

war which had cost America her real sacrifices. The troop transports went off from the West Coast, and returned there with the wounded and the victims of Asiatic diseases. When the first news reports reached Los Angeles, people knew that this meant the end of the detested war, the return of sons and brothers. But the great city gave an astonishing display of grief. The present writer heard bus-conductors and sales-girls in the fruit markets express nothing but horror. This

was victory; but there was a bitter savour of defeat about it. Then came the secretiveness of the politicians and the military about this gigantic source of energy – secrecy which infuriated the intellectuals. The freedom of research, the exchange of information about discoveries, the international fellowship of scientists were clamped down on by officials who were deeply mistrusted. Great physicists fled precipitately from the service of their militaristic government;

one of the most celebrated took a teaching job which compelled him to waste his working time at teaching the most elementary fundamentals of physics, in order not to have to serve under these officials. It had become a disgrace to discover anything.'

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Frustrations of doing science in India

Hetu C. Sheth (*Curr. Sci.*, 1999, 77, 1385–1386) has highlighted the pathetic state of young research scientists in India. The situation is extremely bad in earth sciences as there are no job opportunities for fresh PhDs in any field; teaching, research or industry. I know about a dozen PhDs moving from pillar to post, changing from one project to another looking for some research associate position. I fully agree with his viewpoint that for shaping the future of Indian science, the reservation policy of Indian Government should be legally abolished.

The future of Indian science is at stake if remedial steps are not taken to stem the rot at the university level. Indian universities are starved of funds and there is a total ban on filling up of vacant positions due to financial crunch imposed by states. Research support is available only from funding agencies like UGC, CSIR, DST, DAE, etc. in the project mode for a limited period of 3–4 years. It is a frustrating experience to carry out research in the project mode both for the Principal

Investigator (PI) and his team consisting of JRF, SRF or Research Associate. On the average, a project is sanctioned after the gestation period of 2 years including peer review and some revisions. Almost one year is lost in calling for quotations, recruitment of staff, purchase of equipment and getting the sanctioned grants released by the university. The funding agencies insist on following the university rules which vary from institution to institution. Since the financial powers are with the Registrar or Vice Chancellor and not with PI, it causes delays, unnecessary harassment and the research work suffers. Why cannot the funding agencies empower the PIs as in Europe and America for efficiently running the research projects. No wonder, 50% time of a PI is wasted in clearing the bureaucratic hurdles.

Hetu's remarks are noteworthy regarding the inordinate delays in payment of CSIR stipends to research staff. I have experience of dealing with various funding agencies during the last 25 years.

They have all one thing in common: inefficiency. A recent example of a BRNS-funded project is illustrative. The sanctioned grant due in April 1999 was released in January 2000, after a lapse of 9 months, and the project will be over in March 2000. How can the targets be achieved when the research staff is not paid any remuneration for so long? The situation is not much better in projects funded by DST, once considered to be the most efficient agency. Our research associate has not been paid salary since September 1999 and despite many reminders and personal visits, the bureaucratic hurdle is yet to be cleared. All PIs have similar tales of woe and frustration to share but keep mum lest they may annoy their benefactors!

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More suggestions to overcome problems faced by post-docs

I wish to draw the attention of science administrators and scientific research funding agencies to the plight of scientists like me who after relentless hard-work are still without any job or fellowship to support themselves and their families. There may be several other sci-

entists with a good educational career, highly acclaimed doctoral thesis, 10 to 15 years of post-doctoral research experience and several internationally cited papers in refereed journals. There is a tendency on the part of CSIR and other funding agencies to reduce post-doctoral

fellowships and their tenure periods. The tenure of existing Pool Scientists is being terminated even though the scientists may not have got any job. The Government fails to find a solution for such a frustrating problem faced by the most brilliant segment of the society.

I have a few suggestions to overcome this problem.

(1) All science fellowships should have an option of contributory 'pension fund', i.e. equal contributions from the funding agency and fellowship money should form a 'principal' out of which the 'interest' should become pension money. Thus, scientists after 10–15 years of fellowship will get a reasonable pension for life. They can, of course, encash the entire money on getting a job. (2) All RAs and Pool Scientists who are having

5 years or more of post-doctoral research without any job should be provided with 'Maintenance Allowance' and be attached to National Labs/Central or State Universities. The position which they occupy should be comparable with Lecturer/Reader grade. (3) The service commissions and other recruitment bodies should have 'age relaxation' for the above categories of post-doctoral scientists. (4) For dedicated brilliant scientists having continuous international publications, some kind of scheme may be started in which the upper age limit may

be up to 55 years with a provision of promotion at 10 years' interval.

The above welfare scheme will give meaning to 'Jai Vignan' being added by our Prime Minister to the national slogan.

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Initiatives to nurture basic science

The editorial 'Visions and nightmares' (*Curr. Sci.*, 2000, 78, 5–6) could not have come at a more appropriate time, highlighting the decreasing efficiency of science administration of the country in discharging its duties of nurturing science. Basic science, by nature, is individualistic and it has to be supported at the individual level after the necessary peer review.

Without going into the jargon that has become fashionable and even mandatory

to elicit attention, India would be doing great service to the cause of science if it is seen that the fate of any submitted project proposal is decided in about 6–8 months by funding agencies and that the first installment for the approved projects is released for the first two years. I would like to submit that this *is possible* if the scientists themselves cooperate and finish their review job in a week. It is possible if most of the committee deliberations are

done through electronic media. It is possible if the role and responsibilities of Finance Officers in various agencies are redefined.

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'Mediocre' research on the rise

Apropos the editorial 'Footsoldiers of science' (*Curr. Sci.*, 1999, 77, 1225–1226), I have a few additional comments based on my personal experience. First I must wholeheartedly support the editor's view that progress of science depends on post-doctoral research contributions. Research can at best aspire to be mediocre unless the questions asked have an element of daring in them. Invariably, the risk of failure is also greater. With the graduate student as the main workforce, two options emerge: eschew all risk and settle for 'mediocre' research or be brave and risk disenchantment amongst your graduate students who are emotionally and technically not mature enough to handle the trauma of failure.

In my view, the tendency to eschew risks and settle for the safe PhD pro-

gramme has been on the rise not least because the modern-day student is more aware of his/her career options and is able to exercise them. Clearly, the best will not choose a career in science if the risks associated with scaling the first hurdle are significant.

Another reason and this applies to research in industry as much as in academia, is that when venturing on a particularly ambitious target, the leader does not want to be burdened with the responsibility of tending to the longer-term career aspirations of the team members (which is the case if all the team members were permanent employees). Such concerns would not only circumscribe the ambition but may well lead to suboptimal choice of the plurality of disciplines one may need for effective execution of the project.

From the perspective of the postdoc, it is important to use this opportunity to develop a key competence – working independently. The four levels of work in science are: to carry out instructions, to work independently, to work through others and to do direct research.

The most productive and critical phase for the young researcher is the period of learning to work independently. It is trivial to comment that if during this period all that he/she learns is how to secure a permanent job, one can only pray for the future of science.

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