

obviously the most significant innovations, if they are going to be broadly applicable, cannot demand a super-specialized tool (again excepting big science). Hence, initial experiments can be conceived using what is at hand which is plenty. Second, there is today an enormous surplus of under-used high-powered expensive tools in every major University including one or two in India. Why should sophisticated TEM's or Crays, costing \$ 2 million each, not be

used 16–24 h/day? In the US using a few letters and phone calls, a really well-formulated experiment can be done on someone else's machine for the zero-cost expedient of putting a colleague's name on a paper. Cooperation and co-labouring is the name of the game.

The rewards for using such strategies to get purposeless science back into the picture are enormous. This kind of systems-judo, using the momentum of the system against itself, is most important to restore

the sense of autonomy of the scientist, and remove her/him from under the heels of the oppressing system including funding and peer review.

RUSTUM ROY

*Evan Pugh Professor  
of the Solid State Emeritus,  
The Pennsylvania State University,  
102 Materials Research Laboratory,  
University Park, PA 16802, USA*

## The condition of science in India – Further thoughts

I could not agree more with Vachaspati Pandey (*Curr. Sci.*, 1999, **77**, 1007–1008) about the causes for the pathetic situation of science in India. With a Ph D, numerous research papers in national and international journals of repute (if papers are representative of one's capacities and efforts), and considerable postdoctoral experience acquired and currently being acquired, I am expecting to be on the road next year – unless I find another postdoctoral position elsewhere. A permanent position in the capacity of a research scientist in an Indian research/academic institution (even the poorest University department) is only a dream, as it is for hundreds of young scientists in my position. And, as postdoctoral fellowships in the Earth Sciences are not offered by any institution in India other than Physical Research Laboratory (PRL) Ahmedabad, where I am presently employed, next postdoc would have to be abroad. If I do not wish to go abroad, then I may have to compete with a hundred others for a University lecturer's post (if there is any open position notwithstanding reservations, etc.), or one of those positions called 'research associate-ships', with every possibility of helpless and rewardless exploitation.

We are victims of a vicious cycle. When we graduated, we were told that B Sc would not get us anywhere; we should do an M Sc. Still with no job prospects, we did a Ph D, thinking that it would be helpful. Many of us have done a Ph D due to a liking for science, not just to earn a living. Even after that we don't get a job anywhere (is it not suffi-

ciently ironical already?), so we do a postdoc, and even after our first postdoc there is no job, so we do a second postdoc, and so on. And when we have two or three postdoctoral experiences added to our CV, we *may* be considered for a regular position somewhere back in India (why would we come back?) We had rather sit at home after completing our Bachelor's and done something more useful (some like to say 'work is its own reward' – quite appropriate for Indian science, because in Indian science there is anyway no other reward).

If someone who has been doing postdocs abroad and is happy with both the science he has been doing and the materialistic benefits he has got abroad, does not return to India in the future, India has lost him forever and the science policy makers only are to blame. On the one hand, people talk about inculcating a love for science in school children and of the noble task of popularizing science. Whereas there are awards for science popularizers, there aren't jobs for you if you want to *do* science and are also competent enough. Small wonder therefore that many of us leave science after Ph D and join software companies. I am not suggesting a permanent job to every Ph D student that passes out of every science department in the country. Some are totally undeserving, incompetent and notorious, with chief interests not even remotely connected with scientific research or academics – but so are some of those enjoying permanent positions in various disciplines and departments.

While I was Ph D student at the IIT Bombay (1994–1998) I had several colleagues whose stipends were paid by the CSIR. Although Ph D stipends (like all salaries in India) should be monthly (and may be monthly as per the rules), I found my fellow-students receiving lumpsum amounts once in six months or once in ten months. Such inhuman treatment of promising young scientists and students, effectively a violation of human rights, speaks volumes about the way science is being 'encouraged' in this country. I would like to know if the top authorities in the CSIR also draw their salaries once in ten months.

Any kind of reservation for any scientific position needs be legally banned forever, as perhaps no other policy of the Indian Government has done as much harm to the quality of education in India and the quality of its graduates and postgraduates and doctorates than the reservation policy. It is not uncommon to find advertisements from major research institutions which announce available research associateships or regular permanent positions: 'Two positions available, one reserved for SC, one for ST'. Unless this ludicrous and criminal system is stopped, I foresee the country running out of good, creative, dedicated scientists in another decade or two, and Indian research institutions packed with mediocre scientists with little competence and liking for research, doing mediocre bread-and-butter work (or no work) and drawing handsome salaries.

