

## India's nuclear tests and its consequences

This is in response to the correspondence entitled 'Nuclear weapons' (Udgaonkar, B. M., *Curr. Sci.*, 1998, 75, 871). Whereas it may seem a little late in the day to reopen discussions on India's nuclear tests carried out seven months back, we think it is appropriate now to look backwards to get a better perspective of the event and the consequences thereof.

Udgaonkar is right when he says that India's unrelenting efforts towards nuclear disarmament were disregarded and dismissed by countries that had carried out innumerable tests and possess more than 20,000 nuclear warheads. The so-called P5 countries maintain nuclear hegemony by denying the right to possess nuclear deterrents to other countries that may feel threatened by neighbouring countries possessing nuclear arms. The general feeling of those who favoured India's nuclear tests was that the P5 countries, the US in particular, would pay heed to India's demands for nuclear disarmament only when voiced from a position of strength, demonstrated by nuclear tests. This feeling was exacerbated by our helpless rage against US hegemony.

Now that India has carried out the tests and has demanded to be recognized as a nuclear weapon state, it may be worthwhile to take stock of the consequences of these actions. Two questions in particular need to be addressed.

1. Has our international standing improved as a result of these tests?
2. And more importantly, has our security improved?

The answers to both these questions are, unfortunately, in the negative.

When India refused to sign the CTBT and NPT from the strong moral position of having shown exemplary restraint despite her nuclear test capability, her firm stand was resented by the US but was appreciated by other countries most of which were coerced into signing these treaties. Recently in the UN, 96 countries condemned India's and Pakistan's nuclear tests, 32 abstained and only 4 countries including Bhutan supported India. Japan, a long-standing trade partner of India, reacted most violently against India's conducting the recent nuclear tests. India's long letter to President Clinton justifying the tests and Jaswant Singh's endless meetings with Talbott to redeem India's lost position do not enhance India's prestige.

India's security has plummeted since our nuclear tests. Our relations with Pakistan and China, which were slowly improving, have been severely jolted, while our defence capabilities have not improved, on the whole.

The concept of deterrence has little relevance against terrorists (Commander Robert Green, in *Voices Against Nuclear Weapons*, Tamil Nadu Science Forum, August, 1998). Nothing deters them, and thousands of miles of common border and smaller nuclear weapons make nuclear blackmail a distinct possibility.

Lastly, it is common knowledge that the ability to conduct a few tests is not the same as attaining the capability of using nuclear weapons for defence. 'To

facilitate the efficient and deliberate deployment or/and to prevent any accidental deployment of nuclear weapons, we need to have an extremely efficient Command, Control, Communication and Intelligence system' (Ramdas, L., *Frontline*, 4 July 1998). We are far from attaining this capability and a conservative estimate of nuclear weaponization is Rs 50,000 crores over ten years. Can we afford such massive expenditure for an illusory deterrence programme?

As time passes we may have to accept the fact, if we have not already done so, that despite the provocation of the US strong arm methods and ill-perceived ideas about nuclear threats from our neighbours, we would have been wiser to continue with our peaceful nuclear policy and with the leadership of the non-nuclear countries. This status we have lost, and the door of the nuclear club has been slammed on our face.

S. G. DANI  
ASHOKE SEN\*  
D. P. SENGUPTA\*\*  
DIPTIMAN SEN\*\*

*School of Mathematics,  
Tata Institute of Fundamental Research,  
Homi Bhabha Road,  
Mumbai 400 005, India*

*\*Mehta Research Institute of Mathematics  
and Mathematical Physics,  
Allahabad 211 019, India  
\*\*Centre for Theoretical Studies,  
Indian Institute of Science,  
Bangalore 560 012, India*

## CSIR fellowships play hide and seek in universities

In this age of high-tech wizardry you may predict the onset of a cyclone, an impending earthquake or an about-to-erupt volcano, but not the workings of funding agencies and their acolytes, the disbursing universities. At the outset let the adage be — 'Never do research at any level in any Indian university, particularly the University of Kerala, with a CSIR fellowship'.

My travails (the rule rather than the exception) started with my submitting a CSIR-Research Associate fellowship claim to the University of Kerala in July, 1998. The university took its own sweet time to prepare a bill and send it to the CSIR Accounts Division. After an inscrutable four months the elusive cheque arrived on 26 October 1998. But its arrival was as shrouded in secrecy by the uni-

versity as the pre-Pokhran scenario was. The university resorts to hoarding of cheques and never makes an entry in any register about its receipt. Sheer desperation gives way to elation when your stars get aligned in the 'discover-cheque mode'. And that day is the day the university marks as the date of receipt of the cheque. In my case it happened to be as early as 17 November 1998. The next stumbling

block was that the cheque and the accompanying statement did not make it explicit as to whom the money ought to be paid. The 'cheque receiving section' is reluctant to act since the 'bill preparing section' is located 'far away' in the next room and has not yet revealed these secrets. But in the university nothing happens of its own volition. Divine intervention too won't help here. Nevertheless, the cheque serenades down the road to the wrong cash section and finally to *THE* cash section; from where with amazing agility it hops over, on the same day, to the State Bank of Travancore (SBT). This one cheque is sure to win a frequent flier award, for back it goes to its progenitor, the Syndicate Bank, NPL Campus, New Delhi. Persuasive arguments about government cheques,

