Environmental Biogeochemistry and Geomicrobiology


Biogeochemistry has come of age. The interest, the number of investigators, and the amount of information have been growing dramatically, and the field unquestionably is now able to stand on its own. In the last few years alone, the literature and the attention given to the subject by both basic and applied scientists as well as engineers and individuals in regulatory agencies of government have increased enormously.

These three volumes contain the proceedings of the Third International Symposium on Environmental Biogeochemistry, which was held in Wolfenbuettel, West Germany. The appearance of these volumes only two years after publication of the proceedings of the second symposium and the greater number of papers speak to the interest that has developed and the extent of the research that is being conducted.

The 83 papers included in these volumes cover a vast array of subjects and include studies of aquatic and terrestrial environments, cycles of major nutrients and trace elements, diverse microorganisms and microbial processes, geochemistry and biochemistry, oxidative and reductive conversions, global and local problems, energy and material fluxes, and newly described and also well-characterized phenomena. Other than the extensive activity and the diversity of the field, few general impressions emerge from these monographs. Unfortunately, much of the research is still focused on topics that are more in the realm of soil, freshwater, or marine microbiology and less is directed to geological microbiology or to the broader topics of biogeochemistry, but this narrower scope probably reflects the original disciplines of the investigators and hopefully represents a transitional phase as biogeochemistry matures as an independent discipline. The lack of appreciable attention among microbiologists to the impact of natural communities on the chemistry of the atmosphere and the impact of atmospheric pollutants on microbial communities is likewise unfortunate because such subjects are receiving careful scrutiny by chemists, botanists, and public health workers.

Nevertheless, these volumes are a valuable, timely, and important addition to the literature of environmental sciences, and the breadth of coverage, the practical relevancy of the work, the contributions to basic science, and the variety of specialists and subdisciplines suggest that, though now of age, biogeochemistry will continue to grow and will attract an ever larger audience.—M. ALEXANDER, Department of Agronomy, Cornell University, Ithaca, NY 14853.


Since these volumes are a compilation of individual papers presented at a conference, they do not provide as comprehensive a treatment of the subject, as might be expected in a carefully planned and edited monograph. However, they do contain papers covering almost the entire spectrum of subjects dealing with heavy metals and include papers ranging from those of a review nature to those reporting results of specific experiments. The papers are generally well written and appear to have been carefully edited and arranged into logical groupings. Volume 1, which contains the plenary and future papers along with those dealing with regulatory and analytical aspects of heavy metals, will be of more interest to the general reader than will Volumes 2 and 3 which tend to deal more with technical aspects of heavy metals in the environment. It includes papers concerning the scientist’s role in the decision-making process and the assessment of heavy metals as environmental hazards. Several of the papers dealing with analytical techniques will be particularly useful to those who are interested in quantitative determination, complexation, and speciation of trace metals.

Volume 2 will be of more interest to those readers directly involved in or concerned with the mechanisms and quantitative aspects of heavy metal cycling in the environment. The papers, which are predominately reports of specific studies, cover a wide range of subjects including heavy metals in sediments, soils, air, and water as well as plant uptake and cycling of heavy metals in ecosystems. Part 1 (pages 1–461) emphasizes plant uptake and cycling in ecosystems and agricultural problems associated with soils. Part 2 (pages 462–1045) deals with point sources, reclamation of contaminated lands, and heavy metals in sediments, water, and air.

Volume 3 deals almost exclusively with aspects of human health and as such will probably be of immediate interest to a more limited audience. Papers in this volume tend to be somewhat broader in scope, in that they tend to be reviews of a given subject more than reports of specific experiments and hence will serve as a good source of reference material for many readers.

All volumes have author and subject matter indexes which are valuable to the reader. In addition, Volume 2 includes separate animal and plant species indexes, which are especially convenient for readers interested in these areas.

The conference proceedings should certainly be available to persons interested in heavy metals in the environment. Such individuals may well want to purchase copies for their personal libraries, especially since they are available as separate volumes.—ROBERT G. GAST, Department of Agronomy, University of Nebraska-Lincoln, Lincoln, NE 68583.

A Technology Assessment of Coal Slurry Pipelines


This report was prepared by Office of Technology Assessment specifically as a reference for use by the United States Congress in deliberations over proposed coal slurry pipeline legislation. It is intended as a reference for use in development of general policies on transportation, water resource allocation, and social costs and benefits of energy development. The publication contains much basic information and data on present and future coal markets and demands, costs of coal production, water resources, transportation costs, and environmental impacts. From these data, projections are made of anticipated costs, as well as of social and environmental impacts, of transporting large quantities of coal by slurry pipeline versus movement by rail.

The publication is comprehensive in its comparison of the two systems of coal transport. Separate sections are included on defining the issues involved in this comparison, the technology and costs of movement of coal by both pipeline and unit trains, the economic impacts of slurry pipelines on existing railroads and on allocation of water resources, the social and environmental impacts of the two systems, and legal and regulatory factors that can affect the selection of the best-suited system of coal transport. As might be expected, the report concludes that there is no one “best” system, but that each proposal must be fully evaluated using data relevant to that situation. The report does conclude that without right of eminent domain, coal pipelines could seldom be competitive with railroads. Selection of method of transportation is not expected to have appreciable effect upon projected national levels of coal use.

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