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Ionic Intermediates

Halonium Ions. GEORGE A. OLAH. Wiley-Interscience, New York, 1975. xvi, 190 pp., illus. $18.50. Reactive Intermediates in Organic Chemistry.

This monograph by George Olah, who is also the editor of the series in which it appears, is restricted to long-lived haloniums in solution or in the form of isolated salts, although important references to halonium ions as reaction intermediates are included. The coverage is comprehensive (there are 218 references, some from 1974), with full attention given to work done outside of Olah's laboratories.

Part A of the book, on acyclic halonium ions, has five chapters, including ones on dialkyl-, alkylaryl- and diarylhalonium ions. Part B, on cyclic halonium ions, has six chapters, including ones on ethylenehalonium and tetramethylenehalonium ions. Extensive tables of ^{1}H and ^{13}C nuclear magnetic resonance data are included, as are many spectra from the original papers.

The writing is clear and careful, although I noted perhaps 20 typographical errors. The book has a few controversial features. In the nomenclature section Olah has numbered the halogen "one" in the tetramethylene halonium ion and related cyclic ions. Since *Chemical Abstracts* regards the tetramethylene radical as an entity that must have carbon numbered one, the present book ensures that a hodgepodge of numbering systems will continue to be used. Olah's efforts to discriminate between sigma and pi bonding of positive halogen to alkenes involve considerable intuitive thinking in an area where there are no sharp dividing lines.

The reagent methyl fluoroantimonate is mentioned a number of times. However, work to be published in the *Journal of the American Chemical Society* in spring 1976 has indicated that the reagent is actually methylated sulfur dioxide (in sulfur dioxide solvent). The mechanisms, but usually not the products, of various halonium-ion-forming reactions will require some modification as a result of this reassignment of structure. The author index of the book often refers the reader only to a page in the list of references where the reference number can be found rather than to the page of the text where the reference is cited. The nine-page subject index appears to be comprehensive.

Olah's book is the first review of stable halonium ions that includes ions other than aryl halonium ions. Researchers who may wish to explore the use of halonium ions can proceed with confidence that the main areas explored to date are outlined in it.

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Excited Atoms and Molecules

The Excited State in Chemical Physics. J. WM. MCGOWAN, Ed. Interscience (Wiley), New York, 1975. xii, 492 pp., illus. $25.50. Advances in Chemical Physics, vol. 28.

Excited atoms and molecules are important in many diverse environments, including planetary atmospheres, interstellar clouds, photolytic reactors, lasers, flames, discharges, and explosions. Experimental and theoretical techniques used to study excited states are equally varied. There is a definite need to summarize the widely scattered literature of this field and to unify our understanding of the physics and chemistry of excited species. This book is partially successful in providing such a summary. It is a collection of seven articles that review the properties and behavior of excited atoms and small molecules. Electronic, vibrational, and rotational excitation and their interconversions are examined from both theoretical and experimental viewpoints.

The book has one major deficiency: it is out of date. Most of the chapters appear to have been assembled about 1971. Some of them include supplements with more recent references, but they are not complete and newer work is not incorporated into the text. Important developments such as laser-induced fluorescence monitoring of excited products, molecular beam studies with excited reactants, modern theories of nonadiabatic collisions, and isotope separation are not discussed at all.

The most informative chapters, in my opinion, are those by McGowan, Kummler, and Gilmore on upper atmospheric processes and by L. Krause on sensitized fluorescence, both of which include useful and up-to-date tables of excited state properties. The chapters by Ian W. M. Smith on reactions of excited species and by Robert C. Amme on vibrational and rotational excitation also contain valuable information, although much of it can be readily found in other recent reviews. The chapter by E. E. Nikitin on nonadiabatic collision theory is particularly out of date, containing no mention of recent work by Bauer, Fisher, Pechukas, Preston, Miller, and George. Nevertheless, it is a valuable and important chapter, as is the other theoretical chapter, by Joyce J. Kaufman, on excited state potential energy surfaces.

The primary purpose of this book, according to its preface, is to gather together and critically summarize the various diverse aspects of excited state research. Although it falls short of this objective, it should be a valuable resource for the nonspecialist.

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Integrative Marine Biology

Marine Ecology and Fisheries. D. H. CUSHING. Cambridge University Press, New York, 1975. xiv, 278 pp., illus. Cloth, $27.50; paper, $6.95.

This is an important book. In it Cushing attempts to integrate the theory and knowledge of fishery biology with that of marine ecology. Whether the reader thinks he has been successful will depend on background, bias, and degree of skepticism concerning the theory and content of either field. But such an integration is clearly necessary and, whatever one thinks of some of Cushing's interpretations, he has obviously chosen the right path and has made progress along it.

For the landlocked reader an explanation is in order. There are at least three classes of marine biologists. There are the fishery scientists, who study stocks, their recruitment, growth, and other aspects of population dynamics as affected by fishing pressure. They are frequently employed by the state, are in the unenviable position of being directed to do mission-oriented research, and often treat their subjects as if fish lived in a biological vacuum. There are the biological oceanographers (sometimes also called marine biologists), who are concerned with the structure, function, and efficiency of transfer of energy and materials through food webs. These are often academics and sometimes have the unfortu-