lene)ethylnylenenes] and six other contributions by J.L. Dye, A.G. MacDiarmid, J.O. Morley, L.Y. Chiang, A. Kakuta and D.S. Donald on organic materials with interesting chemical, optical, electronic and magnetic properties.

The third section on Organic Synthesis for Life Sciences contains an article on metal-based Selective Oxidations in Organic Chemistry using Biomimetic Catalysts by D. Mansuy and four contributions from T. Shiba, H. Yamada, P.G. Schultz and Y. Kanaoka on peptides, enzymes, antibodies and ion channels.

All of the chapters are well written and generally easy to read. The editors and authors are to be congratulated; the book overall is extremely well produced despite being a collection of camera-ready manuscripts, and represents a compilation of reviews of the various distinguished authors' contributions. The volume admirably demonstrates the extent to which very many areas of science rely on the crucial contributions of organic, and in particular, organometallic chemistry. Chemists from all disciplines would gain from reading this book, but its very broad scope and high price (£85) make this a library book rather than one for individual collections.

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Coordination Chemistry of Aluminium
G.H. Robinson (ed.) (Howard L. Hunter, Chemistry Laboratory, Clemson University, Clemson, SC 29634-1905, USA) VCH, New York, xiii + 232 pages
DM189
ISBN 1-56081-059-9

Aluminium is the third most abundant element in the Earth's crust. Its coordination chemistry, which determines its speciation in natural waters, its mineralogical transport and distribution, its effect on biology and its role in the environment, are of immense importance. Curiously, however, the coordination chemistry of aluminium in aqueous solution has hitherto been little studied and therefore not very well understood. That is why in this book there is only one chapter, out of five covering particular ligands, on aqueous solutions. The others cover areas where chemistry has to be studied in environments where water is rigorously excluded and aluminium–carbon–nitrogen or–phosphorus bonds are instantly converted by moisture into the aluminium–oxygen bonds that are ubiquitous in the natural environment.

The book comprises six chapters, all by internationally acknowledged experts. The first by A. Haaland (University of Oslo) is a survey of normal and dative bonding in neutral aluminium compounds. This brings together and rationalises an enormous body of structural and thermodynamic data and shows how subtle changes in bond lengths in complex coordination compounds can be understood. The second chapter, by G.H. Robinson, is a straightforward factual summary of coordination compounds based on aluminium–nitrogen bonds. Since valence requirements mean that aluminium nitride itself forms a three-dimensional lattice many molecular coordination compounds are organometallic, with small aluminium–nitrogen cores separated by peripheral organic groups. There is a good summary here both of early work on derivatives of simple amines and of more recent studies on products form multidentate amines where Professor Robinson's own contributions have been extensive. The third chapter on aqueous coordination chemistry is by C. Orvig (University of British Columbia). There are several pages showing organic ligands, associated thermodynamic data (the compilation is illustrative rather than comprehensive), and ^{27}Al NMR results. Low valent and paramagnetic compounds of aluminium are considered by A.R. Barron (Harvard): some of these are transient species investigated mainly by ESR but a number of well-characterised compounds with aluminium–aluminium bonds have recently been made by W. Uhl. The chemistry of alkoxides, thiolates and the heavier Group 16 derivatives of aluminium and gallium are described by J.P. Oliver, R. Kumar and M. Taghiof (Wayne State University). A glance at the reference pages show the enormous advances made in the last few years. The final chapter by J.L. Altwood (University of Alabama) on anionic and cationic organoaluminium compounds describes liquid clathrate compounds and compounds with cyclic ethers.

Though this book makes no claim to be about organoaluminium chemistry, the reviews in it are of considerable interest to those working in this area. They are up-to-date and authoritative and are likely to stimulate even more work in a rapidly developing field.

