BOOK REVIEWS


The evolution of the Indian subcontinent makes a riveting story. It is one of the rarest pieces of real estate that travelled more than 5,000 km in about 30-40 million years to reach its present location. No other tectonic plate exists today to boast of such an extraordinary feat. By the end of that journey, two incomparable things happened which changed the face of earth forever – the genesis of the greatest mountain chain in the world, the Himalaya and the disappearance of a vast ocean called Tethys. During its transit, another extraordinary event occurred: the Indian plate chanced upon a deep-seated mantle plume which was waiting to gurgle out the enormous amount of magmatic fluids. What a massive effusion it was! A landmass of the size of Western Europe within India was flooded with lava. This must have had a profound impact on the life on earth, leading to mass extinctions of some dominant species. If you travel back in the deep geologic time, you start seeing many exceptionally complex processes that shaped the Indian craton, which itself is a mosaic of amalgamated pieces of large chunks of crusts. The Indian cratonic landmass is a repository of events of early Earth history including arguably the origin of life, evolution of early atmosphere, nascent plate tectonic processes, mountain building, rifting and basin evolution. Such processes are continuing today, inexorably, which find reflections in terrifying earthquakes, tsunamis and related phenomena. There is no better natural laboratory than India, to study the account of events from the early evolution of continents to live tectonics along its most happening plate boundaries. The exciting but tumultuous story of geodynamic evolution of Bhara-tavarsha that spans more than three and a half billion years is chronicled in this vastly informative tome by K. S. Valdiya, one of the ablest and consummate earth historians of our times.

Three faded cloth-bound volumes of Edwin Pascoe’s Manual of the Geology of India and Burma with a Government of India logo on their covers published in 1950s are lying on my table. No doubt pioneering giants like Edwin Pascoe have made valiant efforts in bringing together all the then-available information. But, when you leaf through these volumes you will be struck by the dispassionate cold classicism of the ‘systematic’ geological approach. What we miss out is the ennobling sense of dynamism and romance. Classical geology before the advent of plate tectonic concepts looked static and dead. Simon Winchester, who himself was a student of geology in Oxford, would describe old geology in his book, A crack in the edge of the world as a ‘field mined in some alluvial quagmire, defined by dusty cases of fossils, barely comprehensible diagrams of crystals and different kinds of breaks that were made in the earth’s surface (as well as by unlovely Teutonic words like graben, gabro and greywacke), and explained with cracked-varnish wall roll-er-charts showing how the world may or may not have looked at the time of the Permian period’. The later books on geology of India by D. N. Wadia and M. S. Krishnan, however, made a great improvement on accessibility and readability from the point of view of geology students, although my personal favourite was Wadia’s, maybe for its lyrical quality. A whole generation of post-independence geology students was taught using these two books.

Considering the tremendous leaps made in the geological understanding, in particular about the Indian landmass and its contiguous areas (part of Myanmar and Bangladesh), it makes sense to venture into writing a completely independent book rather than revising the existing books on the topic. Now we know much more about what is present on the surface and also much on the subsurface geology. Passive and active seismic studies have produced massive amount of subsurface data of the Indian crust. This is what the author of the present book attempted to do – threading these disparate data to construct the big picture. This is not an easy task, considering that the data from various sources sometimes present conflicting and contradicting pictures, which calls for author’s judgment. You can see here that the vast experience of the author and the insight gained through years of work often come to rescue whenever controversial matter is dealt with. He has also meticulously avoided the controversies. When I received the book from Current Science, the first thing I did was to see the part on the 1897 Shillong earthquake under Holocene tectonic movements. I was happy to see how he had avoided the recent debates surrounding this earthquake in which I had participated.

The Making of India is different from the earlier books of this genre (by Edwin Pascoe, D. N. Wadia and M. S. Krishnan) in that it incorporates the vast amount of data generated during the last couple of decades, including the work by numerous geologists and geophysicists who are ‘unhonoured and unsung’, to borrow the phrase from Valdiya, himself. The Making of India is not just about the structure, lithology, geochemistry, geophysics, morphology and palaeontology of the region but it tells us the dynamical aspects that shaped up the Indian terra firma as we see today, using the current state of understanding. There are sections in the book that narrate how tectonic aspects facilitated human migration into India from outside.

