

The decade of the nineties was in many ways a watershed for Indian science and technology. Science, or rather more accurately technology, once again started occupying a prominent role in public discourse. The launching of satellites, the telecom and automobile revolution, the missile program and finally, the crowning “achievement” of Pokhran-II in 1998 were all responsible for bringing science and technology (S&T) to the center stage. “Jai Vigyan” is now added to the forgotten sixties slogan “Jai Jawan, Jai Kisan” and the dons of the scientific establishment have become household names with Bharat Ratna and other awards being showered on them.

Amidst all this hype, it might be unfashionable, and dare one add, “unpatriotic” (in these times of Kargil and Kandhaar) to sound a dissenting note. But, unfortunately, the self-congratulations of the scientific elite are somewhat misplaced. No one can doubt that we have achieved much since independence in the field of S&T. But, given the amount of precious resources that have gone into the enterprise, the relevant question is whether this has been the optimal use of resources. With 40 laboratories and 25,000 people, how much of the work done by CSIR has been of any use to the industry or to the common man? It is not just a question of pure vs. applied research since a cursory look at any indicators of quality in science (like the citation index or awards) will show the abysmal state of Indian S&T. In a frontier area like biotechnology, even a country like Cuba, with all its economic problems, has emerged as a major producer of low cost vaccines. I don't think, given the amount of resources pumped into the dept. of biotechnology, our returns have been commensurate. Our software sector has yet to come up with a world class product. Instead, it specializes in body-shopping and now data entry, fashionably called fancy names like medical transcription or claims processing. Yes, our nuclear establishment has given us the bomb. The space and defense establishments have given us missiles and launch vehicles. But on the whole, the picture is dismal. A few design improvements for industrial products or a few patents do not justify the enormous investment made in the S&T since independence.

But there is another, more vital issue involved in this recent hype about science. This relates to shifts in our perceptions of science and a change in our heroes and icons in science. The fifties and sixties were also boom times for S&T. Those were the heady days of nation building and idealism was in the air. Science and Technology were supposed to help us leapfrog generations of backwardness. S&T were to be used for developing a prosperous, more “rational” and ultimately a more equitable society. These decades saw large hydroelectric projects, atomic reactors and the SITE project (arguably the world's first satellite transmission of television). The only difference being that instead of song and dance sequences, SITE was for fulfilling the information and educational needs of the hitherto ignored masses in rural India.

The idealism caught the popular imagination. No self-respecting student would be caught doing humanities or commerce. The best went to engineering and science. And stayed on in engineering instead of selling soap as the “whiz kids” of recent years have been doing. The heroes of this generation were people like Vikram Sarabhai, Homi Bhabha and M.N. Saha. These were the icons of a whole

generation of students in those glorious or, as some would say, innocent years of Indian science.

In this pantheon of worthies, Meghnad Saha is probably the most interesting and yet the least well known. Born in a very poor family, he was a brilliant astrophysicist and gave the famous ionization formula that is among the most significant advances in astrophysics till date. He was also interested in the use of science and technology for alleviating the problems of poverty and underdevelopment. For instance, during the devastating floods in East Bengal in the year 1922, he did a pioneering study of the harmful effects of railway embankments in blocking the natural channels and hence causing floods. He conceived the first multipurpose development project for the Damodar Valley along the lines of the Tennessee Valley Project in the USA. He also headed the Calendar Reform Committee that proposed the uniform calendar for all of India instead of the tens of different calendars being followed in different parts of the country. He founded the magazine Science and Culture, and published many articles on popular science as well as the politics of science. Interestingly, one such article rubbishes the claims of certain revivalists that all technology and science is contained in the Vedas!

But all such ideas were passe' by the seventies and eighties, which could well be called the decades of disillusionment. A moribund economy and widespread unemployment led to students opting for more lucrative careers in management and commerce. This trend continued till recently when once again science has become "fashionable" and scientists household names.

The difference is that now the icons are no longer the visionaries who thought of satellite television for rural education or worried about the day-to-day problems of the people. Instead, the heroes of today are the ones who give us Prithvi and Pokhran. The ideals of science for development seem to be forgotten or at best need to be parroted in speeches. For the student, one either does engineering to join the ranks of people getting stratospheric salaries in finance or if you are unlucky enough not make it to an engineering college, you could do science to make bombs and missiles. Never mind that this is in a country where more than 60% of the people do not have access to basic sanitation and close to 40% no access to safe drinking water, leave alone primary health and education.

This is not to decry the achievements of the bomb and missile makers. They have performed excellently in what they set out to do. One can't grudge them their success though it would be interesting to know the true costs to the country for the whole exercise as the recent CAG report has indicated. Nevertheless, it is a reflection on our times that the only people whom we can idolize are the creators of weapons of mass destruction.

It is true that certain events can have a cascade effect on the advance of science and technology in a country. A prominent example is the tremendous progress made in the United States after the Soviets launched the Sputnik. An overhaul of the science and mathematics education in high schools, granting incentives to science students and setting up of a large infrastructure were the result of having lost the Space race. Rapid progress cannot be made only on hype and glorification. What is needed is a broadbased strategy that stresses education and training. Primary, secondary and the University sectors need to be strengthened with

resources, creative strategies and incentives. And what is certainly required is a policy that emphasizes linkages of scientific and technical education with the needs of the vast majority of the population. Needs which are not as glorious as developing an ICBM but more down to earth like a more efficient wheel for the bullock cart or even a cheap technique to purify water.