

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.

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## 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 institution'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



tight control on ethical codes as practised in the Western scientific community is maintained largely by open debates without even sparing the names, however eminent one may be. I refer readers to just one recent instance devoted to the creationist–evolutionist debate<sup>4</sup> in which Richard Dawkin and Stephan J. Gould among others were involved. Dawkin<sup>5</sup> opens his comment with the following:

'A cowardly flabbiness of intellect afflicts otherwise rational people confronted with long-established religions (though, significantly not in the face of younger traditions such as Scientology or the Moonies). S. J. Gould (1997) commu-

nicating in his *Natural History* column on the Pope's attitude to evolution, is representative of a dominant strain of conciliatory thought, among believers and nonbelievers alike . . . '.

Surely, Vidyasagar and Karandikar would label it as 'personal squabble' between Gould and Dawkin. Tiwari may suspect it being 'solely at the editor's initiative' which could even be true. But can they deny its influence on the behaviour of scientists, young and old, going astray?

1. Vidyasagar, M. and Karandikar, R., *Curr. Sci.*, 1999, 77, 731–732.

2. Tiwari, S. C., *ibid*, 732–733.
3. Polany, M., in *Science Faith and Society*, The University of Chicago, 1964, pp. 63–94.
4. The Pope's message on evolution and four commentaries, *Q. Rev. Biol.*, 1997, 72, 377–399.
5. Dawkin, R., *ibid*, 397–399.

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## What is genius?

Ramaseshan's article on Fritz Haber is well written, informative and thought-provoking (Ramaseshan, S., *Curr. Sci.*, 1999, 77, 1110–1112). Clearly, scientific talent and morals are entirely unrelated issues. However, I do find the last statement 'any number of talented chemists could, and no doubt would, have done the same work before very long' a little jarring. It brings to mind Colin MacLeod's statement about the discovery of the structure of DNA. He wrote, in a note to Maclyn McCarty, 'Some day perhaps you will enlighten me about the earth-shaking significance of the double helix, etc. If it hadn't been worked out on a Tuesday, it would have happened in some other laboratory on Wednesday or Thursday' (Friedman, M. and Friedland, G. W., *Medicine's 10 Greatest Discover-*

*ies*, Universities Press, Hyderabad, 1999, pp. 200–201).

It is ironical that the above statements question the genius of what are among the greatest scientific advances of the century. Is it fair to do so? The fact remains that numerous scientists had the same opportunities – but it was Haber (and Crick and Watson) who beat the others to the finishing line. Most endeavours in science – and other activities – do require a slice of luck and timing, in addition to talent and dedication. No one, for instance, would make a statement to the effect that if Roger Bannister had not run the first sub-four minute mile, someone else would have! In the same vein, we can be quite certain that if Vesalius had not dissected the human body and corrected Galen's mistakes and

if William Harvey had not been the first to introduce the principle of experimental method in science, *someone else would have soon done it!*

Indeed, Haber's discovery of ammonia synthesis process provides adequate proof for the statements 'Genius is 99% perspiration and 1% inspiration', and 'Necessity is the mother of invention'. I suggest that genius lies in being the first to recognize or discover something 'simple' that could have been discovered by many more people – but was not!

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## Measurement of copper and mercury

The article 'Total dissolvable copper and mercury . . . off Kalpakkam, Bay of Bengal', by K. Selvaraj (*Curr. Sci.*, 1999, 77, 494–497) shocked me. I find the article to be erroneous on many counts. The concentrations of the two metals reported in coastal waters of the Bay of Bengal were extremely high. The occurrence of

such levels, if at all, would render the whole area 'lifeless' and can create an environmental catastrophe, similar to Minamata tragedy. The Minamata Bay in Japan, had witnessed severe mercury poisoning of fish, which led to deaths and crippling of several humans who consumed them.

Serious errors in measurements of these two metals might have occurred due to the following:

1. For measurements, the method of Mentasti *et al.* (1989) was used, which advocates different pre-concentration methods: The author has used APDC/