CSIR account means huge funds, etc. cut no ice in the SBT. Hopefully by the end of December the cheque would have redeemed its honour and would be worth much more than the pale pink paper on which it is scribbled. Till it is credited I am keeping my fingers crossed and maintaining my family of three on a shoestring budget.

Even when it is credited, it would be another month before the university order condescendingly permitting me access to the amount comes out. And it would be a fortnight before the university audit passes my bill claiming the arrears and issues another cheque. And if I am the first to the post I might be lucky enough to cash it, else it would be another couple of days of uncertainty in which you try to make ends meet and make outstanding

contributions to earth science and try to continue subscribing to *Current Science* and also try to take snide remarks on a tax-free bonanza in your stride.

We in India are riding the crest of infotech, space science and nuclear science, but the troughs are too deep to fathom and many a soul gets mired in it, never to come up again.

Incidentally, I joined as CSIR-RA on All Fools' Day, 1998, but then it doesn't really matter!

A. P. PRADEEP KUMAR

*Department of Geology,  
University of Kerala,  
Thiruvananthapuram 695 581, India*

## Quality of research in science

The article entitled 'Let us do justice to science' (*Curr. Sci.*, 1998, 75, 78-79) and the two subsequent elaborations (*Curr. Sci.*, 1998, 75, 750; 979) bring to focus a number of serious problems leading to the questionable quality, in general, of research in India. Major among them are: (i) Poor quality of Ph D theses which include routine, repetitive and imitative research. (ii) Absence of discrimination between a good researcher, a good teacher and a good teacher-cum-researcher in career advancement. (iii) Contrived evaluation of Ph D thesis. (iv) Indiscriminate admission of candidates to Ph D, without adequate evaluation of research aptitude, in general.

However, a few institutions have mostly been successful in countering those problems. Consequently, not only the Ph D thesis of those institutions satisfy quality standards but quality papers from them get published in international journals also. The logical question that follows is: Why is it that such institutions are not replicated or other institutions improve themselves to such standards? As often happens, logical questions evade logical answers. However it would be introspective to analyse the existing situation.

I shall consider the research environment in agriculture. Not only public funded institutes but also universities are engaged in research and teaching. Such

institutions, follow the pattern of land grant universities in USA for their Ph D programmes. All State Agricultural Universities (SAUs) and premier research institutes of the Indian Council of Agricultural Research (ICAR) which enjoy a deemed university status come under this category. An advisory committee is set up for each Ph D/M Sc student and the student has to complete a set of courses in tune with his field of research. Performance in the courses is evaluated through a set of examinations. The question papers are usually set by the course instructor(s) and a grade is awarded which carries a grade point. A student has to obtain a minimum grade point average (average of grade points weighted by the number of the credit hours per week of each course taken by the student) before he/she becomes eligible to proceed to work for his/her Ph D/M Sc thesis.

Conventional universities (to contrast them from Agricultural universities) which are governed by UGC regulations follow the British system. A student who gains admission to Ph D has no mandatory course work to do but can work for his thesis. In other words, the thesis provides total fulfilment of the requirements of a Ph D degree. In contrast, in the land grant system, Ph D thesis provides only a partial fulfilment.

Right from admission, the system comes under various constraints:

In many institutions, only those with B Sc (Agriculture) degree are eligible for admission to M Sc/Ph D. One argument is that universities offering Ph D under the British system do not take Agricultural graduates. Thus teaching and research are geared to the standards of B Sc (Ag) which vary widely across universities. In addition, in premier research institutes, there are various kinds of quota not coming totally under the rigours of admission criteria. However, admission is selective based on a competitive entrance and an oral examination mainly in premier research institutes, and varying standards exist across SAUs. Standards for research scientists to be eligible to become faculty members also vary across institutions. As has been repeatedly pointed out, the absence of weightage for career advancement for a good teacher and good teacher-cum-researcher continues to be a crucial dampener.

There are scientists who guide Ph D students; but it is not uncommon to find a few faculty members who do not teach any course. The thesis problem is selected around routine research tending to be lackadaisical in output. Naturally, academic excellence and originality in research remain to be conscientiously promoted.

While agriculture is a major sector of the country, job opportunities are grossly incommensurate with the number who