

microorganisms worth exploration and above all, profitability have been discussed. Although the established biotechnology sectors like antimicrobials, pharmacologically active agents and industrial enzymes have been dealt with in fair detail, the emphasis is on emerging technologies such as plant growth-promoting and anti-fouling agents, nutraceuticals, mineral processing, biomaterials and biomimetics. These chapters would be especially useful to those working on bioprospecting, allowing them to identify the limitations/bottlenecks of their work and to circumvent them either by recourse to time-tested strategies or by trying innovative approaches.

Like the subject of biogeography and mapping of microbial diversity, an equally debatable issue where only few experimental data are available, is the *in situ* conservation of microbes (section VII). Is microbial diversity really being lost? Do anthropogenic factors lead to permanent loss or extinction of microbial diversity? In the face of species redundancy, how does it matter if microbial diversity is being lost? Has not the biodiversity recovered after each major episode of mass extinction in the evolutionary history? It is really difficult to answer these questions. However, two points are clear – that loss of microbial diversity does have an adverse impact on ecosystem functioning and it definitely compromises the bioresources. The authors contend that challenges are considerable but some kind of prioritizing for *in situ* conservation, such as that of endangered habitats and biodiversity hotspots may see us through this complex situation.

Any discussion on bioprospecting is incomplete without reference to Convention on Biological Diversity (CBD) and the post-CBD scenario. It is true for this book also. The first chapter in section VIII discusses pros and cons of benefit sharing as enshrined in the CBD. The author notes that the principles of CBD are finding their way into national laws and policies, and into the working practices of scientists. Readers interested in this area will find reference to a number of websites for further information. In another chapter, four historical cases, viz. busy lizzie, *Saintpaulia* (both ornamental plants), periwinkle (source of anticancer vincristine and vinblastine) and ‘Hardangervidda fungus’ (source of immunosuppressive agent cyclosporin A) have been discussed in the context of the present scenario of

bioprospecting – some shades of the turmeric patenting imbroglio closer to home. Three case studies on bioprospecting partnership – the Merck & Co – INBio (National Institute of Biodiversity, Costa Rica), Diversa – Yellowstone National Park and the International Cooperative Biodiversity Groups may serve to lay the framework for future bioprospecting partnership endeavours. The authors clearly bring out how the thorny issues of access, intellectual property rights, and benefit sharing may be handled deftly in bioprospecting partnership programmes. The concluding section (section IX), with only one chapter on the value of biodiversity, brings out the difficulties in valuation of biodiversity, much less the microbial diversity.

This book is a landmark publication on the subject of microbial diversity and bioprospecting. The whole gamut of the subject has been discussed authentically, making it a reference book of high standards. Interestingly, the editor has prefaced every section with a preamble. Each preamble not only summarizes the contents of the section, but also explores the wider perspective of the topics under discussion. The language is simple and lucid. A moderately good number of references published in high-quality journals have been included at the end of each chapter. This book will be useful not only to those specifically interested in microbial diversity and bioprospecting, but also to general microbiologists, microbial taxonomists and biotechnologists alike.

J. S. VIRDI

*Microbial Pathogenicity Laboratory,  
Department of Microbiology,  
University of Delhi South Campus,  
Benito Juarez Road,  
New Delhi 110 021, India  
e-mail: virdi\_dusc@rediffmail.com*

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**Random Harvest, Biographical Sketches, Memoir 60.** B. P. Radhakrishna. Geological Society of India, P.B. No. 1922, Gavi-puram, Bangalore 560 019. India. 2005, 291 + vii pp. Price: Rs 250, US\$ 25.

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Biographies, short or long, of persons of ‘noble character’, have always fascinated me. A collection of 45 short biographies in this ‘Memoir 60’ of the Geological Society of India, Bangalore (GSI, not to

be mistaken for Geological Survey of India) is a labour of love, written out of respect, at various times, regarding personalities of a bygone era and of a few of our times. These ‘sketches and portraits’ have come through the pen of B. P. Radhakrishna (BPR), the President of GSI and formerly Editor of *Journal of Geological Society of India*. Radhakrishna, the doyen amongst Indian geologists, now in late eighties, had an illustrious career spanning over 60 years in the field of geology. During his tenure in the Department of Mines and Geology in the erstwhile Mysore state spanning 37 years, the last ten of which as Director and subsequently, his circle of friends, associates and others, left indelible impressions on him. Writing biographies appears to be his forte. His daughter Lakshmi Krishna notes, ‘apart from the articles and books written on Indian Geology and groundwater resources, etc. he has written many biographies in Kannada of various scholars and scientists. His goal of writing biographies of noted scholars and scientists is to infuse in youth the value of education, science and culture. The very first book he wrote was in 1948, *Nanna Thande* (My Father) portraying the life of his father Bangalore Puttaiah’. Out of the forty-five biographies, a sizeable number were written during the past thirty-five years and published in *J. Geol. Soc. India*. The very first biography in this compendium, on D. N. Wadia is not dated and the second one relating to N. Panduranga Rao is dated September 1952.

