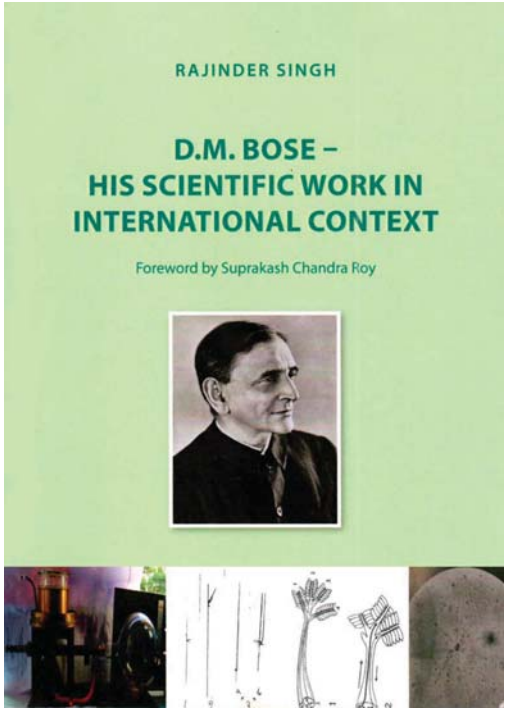
Book Review



D.M. Bose - His Scientific Work in International Context by Rajinder Singh Published by Shaker Verlag GmbH (Germany), Paperback binding. Pages 260, 21.90•/27.40SFr.

"D.M. Bose - His Scientific Work in International Context" by Rajinder Singh, with a foreword by Suprakash C. Roy is treasure trove of little known work by Prof. Debendra Mohan Bose. The unassuming pale green covered book pays homage to the great Indian scientist who has received little publicity in comparison to other scientists of his time. The book is dedicated to S.C. Roy, as the author was influenced by the article "D.M. Bose – A scientist incognito" by Dr. Roy. This book was very much needed for the Indian and international readers, who are less conversant with the work of Prof. D.M. Bose, while they know more about M.N. Saha, S.N. Bose, C.V. Raman and H.J. Bhabha. The book touches on his personality, seeming controversies and the expanse of his work.

The foreword by Dr. Roy summarizes the extent of Prof. Bose's work, discusses his contributions in the modernization of Bose Institute, and dispels some controversies and presents some facts on Prof. Bose's interaction with Rabindranath Tagore. Prof. Roy rightly points out that despite immense contribution in science he is relatively unknown in comparison to his contemporaries (and he refers to the Como conference invitation incident as descried cogently by the author).

The contents are quite detailed listing sections as well as subsections of every chapter. Though the chapters are not numbered, the listing provides a greater access to relevant subsections. An index is also provided at the end of the book for the ease of the reader. The introduction presents the activities of Prof. D.M. Bose, both scientific and otherwise (his association with various scientific bodies) is discussed. This is followed by a brief biography of Prof. Bose with some important dates (his date of birth is, however, replaced by that of Acharya J.C Bose; Prof. D.M. Bose was born on 26 November 1885). The chapters that follow are well referenced.

In the following chapter his work under the supervision of Prof. E. Regener on cosmic rays and his improvement of the Wilson Cloud Chamber is discussed. The author also points out that it was Prof. D.M. Bose who introduced the cloud chamber to India. His work on alpha, beta and proton (H-particles) tracks (in methane and hydrogen) is discussed in great details. His work on gamma ray produced tracks (tracks due to the secondary electrons created by the energetic photons) and his work on detecting the ejected electron. He also visualized collisions of alpha particles and the disintegration of nitrogen nucleus. He also observed the simultaneous ejection of two electrons in the same direction due to collisions of alpha particles in helium which was confirmed by the improved cloud chamber by C.T. R. Wilson.

The next chapter presents the work done by D.M. Bose on paramagnetism. Here a method for computation of magnetic moment of coordination complexes is presented, a work which was done independently by D.M. Bose and L.A. Welo and is known under the name of Welo-Bose rule. The independent contribution of spin and orbital angular momentum in paramagnetism in the presence of a magnetic field was pointed out in the Bose-Stoner hypothesis. He pointed out that in some cases the spin angular moment is important and in some others both the spin and orbital moments contribute. He presented a lecture on this topic at the Como conference. It was soon after

that he returned to India and ultimately took up the Directorship of Bose Institute. As in the previous chapters, this chapter was replete with references.

In the next chapter, Bose's interest in cosmic rays resurfaced. Here, following the strong interaction model of Yukawa, Bose along with his colleagues, *viz.* Biva Choudhuri used photographic emulsions to study charge particle tracks. They devised a mechanism to measure the energy of the projectile ion from the density of "stars" along the track and used it to obtain the energy of the ions in their later work. From the angle between the products and the density of stars they could estimate the mass separately. They used Illford halftone plates and detected and measured the mass of the mesotron (later known as the muon). Powell who got the Nobel prize for the detection of muon, followed the method used by Bose but with a much improved photographic plate.

In the following chapter Bose's contribution in Botany was discussed. Acharya J.C Bose's works on electrical responses in plants could not be repeated by Pearson. His work on electrical responses in plants and ascent of sap were severely criticised in the west. His work was deemed emotional and was difficult to repeat. D.M. Bose was interested in making Acharya J.C. Bose's work on plant physiology understandable to botanists both in India and abroad who may find it difficult orienting themselves to his writings. He classified Acharya J.C. Bose's work under two broad categories (a) inorganic models imitating response in animal tissues, and (b) comparative responses in plant and animal tissues. He and his colleagues worked on *Desmodium gyrans* and showed that the pulvinus reacted to the stimulus light irrespective of whether the leaf blade was still attached to it or not. Early work on biochemistry flourished under the influence of D.M. Bose and in effect made the work of Acharya J.C. Bose understandable and relevant. D.M. Bose also postulated a contractile protein in cytoplasm and with his acumen in theoretical physics proposed the physico-chemical hypothesis in biochemical potential. His experimental work on *Mimosa pudica* revealed a complex vascular arrangement in the subpetiolar region which mimicked neural transmission in plants. All these validated Acharya J.C. Bose's work in the arena of modern botany.

The final chapter preceding the list of publications (and index) by D.M. Bose, the author brings to the front various interesting anecdotes and historical facts, without which it would have been hard to understand D.M. Bose as a person and as a scientist. Regarding D.M. Bose's invitation to the Como conference, it was reported in various biographies on S.N. Bose that the invitation was meant for the other Bose. According to the report the invitation to the Como conference was meant for S.N. Bose and not for D.M. Bose, and the wrong Bose participated. However, as pointed out by the author, D.M. Bose was more eminent at that time due to his work on cloud chamber, muon (mesotron) and paramagnetism, in addition to the familiarity of Acharya J.C. Bose (as a mentor of D.M. Bose) in Europe, and it was certainly not the wrong Bose who was invited. This chapter also reflects on how close was D.M. Bose to getting the Nobel prize and how he (along with S.K. Mitra) nominated M.N. Saha for it (however, the Nobel committee did not consider Saha's thermal ionization theory merited the prize).

The book is interesting to read and provides a window into the unpublicized world of D.M. Bose. The author dispelled various wrong notions (e.g. with respect to the wrong Bose being present the Como conference) and collects the vast spectrum of work done by D.M. Bose which is not widely recognised by the scientific community in our country and abroad. This is essentially a tribute to D.M. Bose, the scientist incognito. ❐

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