

BOOK REVIEWS

S. N. Bose – The Immortal Scientist. C. V. Raman – The Scientist Extraordinary. Meghnad Saha – Scientist with a Social Mission. The Charitavali Series. Dilip M. Salwi. Rupa & Co. 7/16, Ansari Road, Daryaganj, New Delhi 110 002.

The Charitavali Series fulfils a long-standing need for an easy-to-read account of the life and work of some of our famous scientists.

S. N. Bose – The Immortal Scientist

Bose was one of the trio who (along with Meghnad Saha and C. V. Raman) proved that Indian scientists could produce cutting-edge discoveries in physics, the tough branch of science, even from the background of an uninspiring colonial rule. Bose-Einstein Statistics describes how many photons of a given colour exist in a system at a specified temperature and total energy, i.e. the famous energy distribution law for radiation. Dilip Salwi tells us the story of this discovery by a young physics teacher in Dhaka University. Along the way he also tells us about the *joie de vivre* of the young man in living his life – in playing his music – in building up an experimental physics laboratory – in bringing science to the common man in a vernacular language and above all, in passionate participation in Bengali *Adda*, displaying the quintessential characteristic of a Bengali *bhadralok*.

While I enjoyed the book I would have loved to see the list of all the other publications by Bose which are mentioned (a total of 25 papers) and some discussions about them. Bose did M Sc in Mixed Mathematics (securing record marks that are still unsurpassed) and must have written papers in mathematics. The discussions about the BE statistics lacks clarity and should be rectified in a future edition. Another nagging point – why the two related papers after the famous one did not find favour with Einstein? Can Salwi give us some idea?

It is tempting to compare this book with the one written by G. Venkataraman (*Bose and his Statistics*). The latter book gives a comprehensive account of the science of Bose-Einstein Statistics and some interesting consequences, while the present book is more suitable for the layman. However, one feels that Salwi's book has glossed over this part – probably due to space constraint.

On the whole Salwi has done a commendable job in a short book.

C. V. Raman – The Scientist Extraordinary

This is the story of the most outstanding physicist of India. The book traces the growth of Raman through his formative years – his passion for science involving a balancing act between a demanding job at the Accountant General's Office and amateur experimentation – leaving the accountant's job for physics at half the salary – and finally, the discovery of Raman Effect beating quite a few competitors who were on the same track. He got the Nobel Prize for this discovery in 1930.

Raman was an extraordinary man – a man with a unique combination of ambition, passion and endeavour. He did not take things for granted and was always questioning the conventional explanation. A seemingly trivial question like why the sea is blue set him off in a quest which ended in one of the four major discoveries in experimental physics in the last century. The Raman effect describes the response of a molecule to an external light; the molecule not only scatters the light but also modifies it and from this modification one can see the internal structure. There is no other way to look inside the molecule. That is why today the Raman Effect is such a powerful tool with a proliferation of apparatus and new findings of molecular properties.

Raman came from a middle class family located in a town near Tiruchirappalli in Tamil Nadu. From a young age he was fascinated by science. Much ahead of his class fellows, he published his first paper when he was in college at the young age of 18. He moved to Calcutta at the age of 19 after his marriage to Lokasundari who charmed him with her veena recital. Salwi's book takes us through his fascinating years at Calcutta with his students and assistant Ashubabu. It gives us a glimpse of what made him tick. After he moved to Bangalore as Director of IISc, he tried to set up a School of Physics but his strong personality was not liked by many. This ended up in a sad seclusion of Raman for sometime. But he took it in his stride and built the Raman Research Institute to conduct research in his own way.

Dilip Salwi has written an excellent book giving us the flavour of the life and times of this great son of India.

Unfortunately, in all the three books there are occasional mistakes in spelling and

grammar. And I have a doubt if the crystal held by Raman in the photograph in page 56 is really a diamond as the caption says.

Meghnad Saha – Scientist with a Social Mission

This is an apt title to describe the life of a remarkable man. This is the story of a scientist born in a remote village in East Bengal who is the fifth child in a family of eight – in the poor household of simple village grocer – who grew up to be a physicist to discover the secrets of the stars. An amazing tale to inspire millions.

Dilip Salwi brings alive a character who won against all odds. Saha's father would not send the boy to school as he thought that education was a waste of time. Expelled from the Government school for protest against partition of Bengal – burdened with maintenance of a family and expenses for his own education with the only recourse to a meagre income from private tuition – humiliated in the student hostel for being a low caste and daring to share the dining table – were many such instances of threatening barriers. But Saha fought and won the battle. He loved science and mathematics and studied hard to get the second rank in M Sc only because S. N. Bose was there to beat him to the first rank. Saha and Bose – two bright minds, classmates and friends. One can only guess about their intense discussions on science and society when they were together. Saha discovered the *Ionization Formula* at the age of 26 and Bose discovered the *Statistics of photons* at the age of 30 – two of the three most famous discoveries in physics from colonial India.

One wonders at the number of things he did. He built institutes like the Saha Institute of Nuclear Physics and nurtured the Indian Association of Cultivation of Science, Calcutta. He helped in the growth of two academies – the Indian National Science Academy and the National Academy of Sciences, Allahabad. He brought science to the common man through publications like *Science and Culture* – a magazine he personally brought to life. He was a scientist who did not want to stay in his ivory tower and dared to fight election to become a member of the parliament in order to bring science to the service of society.

