis of acids and esters. The latter chapter is of necessity often quite sketchy, but appears to be adequately referenced.

The bulk of this volume is devoted to the reactions of carboxylic acids, esters, and related compounds, with the emphasis being placed on reaction mechanisms. Many chapters do a fine job in updating older reviews and in at least one case (Chapter 5, "Ortho Esters") reviewing an area which has had little previous attention. Esterification, ester hydrolysis, and similar substitution reactions receive the most attention and are discussed mainly in Chapters 3, 9, and 11 (J. Koskikallio, "Alcoholysis, Acidolysis and Redistribution of Esters," 34 pages; D. P. N. Satchell and R. S. Satchell, "Substitution in the Groups COOH and COOR," 72 pages; E. K. Curanto, "Esterification and Ester Hydrolysis," 84 pages).

Electrochemical reactions of carboxylic acids are well treated by L. Eberson (Chapter 2, 50 pages); rearrangement and cyclization reactions by H. Kwart and K. King (Chapter 12, 34 pages); ortho esters by E. H. Cordes (Chapter 5, 46 pages); peracids and esters by S-O. Lawesson and G. Schroll (Chapter 14, 36 pages); sulfur-containing acids and esters by M. J. Janssen (Chapter 15, 60 pages); directive and activating affects of CO_2H and CO_2R by G. Kohnstam and D. L. H. Williams (Chapter 16, 106 pages); and biological formation and reactions of CO_2H and CO_2R groups by S. Doonan (Chapter 18, 142 pages).

This volume is recommended for chemical libraries, especially those serving graduate study and research. It is unlikely that any given chemist would be interested in more than a few chapters and its price certainly discourages purchase. In view of this, it seems reasonable to suggest that the publisher arrange for the purchase of individual chapters or groups of chapters.

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