# Nuclear tests

Ever since India carried out the Shakti series of nuclear tests in May 1998, several letters appeared in various newspapers, magazines and journals including *Current Science* expressing criticism. These perhaps give the impression that the scientific community as a whole is opposed to the tests. We do not think that this is really the case: in fact we believe that there is a substantial body of scientists who subscribe to the views we express below.

In an ideal world, no one would have any nuclear weapons, and any nation that initiates the process of nuclear weaponization can rightly be condemned as a 'rogue nation'. However, given that five nations have arrogated to themselves the right in perpetuity to remain as the only nuclear nations, it seems to us somewhat strange that people from this country should join the chorus of hypocritical condemnation by the West and the Chinese of India's nuclear tests; the more so when these voices were far from heard when tests were carried out by France and China before they acceded to CTBT. Some of the more objective criticisms directed against the Indian tests stem from one or more of the following premises.

**Premise No. 1.** Before May 1998, India was in a strong moral position by refusing to sign the NPT and CTBT, and at the same time, refraining from carrying out any more tests in spite of its 'proven' nuclear capability. By conducting the second round of tests in 1998, India has forfeited its position of moral superiority.

There is little evidence that our earlier non-testing had the kind of impact suggested in this argument. The so-called moral superiority of India seems to us at best an Indian perception, perhaps no more than a comforting myth. In any case, this moral superiority does not translate into any ability to influence the world at large: we lost out to Japan, a G7 nation, in our bid to get a non-permanent seat in the Security Council before the nuclear tests. While many of us in India may pride ourselves on our restraint after the test in 1974, as an outcome of a principled policy, it is far from clear that such a view is shared by the international community. Our restraint has been, more often than not, perceived as the result of weaknesses – economic, scientific, technological, as well as political. We should also not read too much into the fact that various nations voted along with the USA and UK in condemning our tests. The same countries were earlier coerced into signing the NPT and CTBT, whose discriminatory aspects they were well aware of; thus it is not surprising that these countries voted to censure India, a vote which costs relatively nothing. Need we be overly sensitive to moral pronouncements made at international fora that have virtually endorsed the recent Anglo-American actions in Iraq.

**Premise No. 2.** India's relations with its two major neighbours, namely, Pakistan and China were slowly improving. However, ever since the tests, the relations have become strained, and any chance of a permanent lasting peace has been lost.

In the immediate aftermath of the tests our relations with Pakistan no doubt suffered a set-back, but after the recent initiatives it would appear that any lost ground has essentially been retrieved. The fact that the two countries have to deal with each other now as nuclear weapon states need not affect adversely any move towards a more friendly relationship. China has actively contributed to the deterioration of our security environment even if there may be some merit in suggesting that this need not have been emphasized as the reason for our nuclear tests. There seems to be an exaggerated concern among some of our more articulate compatriots about Chinese sensitivities, but they do not seem to be unduly worried about Chinese disdain for Indian perceptions and interests. Improvement in relations cannot be on the basis of unilateral concessions. In any event things definitely seem to be improving (see *The Hindu*, 3 March 1999 or *India Today*, 8 March 1999).

**Premise No. 3.** To facilitate the efficient and deliverable deployment or/and to prevent any accidental deployment of nuclear weapons, we need to have an extremely efficient Command, Control, Communication, and Intelligence system.

If we need 'an extremely efficient C^3I system', we will develop one. Moreover, such a C^3I system is needed in any case, whether the weapons of our armed forces are nuclear or non-nuclear. Thus the need to develop a C^3I system cannot be used as an argument against the induction of nuclear weapons.

**Premise No 4.** A poor country like India cannot afford the huge expenditure. The cost of weaponizing our nuclear capability has been put at Rs 50,000 crores over 10 years invested in weaponization.

Two points need to be made here. (i) The estimate of Rs 50,000 crores includes Rs 20,000 crores for four nuclear-powered submarines, which are a side issue to nuclear weaponization. In other words, India will have to opt for nuclear-powered submarines, even if they carry only conventional, non-nuclear weaponry. (ii) Rs 50,000 crores over ten years is Rs 5,000 crores per year, or a 10% increase in the defence expenditure, assuming no matching reductions in conventional forces. An important reason why US, Russia and other P5 nations went in for nuclear weapons in a big way is the perception that nuclear weapons are cheaper than conventional weapons for the same level of deterrence. Even if one were to assume that no money will be saved otherwise, an increase of 10% of our defence budget, which translates into an additional 1.5% increase in the overall budget, or 0.1% of the GDP, is easily justifiable in the context of national security. The US spends 4% of its GDP on defence, though it has two oceans on the east and west, and two weak neighbours to the north and the south. China and Pakistan spend even more on defence, as a percentage of the GDP.

