

Remembering Homi Jehangir Bhabha

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Homi Jehangir Bhabha (October 30, 1909 – January 24, 1966) defined India's post independence identity more than any other scientist has done. He not only excelled in research himself, but in fact ensured that the nation as a whole matured as a country that could be at the forefront of world research, a dream that we are just beginning to achieve. He laid out and defined the foundation of post independence research in India more than anyone else.

Early Life and Education

Bhabha was born in a prominent family, through which he was related to Dinshaw Maneckji Petit, Muhammad Ali Jinnah, Homi K Bhabha and Dorab Tata. He obtained his early education in the Cathedral Grammar School (which is now known as Cathedral and John Connon School) in Mumbai. From his early days however, Homi was exposed not only to science, but equally with art and music and human values, all of which formed the core of his personality that drove him and those around him to not only excel in their chosen field but also to appreciate excellence elsewhere.

After completing his schooling, at the age of 15, he joined the Royan Institute of Science. Following the pattern of the time, his father decided that he should pursue his higher education in UK and hence Bhabha joined the Caius College in Cambridge University, UK.

When he left India, the country was already getting ready for momentous changes as the momentum of the struggle for freedom from the British rule was picking up. His father felt that it would be good if young Bhabha became an engineer, but Bhabha had other plans. He wanted to pursue physics to the exclusion of all else. His father would agree with him provided he proved that he could be an excellent engineer if he chose to be. He took up Mechanical Engineering Tripos (an equivalent of Honours bachelor's degree) and after excelling in it, changed over to physics. This apparently stubborn standoff between the father and the son in fact would auger well for the nation, for Bhabha would eventually be called upon not only to excel in science but also engineer the country's scientific needs for the future.

Scientific Achievements

After the Engineering Tripos, Bhabha did one more Tripos in Mathematics under Paul Dirac. He worked at



Pencil sketch of Homi Bhabha.

the Cavendish Laboratory while working towards his doctorate in theoretical physics under R. H. Fowler. Bhabha was fascinated by quantum mechanics that had been the core of Paul Dirac's work and equally by the work of R. H. Fowler on the electron band gaps and thermodynamics of systems. In 1936, Bhabha worked with Walter Heitler of Wills Physical Laboratory at Bristol and developed the now famous Bhabha-Heitler Cascade Theory of Cosmic Ray showers. The results were published in 'Nature'. Bhabha found a permanent place in the history of physics. With a special Rouse Bell travelling studentship, Bhabha went on to work with Niels Bohr in Copenhagen, Wolfgang Pauli in Zurich, Enrico Fermi in Rome and Hans Kramers in Utrecht.

In 1939, when Bhabha was vacationing in India, the second World War broke out. He chose to remain in India until the war ended. He accepted a position offered by C V Raman at the Indian Institute of Science, Bangalore. Here he established the Cosmic Ray Research Unit.



Homi Bhabha and Neils Borh.

However, the mood in the nation was changing. The nation was beginning to sense that independence from the British was round the corner and the leaders of the nation had to start preparing the future path of the Nation. A close friend of Jawaharlal Nehru, Bhabha soon immersed himself in chalking out the path of India's re-entry into the great world of science and technology.

Institution Building

In 1943 Bhabha wrote a letter to the Sir Dorabjee Tata Trust requesting for funding to start an institute of research in India: "an embryo from which I hope to build up in the course of time a school of physics comparable to the best anywhere". The Tata Trust readily granted his request and the Tata Institute of Fundamental Research (TIFR) was established on June 1, 1945 at the Indian Institute of Science campus in Bangalore. He soon shifted back to Mumbai and gave firm foundations to the institute in Mumbai. He requested his aunt to donate her bungalow at Kenilworth to the Institute and the aunt's house became the Institute and the gardener's bungalow became the Director's bungalow. However it was soon realised that under the leadership of Bhabha, the institute would truly meet its promise and hence needed a support far greater than what the Tata Trust could provide. Therefore TIFR entered into a tripartite agreement with Government of Bombay, Government of India and TIFR became the National Centre of the Government of India in Nuclear Sciences and Mathematics under an Act of the Parliament. This arrangement continues even today. Bhabha set up the structure, administration and activities of TIFR in such a way that the scientists continue to enjoy maximum freedom, even as there is sufficient support to allow them to continue their work unhindered. The model of administration he set up continues to be studied and followed more than 60 years after it was set up.

