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BOOK REVIEW

FENCHEL, T., BLACKBURN, T. H.: BACTERIA AND MINERAL CYCLING. — Academic Press, London—New York—San Francisco 1979. 225 pp. US $ 34.00.

This book is a general review describing the relationships between bacterial metabolism (including blue-green algae) and the chemical environment of the biosphere, setting a magnificent example to reviewers how to find an equilibrium between the depth and width of information.

The book divided into nine chapters discusses the matter from three main aspects: energetics of bacterial processes, a prokaryote and biosphere chemical evolution, and interconnection between cycling of different elements in natural ecosystems.

The first chapter is devoted to the basic information on energy yielding processes (chemotrophic and phototrophic reactions) showing different typical electron donor/acceptor systems, and to the carbon, nitrogen, sulfur, and phosphorus assimilation. In Chapter 2 a biological and geological evidence for parallel evolution of the prokaryotes and for corresponding changes in the composition of the atmosphere, lithosphere and biosphere is discussed. A "palhirrotrophic"--G/+/-organism having a simple photosystem based on a carotene-type pigment has been, for example, postulated as a hypothetical prokaryote which had appeared $3.6-3.9 \times 10^9$ years ago. In Chapter 3 the dominating role of bacteria in detritus food chains in different ecosystems has been shown (*e.g.* the kinetics of uptake, turnover and mineralization of dissolved organics in natural waters, decomposition of particulate detritus and so on).

The next three chapters (4 to 6) concerning the microbial transformations of the carbon, nitrogen and sulfur compounds form the central part of the book. In the Carbon Cycle Chapter dissimilative reactions and the autotrophic reduction of carbon dioxide are the two main subchapters; the ammonia liberation (nitrogen mineralization), nitrification and dissimilative and assimilative nitrate reduction are discussed in detail in the Nitrogen Cycle Chapter. In Chapter 6 the dissimilative sulfate reduction dependent on the linked oxidation of reduced carbon compounds or hydrogen (*e.g.* in *Desulfovibrio*), chemotrophic sulfur oxidations (*e.g.* in *Thiobacillus*), phototrophic sulfur oxidations (*e.g.* in *Chloroflexis*), and a sulfur turnover are stressed. A heterogeneous collection of chemical reactions of Fe, Mn, Mo, Se, Hg, and P mediated by microorganisms in nature is presented in Chapter 7, while in the next chapter (8) a few cases of symbiosis which involve prokaryotes and which are important in microbial element cycling (such as the rumen system in the ruminant mammalia, the symbiotic nitrogen fixation, and the prokaryotic endosymbionts of eukaryote cells) are pointed out. The last chapter (9) is devoted to quantitative estimates of pool sizes and transfer rates of the global cycling of C, N and S presented as the compartment and illustrative models.

Concluding, let me recommend this book as a very advisable textbook for students and graduate courses and for all those interested in ecology, soil and water microbiology, and environmental engineering.

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