

### Book review

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*Metal Ions in Biological Systems, Vol. 2, Metal Ligand Complexes*; ed. by H. Sigel, Dekker, New York, 1973, xiv + 294 pages, \$25.25.

The second volume of this series is concerned with thermodynamic and kinetic aspects of mixed ligand complexes of metal ions as models for metallo-enzymes and -proteins. By the end of the first section (by R.B. Martin et al.) the fears of the reviewer were reinforced by the admissions of the authors in their concluding summary that correlations and conclusions for mixed ligand complexes are often spurious, since so many parameters are involved and reliable data for even the simplest of equilibria are not available in many cases.

After this discouraging start the book continues with Sigel's contribution on "Structural Aspects", which is largely concerned with the influence of imidazole and pyridine ligands on complex stability. Some insight is gained from this section on the role imidazole may play in metallo-enzymes. A good kinetics section by Sharma and Leussing follows, with some useful comparisons of data for substitution reactions of  $Mg^{2+}$ ,  $Mn^{2+}$ ,  $Co^{2+}$  and  $Zn^{2+}$  complexes. Similar substitution rates may be a prerequisite for  $Mn^{2+}$  to replace  $Mg^{2+}$  or for  $Co^{2+}$  to replace  $Zn^{2+}$  in a number of metallo-enzymes.

Perrin and Agawal contribute an interesting section largely devoted to computer simulations of the equilibria involved between free amino acids, proteins, and metal ions in blood plasma. Since a number of drugs are effective because they selectively complex metal ions (D-penicillamine removes toxic copper in the treatment of Wilson's disease), this is a research area where physical-inorganic chemistry can contribute a great deal to pharmacology.

The final section by Martell on "Artificial Enzymes" is excellent. The examples chosen clearly illustrate the relevance of models to the elucidation of enzyme mechanisms. The challenge to the skill of organic chemists to construct complicated ligands, to physical-inorganic chemists to determine reaction mechanisms, and to biochemists to relate these to metallo-enzymes has clearly been taken up, and such work will receive much stimulation from the appearance of this section.

The two main criticisms of this book are that the contributors have not been selective enough in the choice of the material, with the result that only a tenuous link with biology is apparent on too many occasions, and that where the chemistry is relevant only a superficial discussion of the biological data is given. However, this volume, with its multi-disciplinary approach, does contribute to our understanding of the role of metal ions in biology.