The book is structured to include a varied set of topics starting from physiographic set up to Holocene tectonic movements, and contains 27 chapters. The last chapter provides a summary of what is dealt in the preceding chapters of the book. The book discusses in details the Archaean cratons of south, central, eastern and western India. Then it goes on to the Proterozoic mobile belts in peninsular and Eastern Ghat, and southern granulate belts. The book also discusses in detail the Gondwana tectonics and the Cretaceous volcanism. Valdiya’s contributions to Himalayan geology are legendary. Both my wife and I had the great fortune some years ago to accompany him to the Kumaon part of the central Himalaya and learn the basics in Himalayan geology from the master himself, and listen to him in close quarters. We saw how he ‘conversed with rocks’ of the Himalayas. He is in his elements.
when it comes to the discussion on the Himalayan geology, starting from early Proterozoic through Cambrian, finally on collisional tectonics and emergence of the Himalayas in the Tertiary period. Apart from the scholarly masterful treatment of the geodynamics of the Indian shield region and the Himalayas, the book makes an excellent discussion on Proterozoic intracontinental and Tertiary offshore and onshore basins. The author is able to integrate and able to use the discrete database available with the ONGC sources to unravel the evolutionary history of the Tertiary sedimentary basins; some of which are sources of oil and gas. Much of the material on the geological evolution of the sedimentary basins exists as internal reports or restricted publications of the concerned agencies or in proceedings, and is not readily available even to serious researchers. Another important feature of the book is the section on tectonics and structure of the Bay of Bengal and the Arabian Sea. This part of the book is particularly well-endowed with colourful graphics and display items.

The book of this nature will have to include scores of figures. All the figures are neatly drawn and clearly indexed. At the end of the book the references cited spread over 121 pages (I could not find the list of books, as alerted under the contents), which by itself is an indication of the painstaking efforts that have gone into the making of this book. On the whole, it is an excellent textbook on Indian geology and it also serves as a ready reference for researchers, as well. The author writes in the preface that he intended this book to ‘instil appreciation of the geological developments that have taken place in the making of India’. As a reader, I can vouch that the author who must have spent several years in preparing this book has hit the target. Priced nominally at a few hundred rupees (subsidized by the Government of India through the National Book Trust), this book is accessible to anyone who is interested in the understanding of the Indian geology. I expect that many readers will find it rewarding, and hopefully provoke some of them into serious researches on Indian geology.

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TRIBUTE TO A TITAN—BIRTH CENTENARY OF HOMI JEHANGIR BHABHA

Indian Physics Association (IPA), established in 1970 within the Department of Physics at IIT Mumbai, publishes newsletters, books, monographs and bulletins for propagating knowledge in physics. Tribute is a compilation of the articles focusing on Homi Jehangir Bhabha from three issues of Physics News published in January (Bhabha centenary issue), April and July 2009. The idea of bringing out the special issue of Physics News was conceived on 30 October 2008 when the Prime Minister Manmohan Singh launched the Homi Bhabha centenary, which eventually led to this compilation.

Tribute is replete with photographs of Bhabha with his associates and includes transcripts of lectures delivered by Bhabha at various occasions, including the inaugural address he delivered at the Tata Institute of Fundamental Research (TIFR) in Mumbai on 19 December 1945, lecture at the foundation ceremony of the TIFR buildings on 1 January 1954 and Colaba campus inauguration speech dated 15 January 1962. The letter that Bhabha wrote to Sorab Saklatvala of Dorabji Tata Trust on 12 March 1944, in which he seeks support for setting up TIFR, is also reproduced.

The book opens with a biographical description of Bhabha by William Penny (the Father of the British Atom Bomb). ‘Bhabha the Artist’ is a collection of sketches and paintings by Bhabha. These are from the TIFR archives. G. Venkataraman’s lecture ‘Dr Homi Bhabha as a Visionary’ delivered on Founder’s Day of the Bhabha Atomic Research Centre (on 28 October 1984) is also included. Transcripts of the birth centenary special public lectures delivered by Devendra Lal and Virendra Singh are also reproduced. Other highlights are the reminiscences of those who interacted with Bhabha and had the opportunity to carry forward the legacy of Bhabha’s thoughts. Many authors describe how Bhabha left an everlasting impression at the first and subsequent meetings they had with Bhabha.

Though many of the essays published here (in Physics News originally) are reproductions of writings published elsewhere, the book is special for the choice of the write-ups (both original and reproduced) made by the editors for this collection. However, the interview with Homi N. Sethna (former Chairman, Atomic Energy Commission) could have been edited for clarity. Editors of Tribute are Arun K. Grover, also the Convener of Homi Bhabha Birth Centenary Commemoration Committee, TIFR and Dipan K. Ghosh, the editor of Physics News.

The book ends with the lecture titled ‘Science and the Problems of Development’ given by Bhabha on 7 January 1966 while hosting the meeting of the International Council of Scientific Unions in Mumbai. It was Bhabha’s last lecture. The contributions of Bhabha to theoretical physics, his equal interests in experimental physics, and his love for the arts are well known. This collection, which highlights the multifaceted talents of Bhabha described by those who closely interacted with him is a fine tribute to the man in his birth centenary year and holds historical significance. One hopes that more such collections are brought out by the IPA.

The book was befittingly released during the Bhabha Centenary symposium — ‘Science and Technology at the Frontiers’ held at the Homi Bhabha auditorium in TIFR, Mumbai during 3–5 December 2009.

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