

erature references also is adequate. The production is good, the text generally free of errors and the price reasonable. The book is recommended for judicious use.

1. Davis, P. H. and Heywood, V. H., *Principles of Angiosperm Taxonomy*, Oliver and Boyd, London, 1963.
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3. Kerry, S. W. and Gillet, H. J. (eds), *1997 IUCN Red List of Threatened Plants*, IUCN, Gland, Switzerland, 1998.
4. Matthew, K. M., in *Biodiversity, Taxonomy and Ecology* (eds Tandon, R. K. and Pritipalsingh), Scientific Publishers (India), Jodhpur, 1999, pp. 193–206.
5. Judd, W. S. *et al.*, *Plant Systematics: A Phylogenetic Approach*, Sinauer Associates, Sunderland, Mass, 1999.

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**Biogeochemistry of Rivers in Tropical South and Southeast Asia.** V. Ittekkot, V. Subramanian and S. Annadurai (eds). Institute of Biogeochemistry and Marine Chemistry, University of Hamburg. 1999. 297 pp. Price not stated.

The most striking feature of the earth, also known as the water planet, is its extensive hydrosphere which undoubtedly originated from the degassing lithosphere. The biosphere, lithosphere and atmosphere commonly interact with one another via the action of water. Water in its various states is the medium, catalyst and/or participant in nearly all the chemical reactions occurring in the environment including those of life processes. It is the carrier in many of the natural cycles and transfers energy and chemical materials, dissolved or particulate, from place to place.

The biosphere acts like a transducer taking carbon and water from the atmosphere and the hydrosphere and fixing

them in organic materials by photosynthesis and finally giving them back to the lithosphere. It also accumulates ions as nutrients and sends them back to the lithosphere.

It is with this scenario of global circulation of materials and energy in mind that the book under review carries tremendous scientific significance. With all our major rivers and other water bodies being polluted, the appearance of such a book in the Indian environmental scenario will be a shot in the arm.

This book is a collection of 27 papers presented at an International Workshop on Environmental Biogeochemistry held in New Delhi during December 1998. It addresses critical issues like development and control of monsoonal character and precipitation, terrestrial discharge of dissolved and particulate fluxes through rivers lakes and estuaries, anthropogenic inputs of pollutants like heavy metals, excess nutrients and pesticides, etc., all related to an intensely rain-fed region of south and south-east Asia. Eleven of the papers are directly related to problems in India, nine are of general nature, two related to Vietnam and one each to Sri Lanka, Bangladesh, Nepal, Thailand, Indonesia and China.

The book opens with a paper by Ittekkot and Subramanian giving a comprehensive account of impact of various aquatic fluxes from land to ocean including those arising out of human activities such as agricultural practice, land use, deforestation, urbanization, etc. The heralding of the monsoon in south and south-east Asia, which primes aquatic mass transfer from land to sea, is well discussed by Lydia Dumenil in a paper on monsoon modelling with a 150-year long numerical simulation and in relation to Sea Surface Temperature (SST) anomalies and ENSO-nonENSO oscillation.

In a series of papers dealing with elemental mass transfer, Milliman emphasizes the importance of the SS : DS ratio and the fate of sediments downstream rivers in south-east Asia; Soman gives an account of the rivers of the Western Ghat draining terrains rich in flora and fauna; Decov and Subramanian discuss about mass elemental transfer in major Indian rivers flowing over a variety of lithological basins; Silva discusses the water quality and chemical fluxes in rivers of Sri Lanka; and Nihn *et al.* present data on the Red river in Vietnam. That the sedi-

ment flux to China Sea has apparently decreased in spite of increased flood discharge is pointed out in a paper by Cheng Hequin who accounts for this phenomenon due to man-made trapping of sediments by way of dams, reservoirs, settlements and urbanization. It has also affected nutrient discharge into the estuary with consequent impact on biota. In an identical paper Nguyn *et al.* discuss the mechanism of mixing of the advancing terrigenous plume with sea water in Mekon delta of Vietnam and the consequent decrease in photosynthesis and scavengers in the interactive zone, which apparently has adverse effects on aquatic life.

