

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 Fe_3S_3 complex is likely to be an artifact of the isolation procedures for nature Fe_4S_4 precursors. It is rare to observe reversible equilibria of this kind without an inherent biological function. Such a regulatory function for free 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. Cr^{+6} reduction in the cell nucleus of the binding of 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 β -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-