

Philatelic Tribute to Indian Scientists

SEEMIN RUBAB

Innumerable postage stamps have been issued over the years depicting scientists and their contributions and also institutions of excellence they helped set up or that were named after them. All of which the country could be truly proud of. Exciting stories can be woven around many scientific themes using these postal stamps.

THE announcement of the discovery of the Higgs boson created a bang recently. The fact that one of the most remarkable scientific discoveries in recent times had an Indian name associated with it – 'boson' – was indeed heart warming. But how many of us really know which of the two scientists the term relates to – Jagadis Chandra Bose or Satyendranath Bose? Well, 'boson' was named in recognition of Satyendranath Bose's significant contribution to quantum mechanics. Jagadis Chandra Bose, on the other hand, pioneered the investigation of radio and microwave optics, and was even named by IEEE as one of the fathers of radio science.

Newly independent India was privileged to have Homi Jahangir Bhabha, P.C. Mahalanobis, S.S. Bhatnagar, Birbal Sahni, Vikram Sarabhai and many others who were not only great scientists but also remarkable visionaries and institution builders. It is a pity that Indian masses in general and students in particular are hardly aware about the achievements of Indian scientists. It is one of the recommendations of the National Knowledge Commission to launch a massive science outreach and extension programme.

Biographies of scientists have great motivating values for youngsters. Acharya P.C. Ray became interested in science after reading Benjamin Franklin's biography and his famous Kite experiment. Biographies of Indian scientists should be an integral part of the school curriculum.

Biographies may also be supplemented with stamps instead of usual photographs as stamps carry additional information. For example, if one looks at a

stamp brought out to honour Meghnad Saha, it becomes obvious that he specialized in astrophysics. Vikram Sarabhai was a space pioneer is evident from his stamps. That S.S. Bhatnagar, Homi Bhabha and P.C. Mahalanobis were institution builders is testified by the buildings depicted in the background in the postage stamps brought out to honour them.

Postage stamps, due to the visual appeal they carry, can offer a very good medium to communicate science in an interesting and creative manner. Innumerable postage stamps have been issued over the years depicting scientists and their contributions and also institutions of excellence they helped set up or that were named after them. All of which the country could be truly proud of. Exciting stories can be woven around many scientific themes using these postal stamps. These stories can be communicated through the print medium, audiovisual medium such as PowerPoint presentations or even through documentaries.

It cannot be denied that the process of communication of ideas becomes more delightful through visuals depicted on stamps and brief write-ups. Famous Physicist Ernest Rutherford had aptly said: 'All science is either physics or stamp collecting'.

Here is a random collection of stamps depicting some renowned Indian scientists, their contributions to Indian science and the institutions they helped build. As one can see, a collection of stamps could be linked up and used to tell exciting stories about Indian science that could motivate today's youngsters.



S.N. Bose

Satyendra Nath Bose was a physicist, specializing in mathematical physics and has been in the news recently after the discovery of the Higgs boson was announced. He is best known for his work on quantum mechanics providing the foundation for Bose-Einstein statistics and the theory of the Bose-Einstein condensate. A group of particles obeying Bose Einstein statistics are known as Bosons. Bosons are like Indians, accommodating and friendly. Many Bosons can live together as opposed to Fermions, which are a group of particles preferring to live alone. The S.N. Bose National Centre for Basic Sciences is an autonomous research institute under the Department of Science and Technology, Government of India, established in 1986 to honour S.N. Bose.

Homi Jehangir Bhabha

Homi Jehangir Bhabha was a nuclear physicist who played a major role in the development of the Indian atomic energy programme and is considered to be the father of India's nuclear programme. After his death, the Atomic Energy Establishment was renamed as the Bhabha Atomic Research Centre in his

honour. Bhabha also encouraged research in electronics, space science, radio astronomy and microbiology.

TIFR

With endowments from J.R.D. Tata, Bhabha established the Tata Institute of Fundamental Research in 1945. The TIFR is recognized by the Government of India as the National Centre for Nuclear Science and Mathematics. Other noted institutions in his name are the Homi Bhabha National



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Institute, a deemed university and the Homi Bhabha Centre for Science Education, Mumbai.

Radio Telescope, Ooty

The famed radio telescope at Ooty was Bhabha's initiative and it became a reality



in 1970. This telescope is in the form of a parabolic cylinder and operates at 327 MHz. It is one of the largest telescopes in the world operating at meter wavelength. The concept, design and fabrication of this telescope are indigenous. It is operated by the TIFR.

