

Indian Science at the Crossroads

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In the 19th c. the Indian elite bought the story (repeat story) that science was a creation of the West, and the West was dominant, since it had science and Indians lacked it. The remedy therefore was to imitate the West and become more like it. Many leading Indian reformist thinkers therefore *demand*ed a Western education instead of the Sanskrit colleges the British raj was then trying to set up. In the early part of the 20th c., science was pursued with missionary zeal in Calcutta University, from J. C. Bose to S. N. Bose, K. S. Krishnan and C. V. Raman. The senior D. D. Kosambi, who started the Pali department there, was very particular that his son, D. D. Kosambi, should not be weak in mathematics as he initially was, and it was mathematics that the junior Kosambi eventually took up as a profession.

Post-independence, Nehru gave a new twist to this story. In an attempt to eliminate the petty Raja-s and erect modern capitalists in their stead, he gifted chunks of the science establishment to scions of leading industrial families: atomic energy to Bhabha, space to Sarabhai, and CSIR to Birlas. Let us understand the idea here. Tatas were interested in diversifying into energy—especially the new technology of atomic energy which had become famous with the atom bomb. However, they lacked the resources to invest in developing the know-how. These resources were provided by the state. The only expected outcome of these resources was knowledge, which would be freely accessible to the managers, and would thus act as an invisible subsidy given by the state to promote accumulation of capital. Though the resources—and very massive resources at that—came from the state, the intent to privatise them was made amply clear by keeping these resources outside the ambit of the government system—even beyond the reach of questioning in parliament. Although even if regarded as state secrets, the relevant documents ought to have been legally declassified long ago, they continue to be kept secret, presumably to guard against any possible criticism. It is well known that four decades of promises—of plentiful and cheap electricity from atomic energy—have consistently proved to be false promises, and the future costs of cleaning up the radioactive waste are likely to be astronomical.

Compared to the pre-independence era when science was pursued as a mission, science in post-independence India became professionalised—an exercise in grabbing funds. What was needed for fund-grabbing was legitimisation, not deliverables or concrete results or even knowledgeability in science. The difference is best explained by means of a concrete example. Being a rich man, while in England, Bhabha could hire a refugee Jew, Heitler, to teach him physics. Bhabha's key scientific achievement relates to a paper he jointly authored with Heitler. After returning to India, Bhabha could never produce physics at this level, though only his most outspoken colleagues, like Kosambi, would give an opinion about his knowledgeability. His deputy Raja Ramanna, who later headed the department of atomic energy and was even Minister for S&T, exposed his ignorance of school-mathematics while responding to a question by this author. But since the stature of a scientist in India is decided by the funds he controls, and not his knowledgeability, we have big scientific institutions named after both these worthies! These are by no means the only two cases: most persons who are known as “scientists” in India have only been important science managers, and not real scientists who produced worthwhile innovation in science or who are even knowledgeable about science.

This situation where the top level of science management was insecure had a very unfortunate effect downstream: the most talented people were not tolerated, and only those who compromised (mediocres usually) were promoted by the system. Those talented scientists who did not emigrate, such as

Kosambi, were harshly eliminated by the system.

This process of excluding all talented and knowledgeable people from Indian science should be seen against the background of another characteristic of capitalist societies: most Indians (including the elite) are mostly scientifically illiterate, so they believe (or have faith) in science and scientists without actually understanding the science involved. For example, Stephen Hawking is seen as a new scientific messiah; when he visited Delhi, the intellectual elite flocked for a darshan. However, few people (none to my knowledge) in Delhi understand the mathematics of Stephen Hawking's singularity theory. This was brought home forcefully to me during a series of informal meetings on "science and society" in Delhi University, a decade ago, and a subsequent public debate with Roger Penrose the originator of singularity theory. Therefore, no one understood that Hawking used singularities to advocate creationism. (The bottom line of Hawking and Ellis' *The Large Scale Structure of Space-Time* is this "However, the actual point of **creation**, the singularity, is outside the scope of presently known **laws** of physics." [Emphasis added]) That is, in the concluding sentence of his serious book Hawking speaks of "the actual point of creation" where physical "laws" (instituted by God) would fail (leaving God free to create the world he wanted). However, the Indian elite, being scientifically illiterate, failed to spot the religious fundamentalism underlying what it considered as top-class science, just as ordinarily illiterate people often fail to spot the market fundamentalism underlying those they consider as top-class medical practitioners.

Thus, we have the dismal spectre of a scientifically illiterate society, where people have no understanding of what scientists actually do, where they place their trust in top science managers who have little knowledge of science, themselves, and will not tolerate those who have; where huge funds are allocated for science, but there are no tangible benefits for common people even after sixty years.

Under these conditions, India has evolved a unique methodology of science, which may be called the "Indian scientific method". Notionally, science is about continuously putting knowledge to test, about being sceptical, about relying on first-hand data and not authority etc. However, the "Indian scientific method" proceeds differently, since the objective is legitimisation (for funding), and not truth. Since India has always associated science with the West, the Indian scientific method is simply this: something is scientific if and only if it is socially approved by the West! Therefore, a decision regarding scientific truth can never be taken locally within India, it is invariably taken by measuring the social approval for it in the West! These measures of social approval may take various forms—demanding publication in "international journals" (read journals controlled by people in the West) etc. That is, the Indian scientific method consists of 100% reliance on Western social authority.

