

tein have been shown to function at different parts of the electron-transfer chain for sulfate reduction by Xavier's group in Lisbon. Armstrong tends to take the conservative view suggested by Münck, that the  $\text{Fe}_3\text{S}_3$  complex is likely to be an artifact of the isolation procedures for nature  $\text{Fe}_4\text{S}_4$  precursors. It is rare to observe reversible equilibria of this kind without an inherent biological function. Such a regulatory function for free  $\text{Fe}^{2+}$  has been reviewed by R. J. P. Williams recently.

The chapter by Sykes on biological oxygen carriers is excellent in its treatment of both structure and function of these molecules. The chapter which follows by Daito and Dasaki is strictly a treatment of the inorganic chemistry of oxo-metal complexes without extrapolation to analogous systems in biology. Similarly, Lockhart's chapter on the kinetics and mechanisms for reactions of elements in groups I to III fails to deal adequately with biologically derived macrocycles which provides one of the most exciting aspects of this field.

A monumental chapter appears in the middle of the volume on the chemistry of sulfur coordination to transition metals. This chapter by Deutsch and co-workers is 130 pages long with 296 references. Almost a monograph of the subject, it is extremely well written and covers an area which was badly needed. It represents a systematic examination of the chemistry of S-metal complexes and forms a very important source of information for those biochemists who are struggling to understand the reactions of coordinated thiols.

The final chapter by Yeselwitz and Taube takes a new look at the old problem of self-exchange in cobalt amines, and serves to show that much work remains to be done before such mechanisms are fully understood.

John Wood

**Biological and Environmental Aspects of Chromium.** Vol. 5, Topics in Environmental Health, ed. by S. Langard, Elsevier Biomedical Press, Amsterdam, 1982, v + 277 pages; US \$ 85.00.

This volume introduces chromium as one of the few chemical elements for which all three fundamental aspects of its perspectives in life subsist: technological, nutritional and toxicological. For the two last aspects the uncertainty derived from the analytical and interpretative difficulties is pointed out, especially with regard to the rôle of chromium in the maintenance of normal glucose tolerance and insulin power.

For the metallurgy of chromites and the property of relative products a problem arises: occupation-

al exposure to chromium at the various stages of production and utilization (plating, tanning, welding, painting).

Two chapters are dedicated to the chemical and physical properties of chromium and its compounds in water, soil and air and to a pathway of bioassimilation, the detection limits of which are discussed together with sampling and analytical instrumentation and the relative strategy and sensibility levels.

Numerous and more recent investigations are reviewed on the behaviour of chromium in the human organism with regard to both uptake and cellular retention.

The fractionation studies on the molecular size of chromium compounds in lysates of cells are of great interest. These studies supply hypotheses of chemical behaviour in relation to various bonds including the polymeric one through OH bridges.

Recent *in vivo* studies are also mentioned.

Chromium also has a nutritional rôle, reviewed in the book from uptake to excretion, but its mutagenic activity is the main problem for mankind.  $\text{Cr}^{+6}$  reduction in the cell nucleus of the binding of  $\text{Cr}^{+3}$  to DNA would cause genetic and carcinogenic effects (see biochemical hypothesis on glycidal synthesis).

Other morphological and biochemical investigations are in the last chapter, the content of which is mainly medical.

This volume is particularly notable for the inclusion of many articles by distinguished authors and for its technical and scientific detail.

Carlo Alberto Cecconi

**Reactive Intermediates**, Vol. 3, Edited by R. A. Abramovitch, Plenum Press, New York and London, 1983, xiv + 630 pages, \$59.50.

These enterprising volumes on reactive intermediates contain material of interest to a very wide range of chemists, although the emphasis is usually in organic chemistry. In this latest volume by far the longest chapter is that by Z. Rappoport on Vinyl Cations (189 pages, 354 refs.), and this detailed and very authoritative account could appropriately have appeared as a separate monograph. Its interest to inorganic or organometallic chemists will necessarily mainly be indirect (somewhat puzzlingly no mention is made of the acid cleavage of alkynyl-metal derivatives, such as  $\text{RC}\equiv\text{CMR}_3$  ( $\text{M} = \text{Si}, \text{Ge}, \text{or Sn}$ ), and the implied marked stabilization of vinyl cations by  $\beta$ -metal substituents); this is also true of the chapter on Bridgehead Olefins by G. Szeimies (68 pages, 224 refs.) (which does not deal with any aspects of com-

plexing to metals), that on Synthetic Applications and Reactivity of Alkoxy Radicals by P. Brun and B. Waegell (60 pages, 155 refs.), and that on Homolytic Substitution by Alkyl Radicals by M. Tiecco and L. Testaferri (51 pages, 112 refs.).

The remaining three chapters are of direct interest to inorganic and/or organometallic chemists, namely those on Chemistry of Selenium and Tellurium Atoms by J. R. Marquart, R. L. Belford, and L. C. Graziano (60 pages, 210 refs.), Radical Reactions of Silanes by J. W. Wilt (85 pages, 311 refs.), and Phosphoranyl Radicals by W. G. Bentrude (100 pages, 186 refs.); all three are well organized reviews by active contributors to the respective fields. The chapter by Wilt is eminently readable, containing as it does numerous comments by the author as well as much factual information.

My one criticism of this volume concerns the time between the completion of the literature surveys and the appearance of the reviews in print, and presumably the editor and/or publishers must take responsibility for this. The chapter by Rappoport has a substantial number of 1980 references, but for the others the literature seems to have been covered only up to the end of 1979 (although there are a few isolated later references, apparently added subsequently). This aspect is all the more disappointing because in other respects the editor and publishers have done well in their choice of authors and in the production of the book, which, with its conventional printing is so much more attractive and easier to read than those (sadly an increasing proportion) which use reproduction of typescript. Furthermore the price is exceptionally low for these days.

Colin Eaborn

**Nitrogen Fixation, The Chemical-Biochemical-Genetic Interface**, Ed. by A. Muller and W. E. Newton, Plenum Press, New York, 1983, pp. 379, \$55.

This book represents the proceedings of a conference held at Bielefeld, Zentrum für Interdisziplinäre Forschung, in 1981. The preface states that it constitutes the proceedings of the conference. This is not the case. The book is much more valuable than that.

The problem is that many organisers like to have a volume to present to the world to prove that their conference happened. The vital part of the conference, the discussion both public and private, can never be conveyed adequately in a book. In any case, the interest is often limited. Rather than attempt to convey that discussion, this volume presents a series of authoritative reviews in the area of nitrogen fixation, grouped under the headings of Biochemistry and Genetics, and Chemistry. The authors are all noted contributors to their fields, and all have attempted comprehensive reviews of their selected areas. Consequently, we have a book which can be read with profit both by researchers in the field and those who simply wish to be informed.

About half the book is chemical in content and half genetic and biochemical. The subject coverage is reasonably complete, leaning towards model sulphur compounds on the one hand and towards biochemical genetics on the other. Thus it is not a complete guide to nitrogen fixation, but nevertheless of clear interest to the chemist throughout.

If all conferences produced books of this quality, this aspect of the literature would be far more valuable and the book-consuming public a little less cynical. This book is strongly recommended.

G. J. Leigh