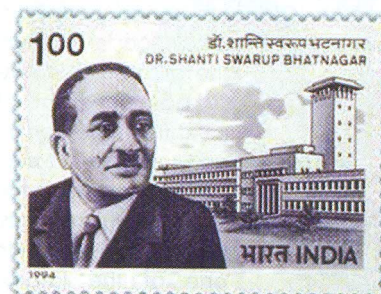
Indian Institute of Science

The Indian Institute of Science (IISc) was conceived by Jamsetji Nusserwanji Tata, in the final years of the 19th century and finally set up on 27 May 1909. The stamp above shows several eminent dignitaries of the time including the founder J.N. Tata, Swami Vivekananda, whom J.N. Tata befriended on his famous voyage to the United States, Dr Bhabha who established

the cosmic ray research unit at the IISc, Nobel laureate C.V. Raman who headed the unit, the Maharaja of Mysore, Shri Krishnaraja Wodeyar IV, and Lord Curzon, the Viceroy of India, whose first task on arrival on 31 December 1898 was to receive a draft proposal prepared by the Provisional Committee set up to plan the establishment of the Institute. The stamp was released at the centenary of the IISc.

Dr S.S. Bhatnagar and NPL

Dr Shanti Swarup Bhatnagar, who founded the Council of Scientific & Industrial Research (CSIR), is seen in the backdrop of the National Physical Laboratory (NPL), a premier laboratory in the field of Physical Sciences and one of the many laboratories of CSIR scattered throughout the country. Bhatnagar's research



interests included emulsions, colloids, and industrial chemistry, but his fundamental contributions were in the field of magneto-chemistry. Jointly with K.N. Mathur, Dr Bhatnagar invented an



Dr S. S. Bhatnagar became the first director-general of the CSIR. He established a total of 12 national research laboratories in India. CSIR established the Shanti Swaroop Bhatnagar Prize for honouring young scientists.

instrument called the Bhatnagar-Mathur Magnetic Interference Balance. The balance was one of the most sensitive instruments for measuring magnetic properties.

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Council of Scientific and Industrial Research

The Council of Scientific and Industrial Research (CSIR) was set up under the chairmanship of Dr. Bhatnagar in 1942 with

the primary objective of advancement of scientific knowledge and sustained industrial development of the country. Over the years, CSIR has developed into one of the largest chains of laboratories around the world – it is today a well knit and action-oriented network of 38

laboratories spread throughout the country with activities ranging from molecular biology to mining, medicinal plants to mechanical engineering, mathematical modelling to metrology, chemicals to coal and so on.

Indian Statistical Institute and P.C. Mahalanobis

Professor P.C. Mahalanobis was the pioneer of statistical methods in India. Basically a physicist, he was introduced to statistics by W.H. Macaulay through Biometric tables. The most prestigious institute of statistics in



India is the Indian Statistical Institute founded by none other than Prof. Mahalanobis in Kolkata. He contributed to Anthropometric studies in India. His most important contributions are related to large scale sample surveys. He introduced the concept of pilot surveys and advocated the usefulness of sampling methods. Mahalanobis was a member of the planning commission and contributed immensely to the second five-year plan.

Vikram A. Sarabhai

Vikram Ambalal Sarabhai was also a physicist. He is considered to be the father

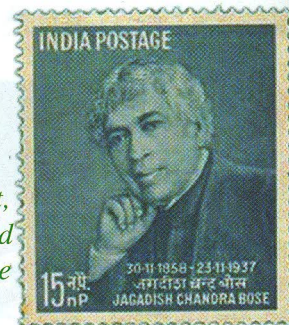


of the Indian space programme. Vikram Sarabhai founded the Physical Research Laboratory in Ahmedabad. The establishment of the Indian Space Research Organization (ISRO) was one of his greatest achievements. Dr. Sarabhai was also a pioneer in science communication; he founded a Community Science Centre at Ahmedabad.