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Gmelin Handbook of Inorganic and Organometallic Chemistry, 8th Edition, Gallium Supplement Volume D1
J-C. Maire, K. Greiner, M. Kotowski, V. Kruppa, M. Mirbach, E. Schleitzer-Rust and D. Tille, Springer, Berlin, 1992, xvi + 320 pages
ISBN 3-540-93657-2

The main volume of Gmelin covering the chemistry of gallium was published as long ago as 1936. Since

then there have been supplements on organogallium compounds (1987) and the present volume on coodination compounds. This covers the chemistry of complexes with oxygen-containing ligands such as water, alcohols, aldehydes, ketones, quinones, ethers, *O*-heterocycles and carboxylic acids, and complexes with ammonia, amines and *N*-heterocycles containing one nitrogen atom. Complexes of heterocycles containing two or more nitrogen atoms will be covered in the next volume, D2.

The literature has been comprehensively surveyed up to 1990 and in some cases the references cover even more recent work. The presentation, as always with Gmelin, is superb and the diagrams and formulae beautifully clear. By systematically considering classes of oxygen-containing molecules the authors have condensed a vast amount of information into a logical and manageable form. Thus at the beginning of each section the ligands are defined and sub-sections follow on complexes in the gaseous state, complexes in solution, and complexes isolated in the pure state and fully characterised.

Although organometallic compounds per se are not included, the volume will be of considerable interest and value to researchers in organogallium chemistry because of the many structural analogies between carbon, nitrogen and oxygen ligands and because coordination compounds are used in the analysis and characterisation of many organometallic compounds. The interplay between molecular and ionic forms: e.g. $2LGaX_3 \rightleftarrows [L_2GaX_2][GaX_4]$ is familar in organometallic chemistry and also a recurring theme in the coordination chemistry of gallium.

The research described in this volume is also important because of the industrial uses of coodination compounds of gallium; for example, in the semiconductor industry, and in the synthesis of modern materials. Another spur to the development of the chemistry of coordination compounds of gallium comes from the use of gallium in positron emission tomography. The speciation of gallium in the presence of the complex oxygen and nitrogen donors found in vivo is crucial to the sucessful exploitation of ^{67}Ga and ^{68}Ga in diagnosis or radiotherapy. In bringing the known information together and making it accessible the authors from the Gmelin Institute have performed an important task comprehensively and well.

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Transition Metals in the Synthesis of Complex Organic Molecules
Louis S. Hegedus, University Science Books, Mill Valley, California, USA, 1994, 358 pages. ISBN 0-93570Z-28-8

This book is based on a series of short industrial courses and graduate lectures. It was originally intended to be part of the third edition of 'Principles and Applications of Organotransition Metal Chemistry' but it is now presented as an independent volume. Its objective is to show how transition metal organometallic chemistry can be of use to synthetic organic chemists.

The first chapters form an introduction describing oxidation states, electronic configurations and bonding. The basic mechanisms of organometallic reactions are outlined. The main body of the book contains chapters on particular areas of synthetic application. These include synthetic applications of transition metal hydrides, of complexes containing metal–carbon σ bonds, transitions metal carbonyl and carbene complexes, transition metal alkene, diene and alkyne complexes, η^3-allyl transition metal complexes, and finally transition metal arene complexes. The coverage is therefore quite wide. There are many references to the original literature including a substantial number from the period 1986–1992. The book is well-written and indexed, and is copiously illustrated with examples which reveal the wide application of various methods. The emphasis throughout is on the role of the metal complex in the synthesis. Of particular interest to the organic chemist are the ways in which these modify the conventional regiochemistry of well-established reactions.

The book is easy to read and clearly produced. It can be recommended to synthetic organic chemists as a useful introduction to the application of transition metal organometallic chemistry in synthesis.

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Lanthanides in Organic Synthesis
Tsuneo Imamoto (*Best Synthetic Methods*, Series Editors A.R. Katritzky, O. Meth-Cohn and C.W. Rees) Academic Press Limited, London, 1994. £30.00
ISBN 0-12-370722-6

As the author rightly points out, organic syntheses involving lanthanide elements have become increas-