



Modern day da VINCI

This year marks the 50th anniversary of Dr. Homi Jahangir Bhabha. Let's take a look at his life and the contributions he has made to nuclear physics.

► VEENA PRASAD

If you cannot return to your laboratory to continue your research, what do you do? Why, set up a world-class facility at home, of course!

This is exactly what the father of India's nuclear programme, Homi J. Bhabha did. What made his act even more extraordinary was that India was still under British rule at that time.

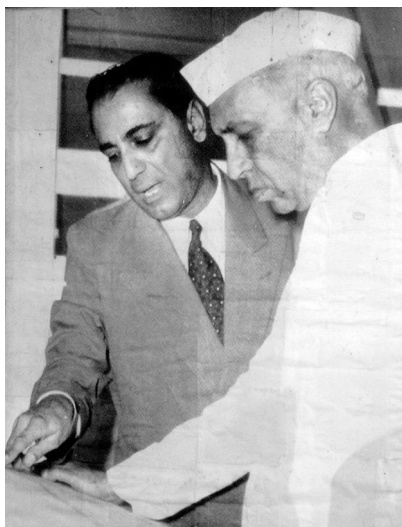
In 1939, after having spent more than a decade in England, Bhabha came to India because World War II had broken out. He had made a name for himself as a noted physicist at Cambridge, but in choosing to stay back after the war, he put India on a path of striding scientific progress that few could envision.

How Bhabha got into theoretical Physics is an interesting story. His father wanted him to become an engineer (which father doesn't?) but half way through his mechanical engineering course at Cambridge, Bhabha discovered his love for Physics. In an impassioned plea to his father, he declared, "I am burning with a desire to do physics... I know I shall do great things here. I have no desire to be a 'successful' man or the head of a big firm. There are intelligent people who like that and let them do it... It is no use saying to Beethoven 'You must be a scientist for it is a great thing' when he did not care two hoots for science; or to Socrates 'Be an engineer; it is work of intelligent man'. It is not in the nature of things..."

His father, like most fathers, told him he could go ahead and follow his passion, but only after earning that engineering degree!

After engineering

So Bhabha did just that, and was then free to pursue physics, in which he obtained a PhD from Cambridge University in 1933. Those were exciting times in science. At the Cavendish Laboratory,



BHABHA, HAD A KEEN INTEREST IN ART, WAS AN AMATEUR ART CRITIC, A GOOD PAINTER, TOOK VIOLIN AND PIANO LESSONS, AND WAS A TECHNICALLY COMPETENT ARCHITECT!

Bhabha got the rare opportunity of working amidst such scientific stalwarts as Rutherford, Dirac and James Chadwick (who had just proved the existence of the neutron). A short trip to Copenhagen brought him face to face with Niels Bohr (who had described the atomic structure), and a hop over to Zurich gave him a ringside view of the quantum revolution pioneered by Wolfgang Pauli.

Bhabha himself was studying cosmic rays and sub atomic particles. His research resulted in some important

scientific contributions — an understanding of electron showers produced by cosmic rays when they interacted with the earth's atmosphere, and the more famous phenomenon known as Bhabha scattering, which explains the electrodynamics of electron-positron pairs by fast charged particles. His formulae are now used in the calibration of beams of particle accelerators.

However, it would not be wrong to say that his most far-reaching contributions came after he returned to India. Working with Sir C.V. Raman, Vikram Sarabhai and other brilliant minds at the Indian Institute of Science (Bangalore), he produced much work in theoretical physics, winning the prestigious Adam's prize by the Cambridge University for his paper on elementary particles.

Theoretical physics was all very well, but if you did not have the facilities to experiment and test your theories, you could not expect to make much progress. So, Bhabha wrote to J.N. Tata (who had established the Indian Institute of Science) and together they set up the Centre for Scientific and Industrial Research and the Tata Institute of Fundamental Research, both instrumental in building experimental facilities. Bhabha immediately set about contacting his old friends abroad, persuading them to take up half yearly positions in these institutes, bringing with them their knowledge and research.

