Great Indian Scientist

Acharya Sir Jagadish Chandra Bose,CSI, CIE, FRS
(30 November 1858 – 23 November 1937)
was a Bengali polymath, physicist, biologist, botanist, archaeologist, as well as an early writer of science fiction.

Born in Bikrampur (present day Munshiganj District near Dhaka in Bangladesh) during the British Raj, Bose graduated from St. Xavier's College, Calcutta. He then went to the University of London to study medicine, but could not pursue studies in medicine due to health problems. Instead, he conducted his research with the Nobel Laureate Lord Rayleigh at Cambridge and returned to India. He then joined the Presidency College of University of Calcutta as a Professor of Physics.

There, despite racial discrimination and a lack of funding and equipment, Bose carried on his scientific research. He made remarkable progress in his research of remote wireless signalling and was the first to use semiconductor junctions to detect radio signals. However, instead of trying to gain commercial benefit from this invention, Bose made his inventions public in order to allow others to further develop his research.

Back to India

Bose returned to India in 1885, carrying a letter from Fawcett, the economist to Lord Ripon, Viceroy of India. On Lord Ripon's request, Sir Alfred Croft, the Director of Public Instruction, appointed Bose officiating professor of physics in Presidency College. The principal, C. H. Tawney, protested against the appointment but had to accept it. Bose was not provided with facilities for research. On the contrary, he was a 'victim of racialism' with regard to his salary. In those days, an Indian professor was paid Rs. 200 per month, while his European counterpart received Rs. 300 per month. Since Bose was officiating, he was offered a salary of only Rs. 100 per month.[9] As a form of protest, Bose refused to accept the salary cheque and continued his teaching assignment for three years without accepting any salary. After time, the Director of Public Instruction and the Principal of the Presidency College relented, and Bose's appointment was made permanent with retrospective effect. He was given the full salary for the previous three years in a lump sum. Presidency College lacked a proper laboratory. Bose had to conduct his research in a small 24-square-foot (2.2 m2) room. He devised equipment for the research with the help of one untrained tinsmith. Sister Nivedita wrote, "I was horrified to find the way in which a great worker could be subjected to continuous annoyance and petty difficulties ... The college routine was made as arduous as possible for him, so that he could not have the time he needed for investigation." After his daily grind, he carried out his research far into the night, in a small room in his college.

contribution in Biological research

Plant research

Bose subsequently made a number of pioneering discoveries in plant physiology. He used his own invention, the crescograph, to measure plant response to various stimuli, and thereby scientifically proved parallelism between animal and plant tissues. Although Bose filed for a patent for one of his inventions due to peer pressure, his reluctance to any form of patenting was well known. To facilitate his research, he constructed automatic recorders capable of registering extremely slight movements; these instruments produced some striking results, such as Bose's demonstration of an apparent power of feeling in plants, exemplified by the quivering of injured plants. His books include Response in the Living and Non-Living (1902) and The Nervous Mechanism of Plants (1926).

His major contribution in the field of biophysics was the demonstration of the electrical nature of the conduction of various stimuli (e.g., wounds, chemical agents) in plants, which were earlier thought to be of a chemical nature. These claims were later proven experimentally. He was also the first to study the action of microwaves in plant tissues and corresponding changes in the cell membrane potential. He researched the mechanism of the seasonal effect on plants, the effect of chemical inhibitors on plant stimuli and the effect of temperature. From the analysis of the variation of the cell membrane potential of plants under different circumstances, he hypothesised that plants can "feel pain, understand affection etc."

Study of metal fatigue and cell response

Bose performed a comparative study of the fatigue response of various metals and organic tissue in plants. He subjected metals to a combination of mechanical, thermal, chemical, and electrical stimuli and noted the similarities between metals and cells. Bose's experiments demonstrated a cyclical fatigue response in both stimulated cells and metals, as well as a distinctive cyclical fatigue and recovery response across multiple types of stimuli in both living cells and metals.

Bose documented a characteristic electrical response curve of plant cells to electrical stimulus, as well as the decrease and eventual absence of this response in plants treated with anaesthetics or poison. The response was also absent in zinc treated with oxalic acid. He noted a similarity in reduction of elasticity between cooled metal wires and organic cells, as well as an impact on the recovery cycle period of the metal.

Bose and patents

The inventor of "Wireless Telecommunications", Bose was not interested in patenting his invention. In his Friday Evening Discourse at the Royal Institution, London, he made public his construction of the coherer. Thus, the Electric Engineer expressed "surprise that no secret was at any time made as to its construction, so that it has been open to all the world to adopt it for practical and possibly moneymaking purposes." Bose declined an offer from a wireless apparatus manufacturer for signing a remunerative agreement. Bose also recorded his attitude towards patents in his inaugural lecture at the foundation of the Bose Institute on 30 November 1917.

Honours

- Companion of the Order of the Indian Empire (CIE, 1903)
- Companion of the Order of the Star of India (CSI, 1912)
- Knight Bachelor (1917)
- Fellow of the Royal Society (FRS, 1920)
- Member of the Vienna Academy of Sciences, 1928
- President of the 14th session of the Indian Science Congress in 1927.
- Member of Finnish Society of Sciences and Letters in 1929.
- Member of the League of Nations' Committee for Intellectual Cooperation
- Founding fellow of the National Institute of Sciences of India (now the Indian National Science Academy)
- The Indian Botanic Garden was renamed as the Acharya Jagadish Chandra Bose Indian Botanic Garden on 25 June 2009 in honour of Jagadish Chandra Bose.

Bibliography

- Mukherji, Visvapriya, Jagadish Chandra Bose, second edition, 1994, Builders of Modern India series, Publications Division, Ministry of Information and Broadcasting, Government of India, ISBN 81-230-0047-2.

REFERENCES:

- Bose Institute Website (http:/ / www. boseinst. ernet. in/ home. html)

SIR JAGADISH CHANDRA BOSE: the unsung Hero of Radio Communication (http:/ / web. mit. edu/ varun_ag/ www/ bose. html) at web.mit.edu J. C. Bose, The Unsung hero of radio communication

- Article on Jagadish Chandra Bose (http:/ / banglapedia. search. com. bd/ HT/ B_0584. htm), Banglapedia
- Vigyan Prasar article (http:/ / www. vigyanprasar. gov. in/ scientists/ JCBOSE. htm)
- Response in the Living and Non-Living by Jagadis Chandra Bose at Project Gutenberg (Project Gutenberg)