It is sad that he passed away young but he left a legacy which has survived to hold a beacon to scientists. Saha's Ionization Formula is ranked as one of the ten most famous discoveries in astrophysics

as it tells the composition of the stars even when we can never go there.

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Megadiversity Conservation: Flora, Fauna and Medicinal Plants of India's Hotspots. A. B. Chaudhuri and D. D. Sarkar. Daya Publishing House, 1123/74, Deva Ram Park, Tri Nagar, Delhi 110 035. 2003. 300 pp. Price: Rs 695.

The estimated 8,000,000 to 10,000,000 species, the hundreds of biological communities that they are part of and the various ecosystems that sustain earth's biological diversity are not uniformly distributed. Some parts of the world are extremely rich in species, communities and ecosystems as against others that are biologically impoverished. Such a pattern of distribution of biological diversity (or biodiversity) has drawn the attention of early explorers and naturalists, including Charles Darwin and Alfred Russell Wallace, that a number of theories have been put forth to explain this natural phenomenon. Although in the past it was popular to divide the world into broad biogeographic realms based on the patterns of distribution of biodiversity, the need to recognize the magnitude of biodiversity within socio-political limits has been the recent emphasis – in fact, the UN Convention on Biological Diversity treats biodiversity as 'national assets'. As a result, countries that support the largest share of the earth's biodiversity have been categorized as 'megadiversity' countries. And India is one of the 12 megadiversity countries originally identified.

The concept of *biodiversity hot spots* became popular probably in the late 1980s. Biodiversity hot spots are regions of the earth that are biologically rich, sheltering a large number of endemic species yet threatened by human development pressures. Sir Norman Myers who first proposed this concept identified 18 biodiversity hot spots throughout the

world to start with and subsequently added a few more taking the total number to 25. The Eastern Himalayas and Western Ghats in India are amongst the earth's biodiversity hot spots. Interestingly, while many megadiversity countries also encompass biodiversity hot spots, as a rule, these two are not coincident. Biodiversity hot spots have been identified in countries such as Sri Lanka, Kenya and Tanzania that are not megadiversity countries.

It is important to popularize the concepts of megadiversity and biodiversity hot spots so that the countries that are identified do get the required national and international recognition and support. The book under review is an attempt in this regard. It has been written by two retired foresters with many years of experience in managing Indian forests. Although the title seems broad, the authors confess that the contents are more focused on the northeastern parts of India comprising the Eastern Himalayan biodiversity hot spot. The book has an introductory section followed by seven chapters, a brief bibliography, maps and an index.

The book is unique in some respects. First, it has an exclusive acknowledgement section although not a single person or institution has been specifically acknowledged. Second, it has an index without page numbers for most part. It is likely that the authors in attempting to be novel (as they have claimed) put together what would qualify for an appendix along with that of an index. Third, despite the emphasis on northeastern India, the cover is illustrated with the pictures of the Indian gooseberry, Asiatic lion, salt-water crocodile (as it appears to me), a swan, showy asteraceae flowers, pomegranates and a nondescript species of ranid frog – none of which are typical of the region in focus.

What is most disappointing however is the content of the book. It is rather evident that the book has been written with a perverse disregard for India's biodiversity, its scientific community and the northeastern region. The first three chapters say virtually little about the northeast. The rest of the book is shabbily peppered with data on the northeast. Considering the fact that the authors have attempted a book in a 'couple of months', as the preface suggests, it should not surprise the readers that the book contains a lot of trash!

First of all, the authors are not clear about the concepts of megadiversity and biodiversity hot spots. They do not even know that lizards are also reptiles, as throughout the text these two are treated separately. They are confused about the term 'systematics' as is evident from chart 6 on page 34.

Second, that 'there is no information on megadiversity and biodiversity hot spots' of India suggests only the ignorance of the authors. They are not aware of the efforts of the Ministry of Environment and Forests (the senior author has served this Government of India agency) including the recently concluded, countrywide, highly publicized effort to draft the National Biodiversity Strategy and Action Plan. They do not know that northeast India received a lot of attention in this process. Most Government of India initiatives that have been cited in the book are based on press releases in *The Times of India* and *The Telegraph*.

Third, the data contained in the book are all far outdated and completely misleading. For example, in table 7, the number of protected areas in India has been provided as 393 (as against the more than 500 in place) covering an area of 14312 hectares (= 143 square kilometers; less than 0.1% of the country's protected area)! Details of the size of protected areas provided in page 19 rarely match with the real figures. The numbers of species of Indian vertebrates provided in table 2 are entirely misleading; mammals 316 (more than 400 in reality), birds 926 (as against 1230), reptiles 390 (vs approximately 500), amphibians 209 (vs 228) and fishes 748 (vs 750 freshwater species alone). Data provided in the tables do not match each other and that in the text.

Fourth, the spellings are atrocious. For instance, some Indian mammals listed include 'black duck, mask deer and perumpur', birds include 'tellow nape ixulus' and reptiles, viz., 'eccentric tree snake (*Hydrophis obscurus*)'. The Food and Agriculture Organisation is abbreviated as 'FAG'. These are but a few examples.

Finally, there are some hilarious section and sub-section titles: 'algal biodiversity vis-à-vis biotal nutrition – algal micro-organism biotechnology and ecology in north-east Indian water' (p. 97), 'realistic' (p. 198) and 'Bist observes' (p. 262). In summary, the book under review is a clear product of conceit that some retired officers exemplify. And as the