After the war, with nuclear technology in the forefront, Bhabha was convinced that India had the potential to get into this club. Just 11 days after independence, he approached Jawaharlal Nehru with a plan to set up the Indian Atomic Energy Programme (later named Bhabha Atomic Research Centre, in his honour), requiring a grant of Rs. one crore. Such was Nehru's confidence in Bhabha that he granted it without question. The genius of Bhabha's plan was in recognising that although India did not have Uranium, we had rich deposits of Thorium, which with a little processing, could be turned into a nuclear fuel. Thorium had never been used this way in any other nuclear plant in the world, making this strategy all the more courageous, and this was ultimately responsible for the stupendous success of India's almost completely indigenous atomic programme.

Yes, those were exciting times in science. Or perhaps the times were made exciting by these brilliant scientists, who were so much more than just scientists. Not many people know that Bhabha, apart from taking keen interest in art, was an amateur art critic, a very good painter himself, took violin and piano lessons, and was a technically competent architect! This prompted Sir C.V. Raman to call him the 'Leonardo da Vinci of modern times'.



Illustration:
K. G. Rangarajan

Operation tin-opener

Year: 1955

Place: United Nations headquarters, Geneva

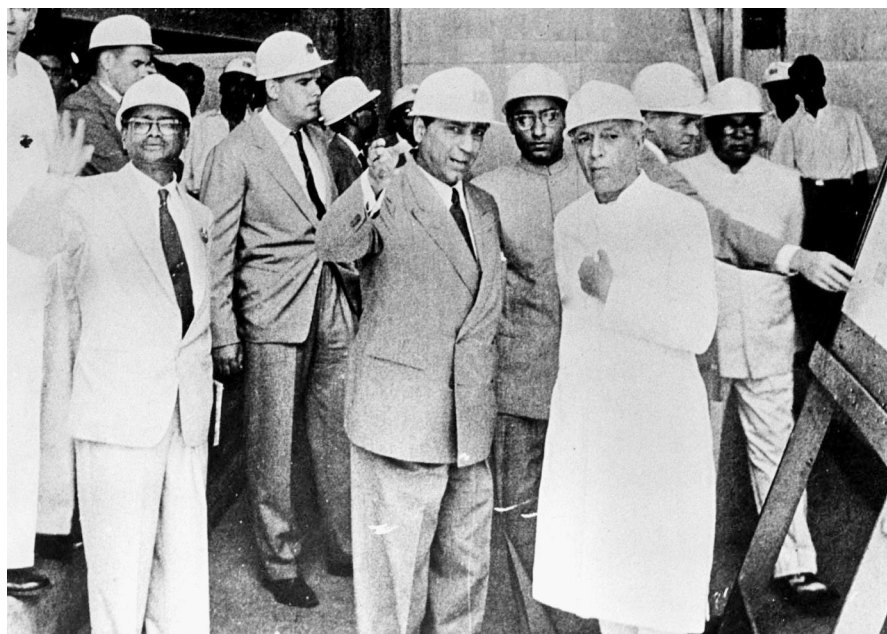
Event: First Geneva Conference to discuss the peaceful use of atomic technology.

Participants: The Scientific Advisory Committee to the UN comprising representatives from seven countries (the U.S., U.K., France, Canada, USSR, India and Brazil), 1,400 delegates from 73 countries, 900 media persons. Dr. Homi Bhabha was the President of the Conference.

Background: Atom bombs dropped on Japan had caused unspeakable human devastation. The nuclear technology used was Fission, which released energy in a blast. Fusion could be used to release energy in a controlled manner for power generation, but more research was required.

The scene: Fusion was top secret. The U.S., U.K. and USSR were each independently engaged in fusion research and did not want this to be known. Fusion was therefore not on the agenda, but Bhabha knew of the research and the possibilities and was unhappy with the secrecy. So he went ahead and mentioned the unmentionable, forcing these countries to come out in the open, albeit reluctantly.

While American politicians were upset by Bhabha's move, scientists across countries appreciated what they called "Operation tin-opener", conceding that had there been a less forceful President the world might have remained ignorant of even the possibility of using nuclear technology for peaceful purposes.



AT TROMBAY: Jawaharlal Nehru and Dr. Homi Bhabha. Photo: Special Arrangement