



Some Pioneers of Mathematics: Biographical Accounts for the General Audience. Subodh Mahanti. Vigyan Prasar, A-50, Institutional Area, Sector-62, Noida 201 309. 2015. xiii + 239 pp. Price: Rs 200.

This book is a compilation of biographies of 22 mathematicians from Pythagoras to Harish-Chandra. These pieces have earlier appeared in Vigyan Prasar's *Dream-2047*, a monthly newsletter. Hence mathematical expressions have been kept to a minimum. Since each essay has been written to be complete in itself, there are some boxed relevant quotations as an introduction and a short list of references at the end of each of them. There is an exhaustive timeline of mathematics starting from geometric patterns on rocks to Andrew Wiles and Gregori Perelman. This runs to 47 pages and is a useful addition for ready reference. There is also a short bibliography on the history of mathematics.

The first three essays are on Pythagoras, Archimedes and Euclid. They are 'modern minds in ancient bodies' as E. T. Bell calls them. The foundations that these Greeks laid in physics and geometry are well documented. There is also a mention of several other scientists of this period.

We have essays on the Scotsman, John Napier – the inventor of logarithms, and the Irishman, William Rowan Hamilton – who discovered quaternions.

Mathematics flourished in Europe in the 18th and 19th centuries, and this is well covered by the essays on Euler, Laplace, Fourier, Gauss, Abel, Galois, Poincare, Hilbert and Minkowski. The addition of some other related photographs besides the standard portraits of the mathematicians would have enlivened the stories.

The nod to women mathematicians is in the inclusion of pieces on Sophie Germain and Emmy Noether. Sofia Kovalevskaya is not mentioned in this anthology. The stories of the lives of women mathematicians, their trials and tribulations are inspirational, particularly to young women interested in mathematics as a career. The myth that women and mathematics do not mix still persists. As late as 1935, Hermann Weyl in a memorial to Emmy Noether wrote 'the graces did not stand by her cradle!'. However Noetherian rings are here to stay.

Of particular interest to us here are the essays on Indian pioneers. The lives and contributions of Srinivasa Ramanujan, P. C. Mahalanobis and Harish-Chandra are well covered. The inclusion of Asutosh Mookerjee in this collection is a bit of a surprise.

The piece on Paul Erdos has many interesting details of this mathematical genius. Since the byline 'The man who loved only numbers' has been used in the heading, the omission of Paul Hoffman's 1998 biography with the same title, from the reference list is surprising.

In the preface, the author does explain the reasons behind this choice of 22 pioneers and says he will not be surprised by comments on certain inclusions and exclusions. However, exclusion of Isaac Newton is baffling. Laplace is included and rightly so; but his byline is 'who was second only to Isaac Newton'. There are multiple references to Newton and his photograph is given not only in the article on Leibniz as expected, but also on the cover. In passing I may add that the photograph of Alan Turing is also on the cover. He has only a mention in the Timeline.

The two volumes of *Men of Mathematics* by Bell have stirred the imagination



Srinivasa Ramanujan

of successive generations since they first appeared in 1937 and have endeared these mathematicians to us. Any book on mathematicians is welcome, for their lives, struggles and achievements always make compelling reading. As the author suggests, this book is ideal for a reader to dip into, and hopefully will inspire many a young reader to take to a life in mathematics. The general audience that the author targets will for the main part be high-school students. For this reason the book could be a welcome addition to school libraries. Many teachers of mathematics do not have adequate knowledge of the history of mathematics and mathematicians. They too could profit by reading this book.

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Nature and Nation: Essays on Environmental History. Mahesh Rangarajan. Permanent Black, Ranikhet. 2015. xiii + 346 pp. Price: Rs 795. ISBN 978-8178244594.

This book is a collection of nine essays published earlier (between 1998 and 2012) by the noted environmental historian, Mahesh Rangarajan, along with an introductory chapter. The introduction provides an overview of themes, approaches and key findings in India's environmental history studies. Scholars interested in new work in the field will find the overview and the recent literature

cited in the bibliography useful. The Introduction also develops on the theme of how nature and, in particular, animal icons, are often appropriated to define a nation, an aspect that has received little attention 'despite the centrality of nationalism as a theme in historical enquiry'. In Rangarajan's telling, states often use animal icons as symbols of national or cultural identity, in representing external relationships with other countries or colonial powers, as well as in mediating internal dynamics as to who should be included and who should not in the citizenry.

While history concerns itself with evidenced reconstruction of the past, in the latter part of the Introduction, Rangarajan extends the narratives of environmental history and contemporary Indian environmentalism into a consideration of nature's future. He highlights key concerns and trends such as India's development trajectory that privileges economic growth over environment, efforts to include forest-dwellers and people in conservation reserves, and expanding conservation over wider landscapes. The nine essays are organized in three parts corresponding to nature's past, present and future.

The first part ('Nature's past') includes two essays. The first essay traces the British Raj's war on the natural world and its 'dangerous beasts' in colonial India – the extermination of carnivores like tigers, wolves, and an array of smaller animals being part of an imperial intervention of control and 'improvement' in India. The second essay provides a detailed political history of the lion in India, from early times when the species was widespread across the country and symbolically associated with power and royalty to its eventual decline

and subsequent revival as a conservation icon in the region of Gir in Gujarat.

The second part of the book, 'Nature's present', with four chapters, focuses on people and issues that weighed heavily on the discourse on nature and nation in 20th century India. Three chapters deal with, in turn, Mahatma Gandhi, Indira Gandhi and Jawaharlal Nehru, leaders whose ideas, writings, speeches and actions in the political arena significantly influenced people and nature conservation efforts over the last century. The last chapter details the parallel impact on a wider audience of readers of English nature writing, which was achieved by five writers: Jim Corbett, Kenneth Anderson, Sálím Ali, Kailash Sankhala and M. Krishnan.

The last part of the book, 'Nature's future', draws the reader into contemporary concerns and debates that may well determine how nature conservation may unfold in the future. In 'The politics of ecology', Rangarajan analyses the debate over wildlife conservation and people in India between 1970 and 1995. The next chapter explores the politics of nature parks and people in Africa – chiefly South Africa, Tanzania, Kenya and Rwanda – and its wider relevance to India and other countries. Finally, the closing chapter examines the connections and nuances of nature, politics and history in contemporary India. This insightful chapter presents a case for broadening conservation beyond boundaries of protected reserves to include wider landscapes and adopt newer approaches, which may require transcending ideological boundaries as well.

This is a valuable volume for those whose primary interest lies either in environmental history or nature conservation because of the way it interweaves

the scholarship and preoccupations of both fields. For natural and social scientists, understanding environmental history is vital in many spheres of research, including understanding present patterns in distribution of species and natural resource use, and the origins and outcomes of management regimes and politics of exclusion. Rangarajan also situates the narratives, particularly in the opening and closing chapters, in relation to wider global contexts such as population and economic growth, land-use change and deepening democracy. This has the twin effect of elucidating their larger ramifications and highlighting their relevance to the developing world.

As one may expect from any such collection, some related topics of interest to biological and conservation scientists are either missing or only partly considered in the introductory and concluding chapters. This includes issues such as the effects of extermination of large wildlife species on local ecosystems and livelihoods and current debates over conflict or coexistence with wildlife in human-dominated landscapes. Still, this is only a minor quibble because those were not the primary focus of the book and the issues have gained attention in other recent publications. The value of the book lies in its exploration of the connections between nature and nation by careful attention to the roles played by individual people and politics, particular species and parks, and alternative visions of human–nature relationships through history.

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