The biographies cover persons born as far back as in 1726 (James Hutton) and as recently as in 1961 (Kalpana Chawla). Several contemporaries (Anna Saheb Hazare, Salumarada Thimmakka, Sunderlal Bahuguna, M. V. Kamath) are also covered. One may wonder as to what made BPR write about this wide spectrum of personalities in a journal of geology. No doubt many of them are related to geology, mines, earth sciences and the like but all of them found a place because, as BPR says ‘association with (some) of them enriched my life’, ‘many ... laboured for advancement of India’, ‘(some) devoted their time and energy to the advancement of our science’ and ‘other mighty minds of a bygone age whose writings opened up new areas of knowledge and have been a never failing source of inspiration to me’. Then there are others who fall in the category of “close personal associates, friends and colleagues “by virtue of their

special qualities and intimate association with” him’. Another author/editor could find other personalities fitting such descriptions and in this sense Memoir-60 is truly a ‘Random Harvest’.

The biographies have served different purposes and are in different formats. Some are routine obituaries, ‘routine’, because I have no better choice of a descriptive word; they give information on family background, early education, career, honours, awards and rewards to the principal subjects of the obituaries. Quite a few do not deal with any of the characteristics of the ‘routine’ biographies but straightaway plunge into facts that made the subjects unique. Some are written on occasions celebrating birth centenaries (for example write-ups concerning C. V. Raman, Bellur Rama Rao, George Everest, Birbal Sahni, J. B. S. Haldane, M. S. Krishnan), 125th birth anniversary (Rajaji), 90th birthday (C. S. Pichamuthu), death anniversary (William Jones) and so on. Quite a few are about persons whom BPR knew well and held in high esteem; N. Panduranga Rao, P. S. Narayana and a few other founder members of GSI are examples of those who fall in this category. Preston Cloud and C. V. Theis find mention due to their singular contributions to earth sciences. A few of the biographies are reprinted from *Biographical Memoirs of INSA*, *Memoirs of GSI* and from other sources but many are from the *Journal of Geological Society*, which BPR edited for over a decade. The biography of P. N. Bose, the first Indian to join Geological Survey of India is based on information collected when BPR was awarded the P. N. Bose Memorial Award for 1990. K. K. Mathur, the first professor of geology at Banaras Hindu University has his life sketched in the confines of this collection because he was BPR’s teacher’s (P. R. Jagapathy Naidu at Central College, Bangalore) teacher. While writing about W. F. Smeeth, BPR notes ‘an institution which forgets its founders is as good as lost’. Smeeth happens to be ‘the chief architect of the Mysore Geological department, who built it from scratch and gave it a status and an honoured place in the geological surveys of the world’. There is a personal tribute to J. B. Auden, the last Englishman to be recruited to and the last Englishman to leave the permanent cadre of Geological Survey of India.

It is interesting to note that ‘plagiarism’ has been in vogue for at least two hundred

years now if not over a longer period. BPR wrote about William Smith (1769–1839) after reading *The Map that Changed the World* and therein he refers to ‘the story of William Smith, his humble beginnings and great achievements, the refusal of an institution like the Geological Society to admit him as a member, the plagiarising of his monumental map, his poverty ... his humiliation and belated recognition ... the highest honour which the Geological Society could bestow’. Let me not be a spoilsport; I think the story should be read as narrated by BPR.

D. N. Wadia founded GSI in 1958 when he became the first president of the society. BPR was the first secretary of the society at that time. The profile of Wadia deals with his early entry into geology. A graduate in natural science (botany and zoology), as the biography reveals, he initiated a geological department studying the subject ‘single handed, without guidance’ and ‘going through the records and memoirs of the Geological Survey of India’. BPR goes on to state ‘it is amazing how a person who had no formal education in the subject could manage to comprehend the geological complexity of a country like India and present it so well and in a manner easily understood by one and all (through the book *Geology of India* – a classic for many a student of Indian geology – by D. N. Wadia). Retiring in 1938, Wadia was chosen to be the first Director of Indian Bureau of Mines in 1948 after India became independent; Wadia was also the prime mover of the Rare Minerals Unit of Department of Atomic Energy under Homi Bhabha. Much later his services and erudition were internationally recognized when he was elected a Fellow of the Royal Society in 1957. BPR gives an insider’s view of the bonhomie that existed between Wadia and himself in the course of working for the GSI. The biography also refers to Wadia founding the Indian Institute of Himalayan Geology (in the Delhi University campus first), which got based later at Dehradun and renamed as Wadia Institute of Himalayan Geology. So also Wadia’s role in establishing NGRI and NIO find mention in the write-up. In all humility, BPR ends the note in his characteristic style ‘My association with Dr Wadia was for a few hours only on 3 or 4 different occasions. I returned from these visits greatly impressed by his austerity in private life, his integrity in official dealings and the magnanimity of his character’.

