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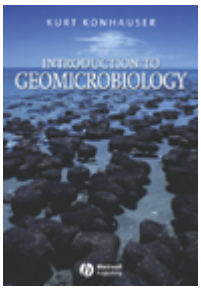
Introduction to Geomicrobiology, by Kurt Konhauser, 2006. Blackwell Publishing, 9600 Garsington Road, Oxford OX4 2DQ, United Kingdom. Paperback, 440 pages, 181 illustrations. Price GBP 34.99; USD 79.95. ISBN 0632054549.



Micro-organisms are found almost everywhere at the surface of the Earth and may even form a significant biosphere within the first kilometres of the crust. They have likely been present since the first hundred millions of years after Earth's formation. Because they can catalyze a large diversity of chemical reactions, micro-organisms have probably largely influenced the evolution of our planet. Understanding which processes have been at stake is certainly one of the major goals of geomicrobiology.

In this context, Konhauser's "Introduction to Geomicrobiology," assembling numerous results from a large variety of geomicrobiological topics, delivers a most convincing and comprehensive picture, linking microbial communities with the evolution of geochemical processes at the Earth's surface. First of all, however, this book is the most recent and the most comprehensive general book in geomicrobiology, showing the great advance made in geomicrobiology during the past few years. As a result, the book is packed with information, which makes it a bit difficult to digest for those willing to read it just for fun, but of great interest for newcomers to geomicrobiology who need a starting point for further study. The rich (56 pages) bibliography is quite up to date, although not extensive on some minor issues. Considering the speed at which this domain progresses, updates will anyway be needed in the next few years if this book has to remain standing at the level it deserves.

The author decided to avoid presenting the details of the many techniques used in geomicrobiology. While this is likely a wise decision, I think that a few introductory lines in boxes here and there, providing references that would allow the reader to dig out more details on the techniques, would have been valuable. The seven chapters (1: Microbial properties and diversity; 2: Microbial metabolism; 3: Cell surface reactivity and metal sorption; 4: Biomineralization; 5: Microbial weathering; 6: Microbial zonation; 7: Early microbial life) are well and efficiently illustrated. Most of the additional information presented in boxes is relevant.

The first chapter gives very general information on microbes: their size, some details on their biochemical components and their chemical and physical requirements for growth. The author strongly emphasizes here the environmental dimension of microbiology. This chapter is, however, a necessarily quick overview, and readers without knowledge of microbiology might want to turn to microbiology books first.

Chapter 2 progressively gets into the main topic of the book, by first detailing the basics of biochemistry regarding energy recovery by various microbial metabolisms. Although this topic is usually not very exciting, I found it nicely presented. Konhauser goes on by documenting the various metabolisms that are presently known and puts them in perspective of their geochemical significance. In the context of geomicrobiology, it seems intuitive to describe the diversity of micro-organisms by discriminating them on the basis of their metabolism; however, I believe that

a systematic description of the phylogenetic groups, maybe in an explanatory box or an index, would have been more useful.

Chapter 3 and Chapter 4 are tightly linked and give excellent reviews of what is known about the structure of cell surfaces, their reactivity and the sorption of metals (Chapter 3) and about biomineralization (Chapter 4). A couple of comments on the differential reactivity of mineral surfaces vs. microbial surfaces for metal sorption, or on the modification of mineral surface reactivity by microbes could have been added, but Chapter 3 in particular is definitely a must-read.

Chapter 5 provides a broad overview of processes involved in the weathering of mineral phases by microbes. This chapter provides good starting points on very diverse topics such as soil formation, basalt weathering and the formation of acid mine drainage.

Then Chapter 6 introduces microbial ecosystems by highlighting the synergistic relationships between various neighbouring metabolisms within a single biofilm. This chapter is also a must-read: Konhauser clearly explains how biogeochemically stratified environments form, and illustrates this notion with the processes involved in early diagenesis or in the formation of stromatolites.

Finally, Chapter 7 provides a geomicrobiologist's view on early microbial life. Of course, a much more detailed overview of this topic can be found in more specialized books. However, I find this chapter particularly interesting because it is one of the first general text on early microbial life written by a geomicrobiologist, i.e., somebody who takes into account the complexity of modern microbial ecosystems, and who understands how various microbial communities interact with each other on the basis of efficient energy recovery. Hence, I believe that such a view on early microbial life, directly resulting from the main ideas expressed in Konhauser's book, is of great value for further discussion with geochemists and geologists working in this field.

As a conclusion, I would recommend this book to any upper undergraduate/graduate students who wish to study geomicrobiology, as well as to researchers in geomicrobiology who may find here either a nice way to fill possible gaps in their knowledge or a starting point for new research.

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