Summarizing, we would like to say that nuclear testing and weaponization are the realistic responses that this country needed to make in the context

of our security environment and the self-seeking totally discriminatory nuclear weapons regime that the P5 nations seek to impose on the world. If deterence is good enough reason for the five to expand and improve their already elaborate nuclear arsenal, it is an equally good reason for India to test and weaponize.

R. BALASUBRAMANIAN*
RAJEEVA L. KARANDIKAR**
M. S. RAGHUNATHAN†

*Institute of Mathematical Sciences, Chennai 600 113, India
**Indian Statistical Institute, Delhi 110 016, India
†Tata Institute of Fundamental Research, Mumbai 400 005, India

# Strategy for promoting science

This is with reference to the editorial 'Strategic follies' (*Curr. Sci.*, 1999, **76**, 712), referring to the Government of India's decision to give higher pay to DRDO scientists and institute a set of handsome annual awards for development of defence-related technologies. The editor discussed the 'wilful neglect' of other sectors and also the decline (and fall) of science departments in Universities and concluded, 'while there appears to be some limited appreciation of what constitutes "strategic science" there is in fact no clear strategy for promoting science'.

Unfortunately, no one seems to know the strategy to promote science. Perhaps, one can deduce something from the demand of the society. The demand for engineering college admissions nowadays is due to the belief that one can earn a decent living if he/she becomes an engineer. Also, the interest in degree courses in biotechnology, organic chemistry, etc. indicates that the public is more interested in job-oriented courses. Hence, the science administrators and educationists should devise strategies so that the degree courses in traditional science subjects (physics, chemistry, and biology) are oriented more towards application and technology development.

The scientists working in the DRDO, DAE and ISRO demonstrated that they could do good work to benefit the country and the government instituted handsome reward schemes for them. However, research in basic sciences is somewhat individualistic in nature and hence more diffused. Therefore, the achievements of basic scientists are not that spectacular, especially in India where the support for basic research is meagre. However, it is always refreshing to hear statements from the basic scientists to the effect 'scientific research is at its best when it is useful' and 'it is a great satisfaction to a scientist when the society finds his work useful'. So, instead of having a pessimistic outlook that their research efforts do not have social relevance, senior basic scientists in India should come forward to orient their research work more towards solving problems faced by the industries/society. This is not a very difficult proposition. For instance, in the 1980s, a retired basic scientist was running from pillar to post to set up a silicon manufacturing unit based on his research work. Surely, having such scientists in our midst should boost the morale of young scientists. Perhaps, the strategy to promote science in India should be to institute handsome reward schemes to appreciate the efforts of such scientists so that all basic scientists will come forward to orient their research towards problems of interest to industries/society.

M. PERIASAMY

*School of Chemistry, University of Hyderabad, Central University P.O., Hyderabad 500 046, India*

# *Current Science* – The vital link

Information, education and communication (IEC) are the key elements for human resource development and its optimal utilization. In this very context, *Current Science* is rendering yeoman's service to the scientific fraternity. This very periodical has come a long way in its metamorphosis to its present form. Yet education is a continuing process and there is further scope for its development to cater to the need of younger generations at the turn of the century. I have been personally subscribing for this journal for over a decade and have immensely benefitted being located in a tribal pocket of Assam. I take pride to congratulate the editorial board for their painstaking job in keeping pace with the flow of manuscripts and maintaining its periodicity intact. In response to the editorial by P. Balaram (*Curr. Sci.*, 1999, **76**, 615–616), I suggest that in keeping with the truly multidisciplinary nature of the journal, efforts should be made to solicit articles from disciplines other than Biological Sciences (most contributions being from this field), viz. Chemical Sciences, Engineering Sciences, Physical Sciences, etc.

Further, select news/articles may be reproduced from leading international journals. There is a definite need to improve the quality of reproduction of