

Book Reviews

Mössbauer Spectroscopy and Transition Metal Chemistry. By PHILIPP GUTLICH, RAINER LINK (both of Johannes Gutenberg Universität), and ALFRED X. TRANTWEIN (Universität des Saarlandes). Springer-Verlag, Berlin, 1978. x + 280 pp. \$38.00.

This monograph contains interesting material on Mössbauer spectroscopy, applied to a variety of transition-metal complexes. Chapter 7 is probably the most valuable for most readers, as it provides a brief introduction into nickel, zinc, ruthenium, hafnium, tantalum, tungsten, osmium, iridium, platinum, gold, and mercury Mössbauer spectroscopy. The level of writing is uneven, and the introductory chapters will probably not be of much help to the novice who seeks to understand the basis and the experimental techniques of Mössbauer spectroscopy. For example, the complex deconvolution of the velocity cosine smearing effect at N.B.S. is discussed, but the simple resolution of most of this problem by Hershkowitz is not mentioned. The electric field-gradient tensor is introduced in Chapter 3 and discussed further in Chapter 6 as it relates to iron compounds. Instead of enumerating the experimental techniques which measure the components of this second rank tensor, and discussing their interpretation for elucidating structure and bonding, the authors weakly conclude that quadrupole splitting (a scalar measurement which is determined by several of the elements of the tensor) is useful chemically. In itself, this would not be a defect. Most chemists will be loathe to voluntarily deal with second-rank tensors. But, if so, there is much wasted effort in the incomplete treatment given. Chapter 8 concludes the book, and explores some of the more imaginative applications of Mössbauer spectroscopy. Briefly mentioned are solid-state reactions, frozen solutions (which exhibit surprising degrees of mobility), surface studies (oxidation, catalysis), metallurgy of alloys, chemical after-effects or hot-atom chemistry (events following by a few nanoseconds the nuclear transformation), and selected biological applications. A very large number of references are cited, and this adds to the value of this book.

R. L. Collins, *The University of Texas at Austin*

Aliphatic and Related Natural Product Chemistry. Volume I (Specialist Periodical Reports). Senior Reporter: F. D. GUNSTONE. The Chemical Society, London, 1979. xi + 308 pp. \$55.00. Also available from American Chemical Society Special Issues Sales.

After the appearance in 1977 of Volume 5 of The Chemical Society's Specialist Periodical Report series on "Aliphatic Chemistry", the decision was reached to divide the series into two, which were to be entitled "General and Synthetic Methods" and "Aliphatic and Related Natural Product Chemistry", respectively. The first volume of the Natural Products series has now appeared, and is the subject of this review. Successive volumes are planned for every other year.

The new series will "emphasize those areas of natural product chemistry which relate to aliphatic compounds or to molecules with an important aliphatic or alicyclic component". Following these guidelines, the contributors have sifted through the literature of 1976 and 1977 and have organized the material relevant to their area into eight chapters. The topics treated are: Natural Acetylenic and Olefinic Compounds (V. Thaller), Marine Aliphatic Natural Products (R.E. Moore), Acyclic Terpenoids (D.H. Grayson), Insect Pheromones (R. Baker and D.A. Evans), Olefinic Microbial Metabolites (R.C.F. Jones), Prostaglandins (P.R. Marsham), Fatty Acids (F.D. Gunstone), and Lipids (A.K. Lough).

The chapter topics are defined by structural features (e.g., acyclic terpenes) or by source or metabolic role (e.g., marine products, insect pheromones). The coverage appears to be thorough, with stress placed on structure and synthesis. The largest chapter, on prostaglandins, runs for 65 pages and cites more than 300 references; the shortest chapter on acetylenes and related compounds has 19 pages with 86 references. The presentation throughout is terse and often highly condensed, but never murky. Generous use is made of structural formulas and structural flow diagrams.

These reports will spare many chemists much time and effort. Those directly concerned with one of the areas covered will find a superb starting point for their own literature search. Others, more casually

interested, will browse through the reviews to get a flavor of the recent research and its direction.

The volume is recommended for Chemistry Libraries and for natural product chemists able to afford the price.

Walter J. Gensler, *Boston University*

Metal Complexes in Organic Chemistry. By R. P. HOUGHTON (Senior Lecturer in Organic Chemistry, University College, Cardiff). Cambridge University Press, Cambridge, England, 1979. x + 308 pp. \$15.95 paperback; \$49.50 hardcover.

This book is part of the series of Cambridge texts in chemistry and biochemistry. It should be useful for special topics courses at the graduate or advanced undergraduate level and for organic and inorganic chemists wishing to learn more about the organic chemistry of coordinated ligands. The book is organized into five chapters, each with nine to nineteen subheadings. At the end there are a reference section and an index. Chapter 1, titled General Principles, includes a well-organized encapsulation of metal-ligand effects with emphasis on types of ligands and their specific interactions with metals. Chapter 2, Effects and Uses of Complex Formation, reviews the results of coordination on ligand chemistry including stereochemical effects, product specificity, stabilization of reactive species, displacement of equilibria, and changes in acidity. Also covered are uses of complexation in purification of organic ligands, resolution of racemic mixtures, and protection of reactive groups. The remaining Chapters 3-5 (176 pp of the book) are a general survey of metal complexes in organic reactions. The organization is according to the type of reaction: substitution, addition, oxidative addition, and insertion. Principles are stressed with detailed reactions given as examples. The subject is well covered with the only notable omission being metal involvement in organic oxidation-reduction reactions. The reference section has 127 references, mostly review papers and texts, which are sparsely referred to in the text. Finally there is a ten-page index.

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Chemical Physics of Solids and Their Surfaces. Volume 7 (Specialist Periodical Reports). Senior Reporters: M. W. ROBERTS (University of Bradford) and J. M. THOMAS (University of Cambridge). The Chemical Society, London, 1978. viii + 184 pp. £22.50 (\$55.00).

This book continues a series previously titled "Surface and Defect Properties of Solids". The change reflects the intention of the editors to broaden the scope of the series and an attempt to "arouse the curiosity" of a wider audience. That the coverage is indeed wide is indicated by the titles of the first two chapters: "Defects and Microstructures in Feldspars" by A.C. McLaren and "Atom-Atom Potentials" by S. Ramdas and J.M. Thomas. The first contains a section on e-plagioclase and one on microcline and anorthoclase. The electron microscopy and electron diffraction evidence is supplemented in the latter section by complementary optical microscope observations. After an introduction to the theory in the second chapter, the authors discuss several applications to molecular crystals. The third chapter, "The Characterization and Properties of Small Metal Particles" by Y. Takasu and A.M. Bradshaw, summarizes recent literature and follows with details of two classes of such particles: those prepared by vacuum evaporation and by the matrix isolation technique. Succeeding chapters are "Neutron Scattering from Adsorbed Molecules and Intercalates" by P.G. Hall and C.J. Wright, and "Photo-induced Reactivity at Oxide Surfaces" by R.I. Bickley. The final chapter by J. Pritchard surveys the field of "Reflection-absorption Infrared Spectroscopy" and includes discussion of experimental methods and applications. A complete author index is provided but no subject index. The many references include 1977 publications.

The wide range of topics and the huge price of this volume will probably limit its attractiveness for one's personal library. However, if there is need for a brief survey and a quick introduction to the recent literature in one of the areas covered, the report would make an effective and readable source.

James N. Lloyd, *Colgate University*