In order to characterize the stream and river fluxes from a pristine, uninterfered basin, Rawat *et al.* have made a pilot study over a macro-basin in the Lower Himalayas, but the authors themselves have recognized minor anomalies in man-made interferences. B. K. Das *et al.* report on the sediment quality of lakes in the lower Himalayas, correlate sediment chemistry to source rocks and propose zero pollution.

In a paper presented by Dupre *et al.* variation in the content of organic acids and the consequent intensity of weathering and decomposition have been noted on plateau, along slopes and in swamps. Decomposition of organic materials and generation of methane in various aquatic bodies, also arising out of agricultural practices, are extensively dealt with by Ramesh *et al.* who opine that the emissions significantly contribute to global greenhouse gases.

While most of the papers mentioned earlier emphasize more on natural flux transfers, as many as eleven papers deal specially with anthropogenic fluxes, such as heavy metals, nutrients (P, N and C), pesticides, etc. Hungspreugs *et al.* present data to establish pollution of Thai rivers with toxic heavy metals. Seno Adi, in a paper on the Brantas river of E. Java, discusses pollution arising out of agricultural practices and urbanization. Dutta mentions the fluctuation in the level of dissolved phosphates during monsoon and winter flows in the Ganga–Brahmaputra–Megna riverine system in Bangladesh. Mahanta discusses the impact of agricultural practices on the C : N ratio and organic/inorganic P in Brahmaputra sediments. Saffiultha talks about arsenic leachates in sediments of Bangladesh and



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Bajpayee and Wittkuhn, in two separate papers talk about phosphates, dissolved and particulate carbon in rivers and backwaters of Kerala. James *et al.* analyse HCH and DDT levels in water and sediments to indicate their persistence in agricultural land as well as downstream Tamiraparani river of Tamil Nadu. Industrial effluent discharges from Tuticorin region have led to the accumulation of heavy metals in coral skeletons in the Gulf of Mannar, according to Ramanujam *et al.* Mining activities too pollute natural water with various heavy metals, describe Chakrapani *et al.* who give a specific example of mobilization of hexavalent chromium downstream a chromite mine, although chromite is considered to be an inert refractory mineral of trivalent chro-

mium. In a lengthy paper, Shivkumar presents an exhaustive account of environmental impacts of various water bodies in Andhra Pradesh and details out dispersion of metal contamination from a point source at an industrial site. The paper by Bikasham Gujja reflects about the impact of degradation of the earth's fresh water resource and consequent loss of biodiversity.

The paper by Natarajan on bioleaching, dealing with microbiological technology of metal concentration followed in hydrometallurgical practices may not appear relevant to the theme of the book, but the discussion helps in understanding the mechanism and the role of microbes in mobilization and precipitation of metals in the aquatic environment.

The paper by Annadurai *et al.* gives an overview of the ENVIS Centre on Biogeochemistry and Environmental Laws at JNU, New Delhi, which also acts as a repository of allied data and source of information on related topics.

Although the book has a few printing errors and poor cartographic presentation in some of the papers, the scientific content is good and will be useful to scientists, research students and environmentalists in general.

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## MEETINGS/SYMPOSIA/SEMINARS

### **National Seminar on Development of Geology and Mineral Resources in India – Vision 2010 and ‘Alumni Meet’**

Date: 15–16 November 2000  
Place: Udaipur

Themes include: Development in geology and emerging thrust areas; Geology of mineral resources: Ore minerals, minerals fuels, industrials minerals and rocks; Mineral development: Exploration, exploitation and environmental issues, mineral processing and technology upgradation; Domestic and international market for Indian minerals: Production programme, demand projections, domestic and foreign trade; Mineral policies, legislation and fiscal regimes: Role of Central and State Governments, private sector, mineral federations and multinational in mineral development.

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### **National Symposium on Acoustics-2000 (NSA-2000)**

Date: 22–23 November 2000  
Place: Tiruchirapalli

Contact: Dr M. Kalidoss,  
Convener, NSA-2000  
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### **National Seminar on Sustainable Fisheries for Nutritional Security**

Date: 30 November–2 December 2000  
Place: Chennai

Themes include: Fisheries training and education; Policies for fishing and fishery products; Capture fisheries; Aquaculture; Fishery biotechnology; Post-harvest technology.

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