

BOOK REVIEW

ENVIRONMENTAL MINERALOGY: MICROBIAL INTERACTIONS, ANTHROPOGENIC INFLUENCES, CONTAMINATED LAND, AND WASTE MANAGEMENT. J.D. Cotter-Howells, L.S. Campbell, E. Valsami-Jones, and M. Batchelder, Eds. (2000) The Mineralogical Society Series, no. 9, 414 p. The Mineralogical Society of Great Britain & Ireland, London. \$70 (\$45 for members of the Mineralogical Society, \$55 for members of associated societies.)

The editors of this book, whose subtitle could as well have been *Cose Fan Tutti*, tell us in its Preface that Environmental Mineralogy is but a new application of traditional mineralogy, one fomented by growing concern (evidently among mineralogists) “regarding the environments in which we live.” More specifically, there appears to be concern among mineralogists that not enough is known about mineral structure and reactivity in surficial environments, where humans now hold sway over the “brutes and vegetables,” as the savants in simpler times used to aver. In other words, Environmental Mineralogy is really a kind of mineral ecology, a study of reactive solid phases in relation to one another and to their surroundings. Its emergence as a subdiscipline can then be viewed as both a concession to the importance of the biota in earth science and a recognition of the growing human domination of terrestrial ecosystems.

What the curious will find in this well-produced book is really four short books in one, each of about the same length. Book One is entitled “Mineral-Microbe Interactions,” bringing to mineralogists four superb introductory chapters on how microorganisms mediate mineral weathering. No toxins or rubbish figure in these chapters, which develop the principal concepts that have emerged from basic research on bacteria, fungi, and lichens interacting with rocks and minerals. Notable are the leitmotif of oxalate as the primary chemical agent of bio-

logically mediated weathering and the delightful rendering, on page 5, of an elfin mechanism for the microbial exfoliation of mica.

Next comes Book Two, obliquely entitled “Anthropogenic Influences on Mineral Interactions,” whose main emphasis is actually on the biogeochemistry of acid mine drainage, including within its purview the principal microbial and mineralogical players, as well as the attendant geochemical kinetics. This is followed by Book Three, a quartet of chapters on “Minerals in Contaminated Environments,” which introduces the notion that minerals can be appropriated as sequestering or scavenging agents for pollutants. Examples include manganese oxides as sinks for heavy (and not-so-heavy) metals; clay minerals as intercalation traps for myriad inorganic and organic contaminants; phosphate amendments as precipitating agents for remediating Pb contamination; and, in an especially cogent chapter, a variety of biogeochemical processes as the means for reducing U contamination. The final three chapters, comprising Book Four, are grouped under the rubric, “Minerals and Waste Management,” but their scope is much narrower, encompassing the use of zeolites to attenuate radioactive waste and of geosynthetic clays to attenuate municipal waste.

Environmental Mineralogy is perhaps best seen as an eclectic source of recent information about important aspects of mineral biogeochemistry in weathering environments. Books One and Three could well serve as supplementary reading for advanced courses on environmental geochemistry, whereas Books Two and Four may be picked over chapter-by-chapter by readers in search of specialized reviews.

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