Writing on Raman, BPR notes ‘I shall only try to highlight certain less-known traits of this colourful and dynamic personality, dwelling especially on the inspiration and guidance he provided...’. He says that ‘At the time of drafting the programme of the Annual Meetings of the Indian Academy of Sciences, Raman took particular care to see that proper representation was given to all branches of knowledge’. That tradition has continued to this day. BPR goes on to say ‘Raman insisted that all scientists, irrespective of their specialization, should sit throughout the sessions and hear what others had to say’; this aspect is missing in session after session, talk after talk in the Academy meetings of late, when one can notice that sizable sections of the audience make a beeline to the exit after making a token presence at the meetings or after hearing people of their own specialization. There are many a nugget related to this great man in the biography. I can’t resist from quoting one of them: ‘He (Raman) was critical of the complacent attitude developing in the country about scientific and industrial advancement – “one of the illusory beliefs that is prevailing in our country is that it has made great strides in the field of science, industry and so on. One of the things which any industrialist thinks about before investing his capital, is of a foreign collaborator and foreign know-how. ... The know-how excludes everything for which a know-how is needed... I have said this before, but I say it again without malice and without fear. Alas! In this country, it so happens that people in power have no knowledge and the people with knowledge have no power”. His words are even now ringing in my ears as I sit recapitulating the events of that great day’.

Bangalore that comes through the collection is a rather different place compared with today’s. References to unique contributions to geology arising from Bangalore (the only other centre of ‘geological activity’ being Calcutta in those days), Central College for its departments and seminars, Cubbon Park where eminent personalities from a variety of walks of life (Chief Justice of the Supreme Court, Chief Secretary of the State Government, Post Master General, Chief Engineer, all retired) gathered discussing about ‘everything on earth’, Gokhale Institute, DVG, intrigues in the Department of Geology at Central College, well-known professors Sampat Iyengar and L. Rama Rao, etc. are bound to bring nostalgic memo-

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ries to persons who have lived in Bangalore for decades in the glorious past.

No reference to Geology of Karnataka is complete without reference to several stalwarts like C. S. Pichamuthu. Pichamuthu was President of GSI in 1972 as well as of Mysore Geologists' Association, much earlier in 1949 (BPR was Secretary for some time). This author enjoyed reading the sections on 'Admirable qualities', 'Methodical habits', 'Evening jaunt at Cubbon Park', etc. in Pichamuthu's biography. However it would have been interesting if there were personal anecdotes. BPR has been liberal in making kind remarks about many persons like A. P. Subramaniam. BPR has also been candid often. For example, writing about L. Rama Rao, BPR says "Professor Rama Rao was not given to taking quick decisions and he deliberated on each and every issue for a long time before taking action. He did not easily trust others and tried to do everything himself...".

'Let us not forget our early benefactors' seems to be the recurring theme throughout, although the biographies have been

written or culled at various times. Yele Mallappa Settaru, the philanthropist, who built Hoskote tank, is identified as one of the benefactors of Bangalore. Salumarada Thimmakka known for planting and taking care of some 300 banyan trees, Sunderlal Bahuguna of the Chipko movement, Anil Agarwal, the noted environmentalist and many others are held in high esteem and written about by BPR for their commitment to causes each different but all the same very dear to each one of them.

This review of a rich harvest of biographical sketches has turned out to be long. But as I said already there are nuggets and nuggets for the interested reader. Like a reading session about a book at its release, I can go on quoting many a gem. One of the most enjoyable biographies that I have no hesitation in recommending is that on Rajaji. Let me end this review by a quote from this biography: 'I particularly remember his putting the question to the scientists gathered at the international food convention at the Central food Technological Institute – "When a cow eating grass can produce milk why

can't you attempt to do something in your laboratory?" This is a sample of wit and wisdom of Rajaji'. Then there are stories related to P. R. Pisharoty, Nani Palkiwala and others. I will not be fair if I do not quote something from Raja Ramanna's biography (I consider Ramanna as one of my mentors). BPR writes, 'With great diffidence I sent a reprint (of a paper relating to the legendary river Saraswati)... Few people have the courtesy to acknowledge, fewer still would read them and give expression to their reaction. Ramanna was not of such tribe and within a week I got a letter from him...'. Let the reader find what Ramanna said in that letter! *Memoir 60* is a useful anthology that would be of interest to any general reader and especially to the geologists. I am sure it fulfils the purpose with which BPR wrote them.

K. R. RAO

29/2, 11th Cross,  
Off III Main (Margosa) Road,  
Malleswaram,  
Bangalore 560 003, India  
e-mail: krrias@yahoo.com