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Kurt J. Irgolic, *Texas A&M University*

Organic Reactions. Volume 29. W. G. Dauben, editor-in-chief. Wiley, New York. 1983. vii + 457 pages. \$47.50.

This latest volume in the exceedingly popular and useful *Organic Reactions* series consists of three chapters, each of which is authored by experts in the areas surveyed. The articles are organized and presented in the characteristic style of previous contributions to *Organic Reactions*. As always, the discussion sections are supported by extensive tables which in these chapters cover the literature through 1980; a few 1981 references are included. A brief summary of the contents of this volume appears below.

Chapter 1, "Replacement of Alcoholic Hydroxyl Groups by Halogens and Other Nucleophiles via Oxyphosphonium Intermediates", by B. R. Castro, concentrates on the formation and reactions of oxyphosphonium salts generated from alcohols and the reagents prepared from triphenylphosphine, triphenyl phosphite, or tris(dimethylamino)phosphine and an oxidizing electrophile such as diethyl azodicarboxylate, molecular halogens, alkyl halides, tetrahalomethanes, and *N*-haloimides. Chapter 2, "Reductive Dehalogenation of Polyhalo Ketones with Low-Valent Metals and Related Reducing Agents", by R. Noyori and Y. Hayakawa, emphasizes carbon-carbon bond forming processes (alkylations, acylations, aldol condensations, and especially [3 + 4] and [3 + 2] cyclocoupling reactions) involving the reactive intermediates generated by reductive dehalogenation of polyhalo ketones. The final chapter, "Base-Promoted Isomerizations of Epoxides", by J. K. Crandall and M. Appar, consists of a lucid discussion of the isomerization of epoxides to allylic and cyclic alcohols, ketones, and cyclopropyl carbinols.

These chapters meet the standards of excellence, thoroughness, and depth of coverage expected of contributions to the *Organic Reactions* series. This volume, like its predecessors, will prove indispensable to the students and practitioners of organic chemistry and is a must for chemistry libraries and personal collections alike.

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Topics in Phosphorus Chemistry. Vol. 11. Edited by M. Grayson and E. J. Griffith. Wiley, New York. 1983. vii + 451 pp. \$85.00.

The eleventh volume of the "Topics" has appeared in print recently continuing this popular series of critical reviews in phosphorus chemistry. The present volume consists of five chapters with the first one by J. Feder entitled "The Chemistry of ATP" (18 pp, 152 references) being rather short, but remarkably concise. The purpose of this article is to address the chemistry of ATP to provide a better understanding for non-biochemists of the biochemistry of ATP. The next chapter by Y. Abe deals with "Condensed Alkaline Earth Phosphates" (48 pp, 80 references) and represents an exhaustive account of the structures and properties of alkaline-earth phosphate glasses and their crystallization. This article is extensively illustrated with graphs, tables, and scanning electron micrographs and provides a clearly written summary of present-day knowledge in this area.

The third chapter by M. W. G. DeBolster on "Phosphoryl Coordination Chemistry" (227 pp, 1438 references) is the longest in this book and is a collection of the literature on phosphoryl coordination chemistry for the years 1975–1981, updating an earlier review on this subject matter by this author covering the period 1854–1975. In this article the tabular listing of the isolated phosphoryl complexes and corresponding physical-chemical

studies takes up 138 pages and the literature references 75 pages, leaving room for only a few pages of text.

The fourth review by R. L. Hilderbrand, J. Curley-Joseph, H. J. Lubansky, and T. O. Henderson reviews the "Biology of Alkylphosphonic Acids: A Review of the Distribution, Metabolism, and Structure of Naturally Occurring Alkylphosphonic Acids" (42 pp, 191 references). Since the discovery in 1959 of (2-aminoethyl)phosphonic acid in various species of protozoa and lower marine invertebrates, considerable amount of work has been done in elucidating the role of this and other related phosphonates found in nature.

The last article on "Quasi-Phosphonium Intermediates and Compounds" by H. R. Hudson (95 pp, 338 references) is a truly excellent one. With the term quasi-phosphonium the author defines any species that can be formally represented by a phosphonium structure but in which one or more of the atoms directly bonded to phosphorus is neither carbon nor hydrogen; however, the present review is restricted to those compounds only in which at least one alkoxy or aryloxy group is attached to phosphorus. These, of course, are involved in the Michaelis-Arbuzov reaction and a number of related reactions.

Altogether, this volume is following in the foot steps of the previous ones, a well-written, well-edited and well-produced addition to the secondary literature on phosphorus chemistry. It should be on the shelves of every library and in the hands of every phosphorus chemist.

The text is photographed from neatly typewritten manuscripts. The book has a subject index and a cumulative index of titles of articles in earlier volumes but has no author index.

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Synthetic Reagents. Vol. 5. Edited by J. S. Pizey. Halstead Press, A Division of Wiley, New York. 1983. 261 pp. \$74.95.

This is the fifth in a series of volumes providing comprehensive reviews on the use of specific reagents in organic synthesis; the current volume covers the reagents ammonia, iodine monochloride, and thallium(III) acetate and trifluoroacetate. The intended purpose of the series—"to assist the practicing organic chemist...to determine both the types of reaction the reagent will effect, its selectivity...and the optimum conditions for the reaction"—is admirable and is met to varying extents with each of the review in this volume.

The chapter on ammonia by R. Jeyaraman selectively surveys additions of ammonia to multiple bonds, substitutions, and heterocycle syntheses with an emphasis on the more recent literature (unfortunately only through 1979). Perhaps because of the breadth of the topic, detail is lacking, especially on the important aspects of yields and reaction conditions. Applications in natural products synthesis are totally absent.

C. W. McClelland's chapter on iodine monochloride (covering the literature through 1980) is subdivided into sections on aromatic iodination, additions to unsaturated compounds, chlorination, cleavage of organometallic bonds, and a few miscellaneous uses. The reactions are discussed in a mechanistic framework, and yield and selectivity data are given amply. These features plus the more critical nature of the discussion make this an informative and useful review.

The literature through 1981 on the reagents thallium acetate and trifluoroacetate are reviewed by S. Uemura (thallium(III) nitrate is specifically excluded). Following useful introductory remarks on general properties, preparation, solvents, and toxicity, reactions of these reagents with aromatic compounds, olefins and acetylenes, cyclopropanes, ketones, and miscellaneous compounds are discussed. General reaction conditions, yields, and selectivities are presented extensively along with some mechanistic discussion. This chapter does indeed provide a good overview of the utility of these reagents for prospective practitioners and those simply wanting to keep abreast of the arsenal of synthetic weapons available to the synthetic chemist.

Chemists presently or potentially conducting research making extensive use of one or more of these reagents will probably find this volume to be a valuable reference. In my opinion purchases of individual volumes of *Synthetic Reagents* would be made much more attractive if the reagents in each volume were grouped in some chemically rational way—e.g., reducing agents, oxidizing