Models of Inspiration

Enduring Legacy of Scientific Works

By J V NARLIKAR

DECEMBER 17, 1997. The scene is set at Pune's Bal Gandharva Theatre, but not on the stage. Outside the theatre, a large crowd has gathered, wanting to get in. But it can't because the theatre is packed. The crowds are gathered for the lecture by Oxford-based scientist Roger Penrose talking about 'Science and the Mind'. Not a 'pop' topic by any means and certainly one that required serious thought. Among other issues, Professor Penrose asks: Can computers take over the functions of the human mind?

Penrose Episode

A lot of Professor Penrose's fame had preceded him. The Pune public is known for responding well to educational and cultural programmes. But the organisers of the talk were certainly not prepared for such huge crowds. In the end, they had to arrange another show of the video recording to pacify those who could not get in.

The Penrose episode demonstrated once again that even scientific pursuits, usually considered suitable for the ivory tower, can excite the popular mind. For science is a reflection of human endeavour to understand and unravel the mysteries of nature, and there are situations when one does not have to be a scientist to appreciate an intellectual advance. Which is why, even though it was claimed at one time that no more than three persons really understood the theory of relativity, thousands turned up to greet Albert Einstein whenever he visited a place for delivering a lecture. That was in the early part of this century in an era which was not as dominated by the media as it is at present.

But, leaving aside the media and how it popularises a scientific work, one can ask, whether individual scientists with extraordinary creativity can serve as inspiring role models to other scientists or students aspiring to be scientists. For, after all, don't we often emphasise that science is objective and that in the long run, it is the facts, not personalities that matter? Don't incidents like the Penrose episode just described only bring out the idolatry of mobs? Why should a practising or an aspiring scientist feel inspired by a Newton or an Einstein, or a Ramanujan, rather than by their work? In short, is there any compromise with his objectivity if a scientist confesses to be inspired by such personalities?

I think not. For human beings are not machines, as Professor Penrose was trying to emphasise. Even though engaged in the objective pursuit of science their mind is driven by intuition, perception and subjective assessment of facts. Success in their research even on a modest scale, can create moments of thrill and against this background, personalities who have contributed path-breaking findings can be sources of inspiration.

When I went to Cambridge as a student, I had the opportunity of attending a lecture course on quantum mechanics delivered by P A M Dirac. Dirac was one of the early pioneers of the quantum theory, who, in the 1920s along with Erwin Schrodinger and Werner Heisenberg, gave a formal structure to that theory. It was Dirac's work on the motion of an electron that in the 1930s led to the prediction and discovery of the positron, the first known anti-particle. Dirac received a Nobel prize for his seminal work on quantum mechanics.

Theory of Relativity

To have the first course on quantum mechanics delivered by a teacher of such eminence can leave a lasting impact on the student, as it did on me. Through him, the student could establish a direct link with the origin of not just a new branch of physics, but with an entirely new way of looking at physics. For, quantum theory is regarded as one of the two revolutions brought about in this country, the other one being the theory of relativity.

Inspiration in general can come not just from persons but from inanimate objects too, objects that link up with history. When you go to the fort of Sinhgarh near Pune you can see the steep rock up which Tanaji and his Maratha warriors climbed in order to take the fort by surprise and to win it for their leader Shivaji.

Science has its historical objects too, like the apparatus used by Michael Faraday, the equipment of Rutherford or Madame Curie,... exhibits displayed with honour in science museums or laboratories where these scientists worked. Even the replica of the telescope made by Galileo takes you back to those pioneering days of the early 17th century when astronomy was breaking out of the limits imposed by human eyes.

This attitude of 'feeling inspired' or 'looking up to' should not be confused with worship of idols. Worship assumes divinity and demands uncritical devotion, alien to science and the scientific attitude. Take Isaac Newton, for example. I feel inspired by Newton because of his tremendous contribution to the subjects of physics and mathematics. Newton created the whole infrastructure out of practically nothing. His genius in generating new ideas and cleverness in executing them are phenomenal.

Negative Aspect

Nobel Laureate S Chandrasekhar did his last work on evaluating Newton's monumental book, the *Principia*, in which there are several propositions on the problems of motion, gravitation and other topics. Chandrasekhar paid tributes to Newton by recounting the following experience. He solved many of those old Newtonian problems by modern techniques and then compared his solutions with those obtained by Newton, only to find that the latter were far superior.

This does not, of course, mean that Newton was a superman, above making any mistakes. His dabblings in alchemy are well known. His intuition on the nature of light was faulty. His opposition to the wave theory of light combined with his personal prestige prevented progress in the understanding of light. He was a loner, without any close friends and he was not an easy person to get on with. Today's scientist can be well aware of these negative aspects and still find Newton an inspiring personality. But this attitude is not one of worship.

About a year ago (Oct 4, 1997) I wrote in these columns of my experiences in planting a sapling descendent from the historical Newton's apple tree. To me, it is a symbol that links with history, with Newton and his law of gravitation. It brings thrill and inspiration to many visitors including schoolchildren. Neither the tree, nor Isaac Newton himself were meant to be subjects of worship, as some readers mistakenly thought.