Sir J.C. Bose

Sir Jagadis Chandra Bose, was an outstanding polymath: a physicist, biologist, botanist, archaeologist, as well as an early writer of science fiction. He pioneered the investigation of radio and microwave optics, made very significant contributions to plant science, and laid the foundations of experimental science in the Indian subcontinent. IEEE named him as one of the fathers of radio science. He was far ahead of his time. He had an American patent at a time when the majority of people in the subcontinent were unaware of either the term or its significance. Sir

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J.C. Bose founded the Bose Institute in 1917. Bose Institute is a premier research institute in the fields of Physics, Chemistry, Botany, Microbiology, Biochemistry, Biophysics, Plant Molecular and Cellular Genetics, Animal physiology, Immunotechnology and Environmental science.

Sir C.V. Raman

Sir Chandrasekhara Venkata Raman was a Nobel laureate in physics recognized for his work on the molecular scattering of light and for the discovery of the Raman effect.



Raman made significant contributions to the quantum photon spin, acousto-optic effect, and acoustics of Indian musical instruments. We celebrate the National Science Day on 28 February every year to commemorate the discovery of the Raman effect in 1928. After two years of this discovery, Sir C.V. Raman brought the first Nobel Award for the country in 1930. Raman Effect has continuously impacted every field of science. Researchers across the world are still extracting exciting new results from his discoveries. Its role in spectroscopy, medical diagnostics and material characterization had been phenomenal.

Meghnad Saha

Meghnad Saha was an astrophysicist best known for his development of the Saha equation, used to describe chemical and physical conditions in stars. Saha and S.N. Bose proposed an equation of state for real gases. Prof. Saha founded the Institute



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of Nuclear Physics in 1950, which was inaugurated by Nobel laureate Irene Joliot-Curie to initiate research in Nuclear Physics. The institute later diversified its research areas and was renamed as the Saha Institute of Nuclear Physics.

D.D. Kosambi

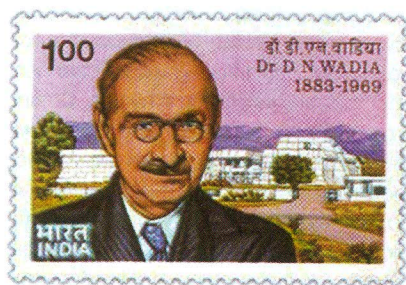
Damodar Dharmananda Kosambi was a mathematician, statistician, historian, and



polymath who contributed to genetics by introducing Kosambi's map function. He is well known for his work in numismatics and was also a Marxist historian specializing in ancient India.

D.N. Wadia

Darashaw Noshewan Wadia was a geologist working for the Geological Survey of India. He helped establish geological studies and investigations in India including the Institute of Himalayan Geology in Dehradun, which was later

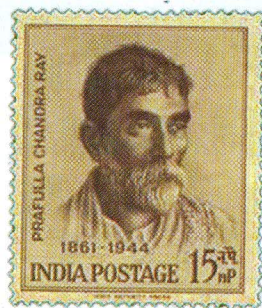


S. Chandrasekhar was an Indian American astrophysicist. His bust is shown on the first day cover along with Bhabha and S.N. Bose to commemorate the International Year of Physics in 2005.

renamed the Wadia Institute of Himalayan Geology.

Acharya P.C. Ray

Acharya Prafulla Chandra Ray was an academician, a chemist and an entrepreneur. In fact he was among the first techno-entrepreneurs of India. He was



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the founder of Bengal Chemicals & Pharmaceuticals, India's first pharmaceutical company. He was a contemporary and friend of Sir J.C. Bose.

International Year of Physics

Subrahmanyan Chandrasekhar was an Indian American astrophysicist. His bust is shown on the first day cover along with Bhabha and S.N. Bose to commemorate the International Year of Physics in 2005. He was a Nobel laureate in physics along with William Alfred Fowler for their work in the theoretical structure and evolution of stars. The Chandrasekhar limit is named after him. Chandrasekhar was the nephew of Sir C.V. Raman.

S. Ramanujan

Ramanujan was one of the greatest Indian mathematicians. He was a self-taught person. He is known for the Ramanujan prime and Ramanujan theta function. He



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made substantial contributions to mathematical analysis, number theory, infinite series and continued fractions. Ramanujan's work has profound significance in physics as well. His formulas have applications in crystallography and string theory.

Dr Seemin Rubab, a doctorate in Renewable Energy from IIT Delhi, teaches Physics at the National Institute of Technology, Srinagar. She is an avid philatelist and has won gold medals at state level philatelic competitions. Address: AP, Physics, NIT Srinagar, Jammu and Kashmir-190006; Email: ask_rubab@yahoo.co.in