

Acharya Jagadish Chandra Basu: A Tribute on his 150th Birth Anniversary. Nitai Chandra Mandal. Acharya Jagadish Chandra Bose 150th Birth Anniversary Celebration Committee, c/o Bose Institute, Acharya J.C. Bose Birth Centenary Building, P-1/12, CIT Scheme VII-M, Kolkata 700 091 and Vijnana Bharati. 2009. 132 pp. Price: US\$ 5.00/Rs 90.

The 150th birth anniversary of Acharya Jagadish Chandra Basu, one of the pioneers to usher in modern science into India, would have passed unnoticed, had it not been for the efforts of Basu Vignan Mandir and Vijnana Bharati, Kolkata; Bangalore Association for Science Education and the Indian Institute of Science, Bangalore and a few journals and newspapers who considered it appropriate to publish books, articles and a documentary on the life and achievements of an extraordinary scientist, who discovered microwaves and transmitted signals without wires; invented semiconductors; showed for the first time that plants feel pain and have a nervous system of their own; measured and demonstrated many other electrophysiological characteristics of various plants.

The book under review by N. C. Mandal is a commendable effort to commemorate this occasion. The book is a somewhat hurried translation from the original Bengali version by the same author and published by the same organizations in December 2008. Mandal, a competent biological scientist, spent 29 years as a faculty member of the Bose Institute, Kolkata.

The book has been divided into 16 chapters mainly covering 'Science education in Pre-Jagadish Chandra era in India', 'The education of Jagadish Chandra

in India and England', 'Jagadish Chandra's teaching in Presidency College', 'Research life of Jagadish Chandra', 'Persons who inspired Jagadish Chandra: "Basu Vijnan Mandir"', 'Researches of Jagadish Chandra; responses outside and inside the country', 'Jagadish Chandra's science in Bengali and its literary impact', 'Nationalistic feelings of Jagadish Chandra', 'The last journey', 'The Honours bestowed on Jagadish Chandra', 'References' and a fairly extensive 'Annexure'.

The inside cover of the book carries reproductions of two interesting advertisements in the *Indo-European Correspondence*, the first reprint (25 September 1896) refers to a Public lecture by Belgian Father Lafont assisted by Jagadish Chandra who received his first lessons in physics from the former. The second one (17 February 1886) is for a lecture by Mahendralal Sircar (who founded the Indian Association for the Cultivation of Science) followed by practical classes in physics by Babu Jagadish Chandra Bose, a lecture by Father Lafont, with admission fees of Rs 6 for the entire series of 12 lectures, but Re 1 and 8 annas for a single lecture. These advertisements speak volumes about public interest in lectures in science in those days and the efforts of these pioneers to propagate science.

After an account of Bose's early days, the influence of his parents Bamasundari Devi and Bhagaban Chandra Basu and his mentor Father Lafont of St Xavier's College, and his education at St Xavier's School and College, Mandal presents some details of Jagadish Chandra's education at Cambridge, particularly the influence of his mentor Lord Raleigh and a number of other professors. Mandal recounts Bose's experiences after joining Presidency College, Calcutta as professor.

The author then goes on to describe the research undertaken by Jagadish Chandra. Mandal has provided useful information, sometimes with quotations from Jagadish Chandra along with a number of coloured plates, describing the details of these inventions. He goes back to the serendipitous discovery of the effects of electricity on magnetism by Hans Christian Oersted in 1820, through Maxwell's theory of electromagnetic waves to the experiments of Heinrich Hertz, Edouard Branley's invention of the coherer (1890), inventions of Oliver Lodge, and the discovery of microwaves

by Jagadish Chandra and his experiments to establish their optical properties. A list of the present-day uses of microwaves provided by the author (p. 27) is educative.

Jagadish Chandra's experimental skills and his designing of instruments with unbelievable accuracy have been described briefly by the author (p. 33). In chapters 6.2 through 6.8, Mandal has described with authenticity, the experiments and theories on plants by Jagadish Chandra.

The author goes on to describe the Big Bang theory of creation of the universe and the evolution of life in terms of the creation of genetic material (DNA) from elementary particles (pp. 47–50). After quoting from Jagadish Chandra, Mandal concludes, 'During the period when Jagadish Chandra carried out his researches, the details of the structure of atoms and the structure of gene and genetic material were not known. In spite of these lacunae, the perception of Jagadish Chandra about the unity among the diversity of living organisms as well as that between nonliving and living has a similarity with the theory of molecular evolution to a certain extent. If one considers from this angle, one can conclude that Jagadish Chandra was also much in advance of his time in his perception about molecular evolution leading to the formation of plants and animals'.

Although Mandal has made a guarded statement, one wonders whether we should get carried away and come to such a conclusion based on some statements that Jagadish Chandra may have made in certain context in a general sort of way.

On the other hand, the 1904 American patent of Jagadish Chandra, his anticipation of p-type and n-type semiconductors and his researches in plant electrophysiology, some of which were rejected during



J. C. Bose delivering lecture on Microwave at Royal Institution (1897).

his lifetime but are finding acceptance today, were all based on experiments conducted by him. These leave one in no doubt that Jagadish Chandra was indeed several decades ahead of his time in certain fields of research.