Science has thus become symptomatic of the dominant blind faith that the Indian elite repose in the West. This has dangerous consequences. During the above mentioned meeting on "science and society" at DU, I argued my thesis (later elaborated in the *The Eleven Pictures of Time*) that Hawking's singularity theory is aligned to the church doctrine of creation. This key theological idea that the world was created a short while ago is also suggested by the very title of Hawking's popular book *A Brief History of Time*: the big bang, we are expected to believe, was also the beginning of time. For those who found this too subtle, F. J. Tipler makes things perfectly explicit: he begins his book *The Physics of Immortality* by asserting that "theology is a branch of physics". Nevertheless, the Indian elite which cries itself hoarse about every real or imagined threat from "Hindu fundamentalism" did not, in all these years, utter a word against this sort of blatant fundamentalism which it swallowed as the scientific truth just because it came from socially respectable Western sources. This is just one consequence of conflating scientific truth with social acceptance by the West. Just as the Indian elite has exploited the illiteracy of the masses, so also this scientific illiteracy of the Indian elite can be exploited to push the

goals of soft power: goals that Huntington quite explicitly stated in his doctrine of “clash of civilizations”, which the Indian elite have yet to understand¹ as having something to do with science!

It is under these conditions, that India is today poised at the crossroads, where it dreams of becoming a “knowledge society”. The dreams themselves are very fragile, based on some recent income that has come in from the IT boom, and from the communication technology that has made it possible to relocate services and back-office processing to areas that are not geographically proximate. The dreams rest on very narrow advantages, such as greater facility with English, and these could evaporate if the Chinese or Vietnamese pick up English. The dreams could also evaporate if the recent financial meltdown leads to a recession, as it very likely will, despite the recent attempts to export war to stop it. Finally, the dreams could also evaporate if the technology growth slows down, as it well might because physical limits are reached by “Moore’s law”, and quantum computing proves to be infeasible.

However, that may be, what is of interest is to see the activity that these dreams have generated. Pre-independence, the introduction of a British system of education, to produce civil servants for the British government, destroyed the indigenous system of education in India. Since education was now seen as a passport to a cushy job, in post-independence India the elite made strenuous efforts to keep most people uneducated and illiterate. Resources could never be found for education, though they could be found for almost anything else.

The recent dreams of wealth have, however, changed this old scenario significantly. Industry now realizes that its comparative advantage lies in lower wages, and that, with increasing prosperity, the second or third-generation Western educated Indians are not likely to be available cheap anymore. Therefore, there is anxiety to take education to the mofussil, to widen the base of educated manpower that industry can draw upon, so as to maintain lower costs of labour. It is this anxiety which has led to the formation of institutions such as the National Knowledge Commission. There is also a realization that genuine scientific and technological innovation is needed to keep ahead in this globally competitive game.

While this represents a welcome historic opportunity for a change in the existing structure, it can also tie us down to a longer-term of slavery. To understand the two points of view, consider the IITs. They are widely regarded as symbols of excellence (although I personally refused to join after being selected for IIT: JEE, and when I did join IIT: Delhi later, I left within 3 months, after finding the standards of the faculty abysmal there). On the other hand, a very significant chunk of the IITians have gone abroad or offered their managerial acumen to MNCs in India. The IITs were started with the help of foreign countries just for that reason. So informed people have been laughing for decades about the huge subsidy that the Indian government pumps in to provide cheap skilled labour abroad! However, our bureaucrats boast about the IITs, since our index of achievement is Western social approval, and not prosperity of people in the country. The state now aims create many more such institutions. The National Knowledge Commission too continues to rely on the same old experts who saw everything from the standard of Western social approval. From this perspective, there is a serious danger that the recommendations of the National Knowledge Commission will work like Macaulay 2 (as I have called them) and entrain Indians to several future generations of slavery through soft power of the West. The imminent possibility of a recession has created some breathing space for a reconsideration of these issues.

¹ For a quick overview of how religion uses the credibility of science in the quest for soft power, see my article “Benedict’s Maledicts”, *Indian Journal of Secularism*, 10(3) (2006) pp. 79-90. The previously published version in ZMag is available online at <http://zmag.org/znet/viewArticle/3109>. [Might need to click on “printer friendly version”.]

So the basic issue boils down to this: how can we use the currently prevailing situation to the advantage of people instead of the elite? Regardless of the caste system, the Indian ruling elite has always been willing to sell the rest “down the river”, for the sake of its petty advantages. Therefore, as a first step we need to generate a different standard of accountability suited to the people not the elite, where the achievements of our scientific institutions are judged at home, by the value they produce for the people, and not by the unacceptable standard of Western social approval that they might generate, and which our bureaucrats and technocrats are so fond of using. We need to bring in mandatory legislation like RTI to ensure appropriate accountability, and transparency in the system of science funding and appointments, which are today decided almost exclusively through cronyism, though casteism and even nepotism also play a role.

Moving to pragmatic and people-oriented standards rather than the Western-oriented standards of the elite will hopefully also restore the idea of science as relating to our immediate surroundings, both social and natural.