I really wonder how the custodians of Indian science, far from confronting

these issues and carrying out their responsibilities in shaping the future of Indian science, shed crocodile tears while speaking about issues like India's (alleged) brain drain and our (alleged) lack of patriotism, and the poor condition of Indian science and the poor international recognition currently available to it. India spends millions of rupees to educate its youth, and we acquire degrees from Indian institutions, and then flee the

country at the first available opportunity after attractive salaries and material comforts abroad. Could anything be farther from the truth?

The prominent journal *Science* recently devoted a large part of a recent issue to the postdoctoral scene and conditions of postdoctoral fellows in USA and Europe. *Current Science* can similarly bring about a lot of discussion, awareness and improvement in the current monstrous scene.

In the meantime, we young, bright, dedicated but unemployed-and-to-remain-unemployed scientists must prepare to either leave India, or leave science.

HETU C. SHETH

*Earth Sciences Division,  
Physical Research Laboratory,  
Navrangpura,  
Ahmedabad 380 009, India*

## The importance of debating issues in 'personal squabbles' for the Indian scientific community

It is pleasing to note that *Current Science* is sensitive to serious issues involving norms of behaviour of individuals in an institution. The denial of permission to Jayaraman to attend a meeting is a good relevant case which Vidyasagar and Karandikar<sup>1</sup> label 'personal squabble' not worthy of debate in *Current Science*. The authors, in the process, unwittingly imply that the Director has settled some personal score as would be considered natural in any personal squabble. The confusion, however, is genuine and needs open discussion for others to appreciate the dilemma of the Director in the act of protecting the interest of the institution and help shape their perception of what is right or wrong in such decisions.

Two recent letters<sup>1,2</sup> raise very important questions of concern to the scientific community in India. It is sad to have to point out though that the frustration accumulating from such very personal squabbles has corroded the quality of Indian science.

The suggestion<sup>1</sup> that *Current Science* should not take up issues which are neither 'current' nor 'science' could not have been meant to be taken seriously. Shall we then not discuss Raman, Bhabha, Saha and others who established well-known institutions? Shouldn't we inspire and caution the future generation by discussing such matters because these are not 'current' and also not textbook 'science'?

The two letters<sup>1,2</sup> have not even attempted to address the question as to what constitutes an institutions's interest. A simplistic definition conjured up from the meanings of the two separate words 'aca-

demic' and 'freedom' is all that Vidyasagar and Karandikar seem to understand of the idiom phrase 'academic freedom'. Meanings of phrases are not always the regular logical sums of meanings of individual words when they stand alone, but are fixed by usage. By requesting permission to attend the meeting, Jayaraman was respecting the institution's norms, not begging his share from any custodian of academic freedom. *For, that freedom cannot and should not be submitted to servitude towards any external authority, but guarded carefully at any cost by the dictates of the individual's own conscience.*

Tiwari<sup>2</sup> points to the strict regulations in institutions in the West that could have cost Jayaraman his job. It is, however, extremely important to realize that the West has earned this moral right by recognizing the supremacy of an individual's academic freedom. The following passage by Michael Polanyi<sup>3</sup> should enlighten our academicians pleading Western mentality for passing judgements on issues they hardly seem to comprehend:

'Sovereignty over the world of science is vested in no particular ruler or governing body, but is divided into numerous fragments, each of which is wielded by one single scientist. Every time a scientist makes a decision in which he ultimately relies on his own conscience or personal beliefs, he shapes the substance of science or the order of scientific life as one of its sovereign rulers. The power thus exercised may sharply affect the

interests of his fellow scientists. Yet there is no need for a paramount supreme power to arbitrate in the last resort between all these individual decisions. There are divisions among scientists, sometimes sharp and passionate, but both contestants remain agreed that scientific opinion will ultimately decide right; and they are satisfied to it as their ultimate arbiter. Scientists recognize that, inasmuch as each scientist is following the ideals of science according to his own conscience, the resultant decisions of scientific opinion are rightful. This absolute submission leaves each free since each remains acting throughout in accordance to his own conviction. A common belief in the reality of scientific ideals and a sufficient confidence in their fellow scientists' sincerity thus resolves among scientists the apparent internal contradiction in the conception of freedom. It establishes government by scientific opinion, as a General Authority, inherently restricted to the guardianship of the premises of freedom'.

Unfortunately, both the letters resent this supremacy and accuse *Current Science* for having encouraged such a debate. On this count alone, by the Western yardstick they have themselves chosen an untenable position. You cannot have it both ways—deny academic freedom by use of the institution's authority vested on an administrator, and also not openly debate the issue in the scientific community!

To many of us who look Westward for guidance, it may be a surprise that the