Book Review

Metal Ions in Biological Systems. Vol. XVIII. Circulation of Metals in the Environment, Edited by Helmut Sigel, Marcel Dekker, New York and Basle, 1984, 397 pp.

This is the eighteenth volume in a series devoted to researching the role of metal ions in biological systems. The series has run for more than a decade and has provided very many useful review chapters of this rapidly developing area.

This particular volume focuses upon the scientific understanding of the chemistry involved in biogeochemical cycles. A new innovation in this series is that the first and last chapters of this 11-chapter volume provide introductions and overviews, and summarizing remarks to the whole volume. This is a welcome move. The majority of the chapters are written by Swiss scientists but Scandinavians and Americans also contribute. Thus, the reader acquires a fairly balanced overview of the chemistry, and of its problems, involved with the circulation of metal ions in the environment as far as the industrialised world is concerned.

The analytical chapters display a close cooperation between laboratory experiments and field studies and produce a fairly reliable list of techniques, even though new techniques such as laser acoustic spectroscopy and speciation analysis are not described. The same authors (Jørgensen and Jensen) then proceed to outline some of the processes in which metal ions circulate in the environment. This chapter contains many useful facts but, several decades after Bjerrum described his studies into simple coordination chemistry, one wonders whether it is really necessary to spell out formulae in order to show the reader how copper ions and ammonia form complexes. Non-chemists reading this chapter would benefit more from a more relevant paradigm.

The chapter on surface complexation is readily understandable but in the interests of brevity some important aspects, such as colloidal complexing, have been overlooked. The chapters concerning biological availability and metal organic interactions in aquatic systems are well written and the chapter describing the evolutionary aspects of metal ion transport through cell membranes (written by Wood) leaves one wishing it were longer as so many aspects of this fascinating subject are only recently being researched. The final chapter, which summarizes the book, states that we now have sufficient knowledge to regain control of the metal fluxes in the environment and to reduce their emissions.

I enjoyed reading this volume during two days of travelling and it was pleasant not to have to cut my way through all the sorts of rubbish, cant, and vested interests that one encounters in some books professing to provide all of the answers (not books of this series I hasten to add). Each of the chapters is well-written at an understandable depth for an interdisciplinary audience. Were I to be forced to criticize this volume, I would have to say that it is a little light in terms of listing crisp and courageous problems yet to be tackled but rather its complacent air creates the impression that we are on top of the subject. Just as there is all the difference in the world between a 'woman and child' compared to a 'woman with child', so too, these worthy authors have certainly 'got into' the act of environmental chemistry but I have the impression that the act has not yet been completely 'got together' and so requires a great deal more research. This message is not abundantly clear from this volume. Life is considerably more complex than the authors might lead us to believe. For example, there are large computer programs and databases regularly operated by geochemists to reflect the pathways equilibrium flows of metal ions through the environment. The construction of these models, their validation and verification, and their role in assessing risk factors, potential bioavailabilities and threats to man is a relatively new subject with tremendous challenge and potential that is not even alluded to in this volume. However, Volume XX of the series is reported to be devoted to a study of the toxicity of metal ions and so this area, in which the book is somewhat light, could well be reinforced.

I commend this book to postgraduates in bioinorganic chemistry and in environmental sciences and to dons writing undergraduate lectures. This is another valuable contribution at a realistic price to this very successful series and the authors and editors are to be congratulated.

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