BOOK REVIEWS

Organometallic Survey

Organoaluminium Compounds. By T. Mole and E. A. Jeffrey. Pp. xiv+465. (Elsevier: Amsterdam, London and New York, 1972.) Dfl. 175; $54.75.

In twenty years we have seen a very substantial growth in organoaluminium chemistry yet a detailed critical monograph summarizing the subject has been singularly lacking until now. Drs Mole and Jeffrey are to be congratulated in admirably filling the requirement with a crisply well written survey of the field.

Organometallic chemistry has undergone a spectacular expansion since the discovery of ferrocene in the early 1950s. Those persons who have spent most of the last two decades studying the organoderivatives of the transition metals are inclined to forget the very significant advances made in the corresponding derivatives of the main group metals. Among these, Ziegler's two discoveries, the direct synthesis of trialkylaluminium compounds from aluminium, olefins and hydrogen, and the formation of carbon-carbon bonds by addition reactions of alkylaluminium compounds, are now recognized as being of particular significance. These discoveries in turn stimulated much other important work. An instance is the use of alkylaluminiums as reducing agents in the synthesis of chemically significant transition metal complexes, for example, bis(cycloocta-1,5-diene)nickel.

In the various chapters of the book the authors have surveyed the whole field of organoaluminium chemistry from the pioneering researches of Ziegler to the latest structural studies on the nature of the dimerization of the alkyl compounds. Chapter 1 gives a perhaps unduly short account of the main principles of organoaluminium chemistry. This is followed by fifteen chapters reviewing the following topics: organoaluminium halides; organoaluminium hydrides; trialkylaluminiums; reactions of the latter with olefins; arylaluminiums; organoaluminates; organoaluminium alkoxides and related compounds; organoaluminium amides and related compounds; reactions of organoaluminiums with sulphur, phosphorus and arsenic compounds; unsaturated organoaluminium compounds such as vinyl and alkynyl derivatives; reactions of organoaluminium compounds with oxygen-, nitrogen- and sulphur-containing functional groups; reactions with organic halides; alkylation of compounds of main group elements; reactions of organoaluminium compounds with transition metal compounds; and finally a short account is given of the analytical techniques used in this field.

A formula index is provided, and the usefulness of the book is further enhanced by many helpful footnotes and a judicious use of cross referencing between the chapters within the cursive text.

The cost of this book places it outside the reach of all but a very small minority of individuals but even at the exceedingly high price it is an essential treatise for any chemical library. The authors have succeeded in providing the chemical community with a masterful survey of an important field; let us hope the publisher has not priced it beyond the means of many university libraries.

F. G. A. Stone

Mass Spectrometry

Mass Spectrometry. Edited by A. Maccoll. Consultant editor, A. D. Buckingham. (*MTP International Review of Science. Physical Chemistry*, Series One, Volume 5.) Pp. 300. (Butterworth: London; University Park: Baltimore, Maryland, 1972.) £10; $24.50.

This book forms part of the 13-volume section of the *MTP International Review of Science* that is concerned with physical chemistry. The introductory remarks emphasize that the subdivisions of physical chemistry adopted are not conventional but have been designed to reflect current research trends. The same can be said of the eight topics from which this book on mass spectrometry is made up. Necessarily, many topics have been omitted and the literature cited sometimes reflects the limited field of interest of the reviewer, but the topics discussed include most of those which are developing rapidly in terms of new ideas. The reviews are indeed critical, catch the spirit of the times and point the way for the future.

The subject of mass spectrometry is already reviewed every three years in the much larger *Advances in Mass Spectrometry* published by the Institute of Petroleum which reports the proceedings of a regular international conference. The MTP review volume, however, has managed generally to give a more critical and easily digested account of particular areas. The theoretical chapter, for example, does this by concentrating upon a consideration of the fragmentation of polyatomic ions in terms of the quasi-equilibrium theory. The review is to appear biennially and there will thus be ample opportunity of inviting different contributors to supplement these accounts and at the same time to reflect their own interests by concentrating upon somewhat different aspects. If this is done and the list of topics included in the review is changed as the focus of interest changes, the volumes will be valuable to all concerned with mass spectrometry.

This volume in the first series has reviews on the theory of mass spectra, ionization and appearance potentials, field ionization, chemical ionization, ion cyclotron resonance, time-of-flight and metastable ions. It also includes a chapter on electron spectroscopy which contains much work that does not strictly form part of mass spectrometry but which is none the less required reading for mass spectroscopists. There are some interesting historical introductions and the chapter on ion cyclotron resonance is particularly timely in that most of the literature on this subject spans only the last three years. The chemical ionization chapter is largely a listing of spectral characteristics from different compound types but this, too, is useful at this still early stage of development of the method. I look forward to the publication of the corresponding volume in the second series in two years' time and hope that the topicality and authority evident in this first volume are maintained.

J. H. Beynon