past five years is time-of-flight mass spectrometry (TOFMS). In the search for transient clusters the multiplex advantage offered by TOFMS is extemely useful. It is nice to see, therefore, that in Chapter 6, Keesee and Castleman give an overview of the technique. In particular, they discuss the refinements that have been made to TOFMS in order that fragmentation steps within the apparatus may be identified and put to use in the analysis of chemical reactions in clusters. A brief survey of results from specific cluster systems is also given.

In a very extensive article Bernstein (the editor) presents a comprehensive review of the visible and UV spectroscopy of organic solute–solvent clusters. Of particular value is the interpretation of frequency shifts in terms of the intermolecular interactions that exist between the constituent molecules. If nothing else the bulk material and the clusters must share the same potential energy surface and so the results from the type of experiments described by Bernstein are of value to those interested in the computer simulation of bulk liquids and solids. In the final chapter Whetten and Hahn review some of the spectroscopic tech ques that have been used to study clusters ranging in constitution from Ar_n^+ through to $(CH_3OH)_n \cdot Cs^+$. Given the contens of the previous chapters it may seem that ther is not much else to cover, but in fact the article provides some fresh ideas and insight into the types of problems in cluster physics that we might wish to tackle over the next ten years.

Viewed as a whole the book provides an extensive survey of current research in clusters, with each article having been prepared by an acknowledged expert in the field. It is unfortunate, therefore, that at $253.75 the work is unlikely to be purchased by those most likely to benefit from its contents.

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Transition Metals in Total Synthesis; by P.J. Harrington, John Wiley and Sons, New York, 1990, xvi + 484 pages, £47.50; $71.95. ISBN 0-471-61300-2.

The extent to which organo-transition metal chemistry has been used in organic synthesis has increased substantially over the past decade. A number of syntheses have been reported in which the application of an organo-transition metal reagent has allowed a synthetic step to be used which possesses an unusual regiospecificity thus permitting a novel synthetic strategy to be developed. It is therefore important that the power of these methods is incorporated into the armoury of the synthetic organic chemist.

This book takes twenty biologically important molecules and explores the way in which organo-transition metal chemistry has been used in key steps in their synthesis. Each chapter begins with an outline of the importance of the compound concerned and then describes in general terms the principles involved in the use of the organo-transition metal reagent before the syntheses themselves are discussed in detail. Each chapter is well referenced. The text is organized by metal. Thus chapters 2 and 3 describe applications of organopalladium chemistry whilst chapters 4–6 cover three areas of organoiron chemistry. Chapters 7–10 are devoted to aspects of cobalt-alkyne chemistry. Chapters 11–13 describe areas of organochromium and titanium chemistry whilst the final chapters review some advances in

transmetallation methods as applied to organic synthesis. The range of target molecules is wide covering indole alkaloids, steroids, prostaglandins, sesquiterpenoids and the anthracycline antitumour antibiotics.

This book is much more than a catalogue of syntheses. Each chapter needs to be read and pondered for it will then reveal further potential applications of organotransition metal chemistry in synthesis. The book is well produced and should make valuable reading for chemists wishing to apply organometallic and, in particular, organo-transition metal chemistry in synthesis.

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J.R. Hanson

Gmelin Handbook of Inorganic Chemistry, 8th Edition, Coordination Compounds of Manganese, Springer Verlag, Berlin, Volume D6, 1988, pp. 416 + xix, DM 1914. ISBN 3-540-93565-7. Volume D7, 1990, pp. 289 + xvi, DM 1335. ISBN 3-540-93602-5.

These volumes continue, but do not conclude, the coverage of the coordination chemistry of manganese begun with volume D1 which was published in 1979. Volume D6 covers the coordination chemistry with Schiff bases, hydrazones, carbazones, and related compounds with a literature closing date not earlier than 1986. Volume D7 deals with nitriles and ligands containing sulphur, selenium, and tellurium, with a literature closing date not earlier than 1987. One imagines the Gmelin staff pursuing this subject to an eventual conclusion, only to find that it is necessary to revise volume D1 once again. An endless treadmill is presented to these tireless reviewers. Once again, the presentation is superb, the treatment immensely detailed yet easily appreciated, and professional in the extreme. The volumes each contain a ligand formula index, and a detailed contents index. Thus the material is very accessible. As far as can be judged, it is comprehensive.

The cost of these volumes makes it unlikely that there will be many private purchasers, and certainly many libraries will think twice about spending so much.

The Gmelin Institute is, surely, providing a service which is invaluable but cannot be economic, even at these prices. One hopes that they may long continue.

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