Vision

However, his vision continued to be broad as ever and he soon recognised in Vikram Sarabhai another stalwart who could lead India's quest for scientific progress. Even as Bhabha himself set up the Atomic Energy activity in India, he ably supported Sarabhai in setting up India's space programme. In 1948 he started the Atomic Energy Commission under which he set up India's first experimental nuclear reactors in the outskirts of Mumbai. Later on, this setup would be renamed as the Bhabha Atomic Research Centre and would be the foundation of India's nuclear energy programme.

The philosophy behind setting up these institutions was novel, to say the least. For TIFR, Bhabha never listed out the topics in which he wanted the research done. Instead he concentrated on identifying excellent people and then letting them grow on their own pursuing their instinct about the line of investigation they wanted to follow. He went to the extent that when he found an excellent biologist he even offered him a position in an institute that was officially meant for physics. This is the philosophy that TIFR follows even today where great care is taken in selecting scientists but once selected, they are allowed to pursue their personal query. This philosophy has meant that TIFR has excelled in fields of research as varied as research in cancer of the mouth induced by tobacco usage, molecular biology and genetics, chemical physics, large molecule studies and nuclear physics, atomic physics, nano sciences and astrophysics. Essentially, this has provided the country with experts in a wide variety of subjects even as it has given some excellent scientists opportunities to do research on a subject to their choice. The only criterion of judging the work is international scholarship in this field that generally goes under the name of blue sky research. While such a research does not necessarily produce applicable research, it is highly innovative and pushes technology to its extreme resulting in new insights into the working nature.

In contrast, the Atomic Energy Commission was set up with the express task of designing and running nuclear reactors and allied technologies. This focus on technology development that has proven to be the backbone of India's march into modern fields of science and technology, proved crucial for India's energy and defence needs.

A Multi-faceted Personality

Another unusual features of Bhabha's style was his synthesis of science and art. While the campuses of BARC and TIFR are designed with utilitarian compactness, their artistic and aesthetically pleasing



Painting by Homi Bhabha

modern Indian paintings that he purchased from artists who were unknown at that time but rank amongst the most famous names in Indian art today. They include, M F Hussain, Kishan Khanna, K H Ara, Sabbawalla, Langhimer and others.

However, Bhabha was a world citizen. His dreams of using nuclear energy for the salvation of mankind by providing cheap and reliable energy extended beyond the needs of the citizen of India. In the 1950s, Bhabha represented India in International Atomic Energy Forums where he worked vigorously for peaceful uses of nuclear energy and served as President of the first United Nations Conference on the Peaceful uses of Atomic Energy in Geneva, Switzerland in 1955.

Even while working at the cutting edge of science and science policy, Bhabha was a keen science communicator and made several excellent films on various aspects of science and daily life with the Films Division of India which still make delightful viewing.

Honours & Awards

Amongst his many recognitions, he was elected a Fellow of the Royal Society of London in 1941 as a recognition to his contributions to the field of cosmic rays, elementary particles and quantum mechanics. From 1960 to 1963, he was the President of the International Union of Pure and Applied Physics, the highest professional body of physicists in the world. He was awarded Padma Bhushan by Government of India in 1954. He later served as the member of the Indian Cabinet's Scientific Advisory Committee and set up the Indian National Committee for Space Research with Vikram Sarabhai.

design layout cannot be denied. The buildings inspire both, a soothing thought and creativity. Equally interestingly, the buildings have been endowed with the country's largest collection of



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