

the problem by 'a set of interesting speculations'.

(c) The paper ('On the total reflection of electromagnetic waves in the ionosphere') by S. N. Bose. It is well known that Bose did pioneering work on Planck's blackbody radiation law, which removed a major objection against light quanta. Subsequently, he worked on total reflection by the ionosphere, experimental crystallography, fluorescence, thermoluminescence, theoretical general relativity, etc.

The papers are interleaved with writings that are related to the Indian Association for the Cultivation of Science (the home for *IJP*), founded by Mahendra Lal Sircar in 1876, 'with the sole function of science learning and science teaching'.

The compendium deserves to be added to libraries, because it gives at one place some of the important papers published by the pioneering and well-known scientists of India, of the pre-independence era.

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Random Harvest – An Anthology of Editorials. Memoir 51. B. P. Radhakrishna. Geological Society of India, Bangalore. 2003. 444 pp. Price: Rs 250/US\$ 25.

The book under review is an anthology of editorials written by B. P. Radhakrishna, a doyen among Indian geologists. The author, affectionately known as BPR, is synonymous with the Geological Society of India and its journal, of which he was the editor for about 18 years. The selected articles spanning a period from 1984 to 2002, which appeared in the various issues of the *Journal of the Geological Society of India*, deal with the development of geological sciences, management of mineral and water resources, sustainable development, state of the environment and the Indian antiquity, in addition

to a few other general topics and some personal reminiscences. Encompassing a wide range of topics, this anthology allows the readers to fathom the views of a great living visionary of Indian geology and to share his concerns on the deteriorating levels of science, social values and environment. BPR does not stop with listing the maladies, but goes further than that and he provides us with a road map for recovery, healing and sustainable development. Each page of the book is a call for action and it reveals BPR's humanistic world-view, which rests on the solid pillars of the age-old Indian value system and is profoundly influenced by a Gandhian social outlook.

The book, most appropriately, starts with an article on the twenty-five years of the Geological Society of India (GSI) – a premier association of Indian geologists. The author, who is intimately involved with its origin and development, traces the history of this organization and projects what its role should be in future, a theme that is touched upon in several articles in the book. This organization, initially a handiwork of a few enthusiasts has been nourished and nurtured and brought to an independent status by the toil of a handful of committed individuals, of whom BPR was a key player. He remembers the services of many and mentions especially about the BBD Press, which had stood behind him like a bastion. Among the most visible activities of the Society, the publication of the journal has been justifiably cited as a significant achievement, and is a major medium for publishing peer-reviewed papers of geological studies in the country. Started in 1959, this monthly journal is a landmark event in Indian geology and continues to work diligently to enhance the quality of earth science research.

Having served as the editor of the journal, BPR occupied a vantage position to monitor the quality of earth science research. It is, therefore, no wonder that a recurrent theme of his articles is about the means of raising the standard of geological education, the quality of research and the means of effective dissemination of knowledge thus accrued. To make geological studies regain their lost sheen, the author stresses on the importance of geological mapping and fieldwork, among other measures – the areas that are largely relegated to the background by many present-day practitioners. His call for the primacy of field mapping resonates in

many parts of this book. In one eloquent article on William Lambton and George Everest – who led a mission to measure the Great Indian Arc – a 2500-long-segment of India, which took about nearly fifty years ('The Great Indian Arc – Longest Measurement of Earth'), BPR concludes with this observation: 'The spirit, which animated the early pioneers who endured innumerable hardships in providing accurate topographic maps on a variety of scales, is sadly missing today. What is more regrettable is that topographic maps so badly needed for planning development are denied to user agencies, raising the bogey of defense of India . . .'

Another equally valid point that BPR raises in this book is the lack of interest in interdisciplinary studies among earth scientists. A strange lack of bonhomie between geologists and geophysicists in India appears to be a major stumbling block to greater understanding of the geological problems. He is also critical about the attitudes of many national organizations in their refusal to part with basic data. He stresses the importance of cultivating the reading habit and cautions against 'lateritization of brain', which will eventually result in drying up of wells of creativity. In the article, 'Whither earth science research in India' he opines, 'the quality of earth science research in our country should greatly improve. It should cease to be merely repetitive and descriptive . . . The field of earth sciences . . . should be in the forefront instead of waiting in the corridors, unheard and unrecognized'.

BPR goes on to dissect the current state of geology in several other articles. He worries that the geologists are going through an identity crisis and have developed a sense of inferiority in relation to other disciplines (article on 'Declining interest in geology'). 'How could this happen in a period when geology and its unique interpretative methodology are becoming central to finding lasting solutions to many complex problems that confront the earth system?', he asks. Another theme repeated in the book is about ethics in science and scientific fraud per se. The author draws attention to the infamous case of 'Himalayan fraud' perpetrated by an Indian professor of palaeontology. The *Journal of the Geological Society of India* had been in the forefront in upholding the ethics in science. BPR's suggestion is to create a national apex body for looking into such cases and to

take appropriate steps in curbing such tendencies.