In his concluding statements Mandal does not provide any reference to authenticate his remark (p. 113). . . 'After an extensive investigation at the International level looking into various authentic documents, it has been established that the real discoverer of Radio Waves was Jagadish Chandra, not Marconi'. In fact the author does not provide reference to sources of many statements that he makes in the text, although he does provide a list of references.

That Jagadish Chandra discovered microwaves has been established without any doubt, but the contest between the claims of who invented the radio (not radio waves), for which Marconi was awarded the Nobel Prize, does not have a clear answer. Marconi is known to have used the coherer developed by Bose, but Jagadish Chandra has to be blamed for his intransigence and refusal to patent his discovery of transmitting and receiving microwaves that he had successfully produced (1894–95), despite warnings about making public the details of his discovery. And we cannot ignore the fact that Nikola Tesla, the Serbian–American engineer had also independently produced radio waves, transmitted and received them at about the same time as Jagadish Chandra.

Mandal provides a few interesting anecdotes that are not generally known. One such was about the failure of one of Bose's experiments in Paris to exhibit how a plant reacts to the administration of a lethal poison like potassium cyanide. It was found later, after some embarrassment, that the chemist had supplied sugar powder instead of cyanide to the girl sent to buy the chemical, since a number of French women in those days were using potassium cyanide to commit suicide.

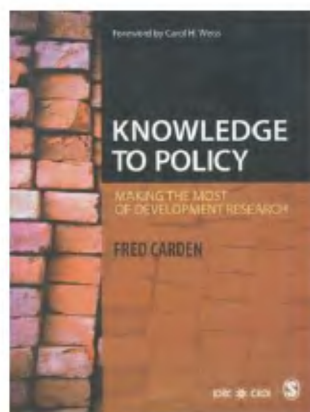
The author provides details about the dreams of Jagadish Chandra to set up an institution, much like the Royal Institute in England and how he spent his life's savings to establish the Basu Vijnan Mandir and also about a list of people involved in this endeavour.

Finally, one is forced to conclude that the book needs extensive editing. Hasty translation by three individuals, the

author being one of them, has affected its quality. The author of a book may not necessarily be the best person to undertake its translation, as is evident from the book under review. It may not be irrelevant in this context to recount that it was Sister Nivedita who not only edited most of Jagadish Chandra's writings (2500-odd pages), but was prevailed upon by the latter to translate a few short stories of Rabindranath Tagore; her translation of *Cabuliwallah* is a masterpiece.

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Knowledge to Policy – Making the Most of Development Research. Fred Carden, International Development Research Centre, P.O. Box 8500, Ottawa, ON, Canada K1G 3H9 and Sage Publications India Pvt Ltd, B1, I-1 Mohan Cooperative Industrial Area, Mathura Road, New Delhi 110 044. 2009. 218 pp. Price: Rs 395.

One of the primary pursuits of social science research is to provide feedback to policy bodies by connecting results to policy and further to implementation. In common parlance, policy refers to those essential administrative measures externally undertaken by the state towards augmentation of aggregate welfare. It is a standard protocol that guides decisions to achieve pre-decided welfare-leading outcomes. These could also be referred to as pre-meditated rational and crucial interventions. Therefore, incidentally

most of the researches are expected to culminate into some policy leads. Some of these, however, do not possess the necessary inputs and thus remain far away from the threshold of policy. Nonetheless, quite a few research pursuits are actually not intended to reach policy as such and are therefore form a different group in themselves.

Among the researches where the primary intention is to reach policy, one meets the policy more often in a casual appearance than a deliberate effort. It is in this context that the International Development Research Centre (IDRC), Canada, initiated a study of illustrating the connections of the generated knowledge assembled through social science research to policy. The book under review is illustrated in a unique 'participative' nature. The arguments are based on a large number of case studies that help the readers to smoothly traverse through the route of reaching policy and understanding the necessary inputs to translate knowledge into policy. The book is organized in three sections beginning with the findings, case studies and finally providing technical notes.

The book begins with an authoritative 'Foreword' by Weiss, who elaborately sketches the connections between evidence-based researches and policy. Terming the book as one of the most recent studies to look 'four squares' at the effects of research in international development, Weiss deliberates on the stages that a research study goes through right from the starting point to the policy. Tracing the path wherein research percolates into policy, the preface leads us to identify the requirements where research also delivers some of the policy leads. Weiss questions the apparent assumptions of the author about the government picking up research findings straight on its own and warns that 'researchers are fallible too', a warning that must be taken seriously in the context of today's research environment. It is really a treat to read the 'Foreword' before one gets into the book, as it lays open the contours of different ideas elaborated in the book more lucidly and in a crisp form for the readers.

The first section of the book on the 'Findings' begins like a cookbook approach towards making research count. The section is interestingly based on the 23 case studies, wherefrom the author distills goals and research outputs. One