

regio- and stereo-selectively to seven-membered ring products including bicyclo[3.2.1]octenediones.

Five chapters are devoted to mechanistic and exploratory chemistry. Kochi provides detailed arguments to illustrate the utility of the electron donor-acceptor concept as a unifying mechanism for organometallic reactions. Walther *et al.* discuss the use of nickel bipyridyl complexes to introduce carbon dioxide into organic molecules. For example, 1,3-dienes are converted to the corresponding pent-3-enoic acids, a reaction which has applications in the elaboration of steroid side chains. Casey *et al.* report a series of novel and interesting reactions of organorhenium compounds including olefin, allyl and carbene fragments attached to the cyclopentadienyl rhenium dicarbonyl fragment. Okuda *et al.* discuss the tethering of olefin and cyclopentadienyl ligands to generate new chiral complexes of cobalt. Schurig *et al.* describe the use of nonracemic molybdenum oxodiperoxo reagents to effect the asymmetric synthesis of oxiranes from prochiral olefins and for their kinetic resolution.

Finally four chapters are devoted to asymmetric carbon-carbon bond-forming processes, with particular reference to stereoselective additions to aldehydes. Hoppe and Zschage describe the development of chiral metallated carbamates and strategies for their use in asymmetric synthesis. Hofner *et al.* report the development of a novel class of carbohydrate-derived cyclopentadienyl dialkoxy titanium chiral auxiliaries for attachment to allyl groups and enolates and their use in highly enantioselective allylations and aldol reactions respectively. Bolm reports the synthesis of a C_2 -symmetric homochiral bipyridyl-containing diol which is used directly to catalyse the enantioselective addition of diethylzinc to benzaldehyde and, via its nickel complex, to catalyse the asymmetric conjugate addition of diethylzinc to enones. Noyori *et al.* describe the use of chiral amino alcohols as catalysts to promote the highly enantioselective addition of diethylzinc to aldehydes. The origins of the chirality-amplifying phenomenon operating in these systems is elucidated.

Each and every chapter provides an interesting overview of specific areas of organometallic chemistry. For this reason the book should be on the shelves of every library used by organic and organometallic chemists. The rapid pace at which this subject is evolving means, however, that this collection of individualistic views of the state-of-the-art of particular areas is unlikely to find a place in personal collections. The authors have prepared their chapters in camera-ready form: each therefore has its own particular style, and this combines with the rather curious order in which some of the chapters have been placed to make the book as a whole seem rather disjointed. Perhaps the editors could have done more to control this. Nonetheless I enjoyed reading the book and commend it highly to others interested in organic synthesis via organometallics.

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Transition Metal Organometallics for Organic Synthesis

F J McQuillin, D G Parker and G R Stephenson
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This work is a continuation by Drs Parker (ICI, Wilton, UK) and Stephenson (University of East Anglia) of the established text of Parker and the late Professor Francis McQuillin of the University of Newcastle upon Tyne. As such, the present 1992 version has built upon solid and valuable foundations. As the present authors state, they have continued the original McQuillin concept which existed to provide examples giving insight into new synthetic methods using organometallics. The literature is surveyed up to 1988 and extensive literature citations are provided for each of the 15 chapters. Unusually these are all grouped together (but separated by chapter) at the end of the work. However, there is no disadvantage to this approach.

The chapters are sensibly arranged according to the nature of the reactions. This is an approach which most chemists will think more useful than any alternatives, e.g. arrangement according to the metal involved. The chapters proceed as follows: Chapter 1 discusses the properties of ligands; Chapter 2 is concerned with isomerization and rearrangement, and Chapter 3 with epoxidation of alkenes. Chapter 4 covers alkene oxidation, Chapter 5 and 6 the use of unsaturated compounds and π -allyls as synthetic intermediates. Chapter 7 continues the synthetic theme, considering the use of π -complexes as synthetic intermediates. Chapter 8 covers σ -complexes as nucleophiles; Chapters 9 and 10 cover insertions. Chapter 11 discusses cycloaddition reactions and Chapter 12 is concerned with carbene complexes; in Chapter 13 various methods of protecting groups or compounds are considered. Chapter 14 is concerned with the important area of natural-product synthesis and Chapter 15 covers heterocyclic synthesis. The important synthetic process of hydrogenation is covered in Chapter 10. The Index is very detailed and useful (it is 17 pages in length).

Clearly this book is invaluable to the group to whom it is most directly aimed, viz. those who are involved with organometallics in synthesis. However, this Reviewer believes it should be on the desk of all organometallic chemists. It is also particularly useful for those who teach the subject at undergraduate or postgraduate level. The cost is not out of proportion to the usefulness of the book, which is a valuable continuation of an important text and continues to be a fitting memorial to the work of Francis McQuillin.

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