A major topic of discussion in BPR's editorials pertains to management of water resources in the country. Everybody agrees that water scarcity is going to be a major problem in India in the coming years, which will have serious political ramifications. Parts of India which used to be self-sufficient are now becoming water deficient mainly due to the unscientific utilization of precious water resources. BPR puts forward a number of suggestions to alleviate this problem, mainly centred on conservation involving people's participation. Another major area of discussion in the book is about mineral exploration and its utilization. The author is critical of the lop-sided planning in mining industry, mostly interested in making quick money by exporting raw minerals rather than developing our indigenous expertise on production of end products. His ideas on the gold mining industry outline a strategy to make India a major producer of the yellow metal (eight articles in this book deal with gold). In all these endeavours of prudent resource utilization, he visualizes an active role for the geologist in helping the people formulate sustainable ways of developing resources at the local level. He lists a number of areas of research where geological knowledge can be applied to improve the life in rural areas (see article on role of earth sciences in solving problems of our countryside). Through such innovative programmes, BPR believes that the society would also become more aware of the role of geology in developmental work. Following these suggestions, it will be a good idea for the national organizations like GSI to think about setting up regional cells consisting of young geologists, on their probation, who will work in rural areas along with local NGOs in water harnessing, cadastral-level resource mapping, land use, soil conservation, environmental degradation and a number of other issues, where welfare of the people is directly involved.

In many articles, BPR eloquently discusses about the age-old vibrant culture of India. He writes about the Cambay archaeological find, presumed to be related to an 8000-year-old settlement (see 'Glimpses of lost Indian civilizations'). Obviously, this find is only a preliminary interpretation and as he admits, many scientists have not accep-

ted this theory. His own table on Holocene chronology for this period (p. 319) shows 'megalithic graves and mounts and a land peopled by forest dwellers and hunters'. This discrepancy raises a question: was this advanced Cambay settlement an isolated urban centre, which developed without receiving sustenance and cultural interaction with the surroundings? Such missing links indicate the need to conduct more systematic geoarchaeological and geological studies. Clearly, this is an interface where archaeologists and Quaternary geologists can work together to unravel the prehistoric past.

In a concluding chapter, 'India unbound', BPR ends his musings on India with a note of optimism. He says, 'We must realize our inherent strengths as well and create an environment for talented youth to forge ahead to become a prosperous, tolerant and creative nation of a billion people'. He sees silver linings of a bright future in the emerging entrepreneurship in the country. But the question is who will ensure its social responsibility and what mechanism will check the unbridled market forces. And, would it not open the doors to foreign capital and eventually to their domination? Would this not run counter to BPR's vision of village-centred development? This scenario reiterates the need to evolve an indigenous system that is sensitive to a socially complex country like India – a view that is propagated in many articles of this book.

A few things set this book apart – its scholarship, its simple and clear prose without being rhetorical, and an underlying continuity of thoughts despite the fact that this is a collection of stand-alone articles. The above qualities would help to catch the attention of even a lay reader having only a nodding acquaintance with geology. The publishers can take pride in the fact that the book is elegantly simple and without any obvious typographical errors. However, I think the book would have been much more attractive if the articles were arranged subject-wise rather than in chronological order. An exhaustive index is given at the end of the book, although it misses some important names discussed in the book. An apt introductory article written by M. S. Rao, the present editor of the *Journal of the Geological Society of India* increases the value of the book. This book should not be restricted to only earth

scientists as it also deserves to be read by those who worry about Indian science and related developmental issues.

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Plant Viruses as Molecular Pathogens.

Jawaid A. Khan and Jeanne Dijkstra (eds). Food Products Press, An Imprint of Haworth Press, 10 Alice Street, Binghamton, New York 13904-1580, USA. 2002. 167 pp. Price not mentioned.

'The discovery of truth and its transmission to others belong together, and their joint exercise can afford satisfactions greater than either one practiced by itself.'

– Joel Hildebrand

This is a quotation reproduced from the above book, which is an endeavour by a number of pioneers in plant virology to transmit the truth they have discovered.

Virus diseases cause serious losses worldwide in horticultural and agricultural crops. Molecular strategies for generating resistant plants have benefited from progress in plant molecular virology that has enhanced our understanding of the molecular basis of plant viral diseases. The above book intends to provide insights into molecular processes whose end result is pathogenesis. The authors have achieved this intention quite successfully.

The book begins with the guiding principles of plant virus nomenclature. This will prove convenient to the virologists involved in teaching and research. Viruses are classified according to the type of genome and are fully referenced in the index. The section on 'How to write