

## CORRESPONDENCE

### Revitalization of Indian science

A draft paper<sup>1</sup> prepared by the Indian Academy of Sciences on science education, National Science University (NSU) proposal of Mahajan<sup>2</sup>, and the dedication<sup>3</sup> to the nation of the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) on 4 March 1995 have not only commonality in the declared objectives of achieving excellence in science, they also display identical mind-sets of the persons involved. My purpose is two-fold: to delineate some of the vexed questions related with the Indian science by analysing these examples<sup>1-3</sup>, and to offer suggestions for small corrective measures to check the degeneration effectively.

The debate on the NSU proposal has been mainly centred on three issues discussed below:

1. *The Role of the NSU.* The basic premise is that a talented few should be nurtured by providing them with the support and facilities comparable to the best in the world. This is not new, and as noted by many readers the so-called elite institutions have been established based on this premise without having made much impact on the state of science done in our country. As for catching up and competing with the frontline research areas, the path-breaking or sufficiently influential contributions from India have been almost nil. If we examine the names of the scientists comprising the top body in any heavily funded enterprise ostensibly aimed at excellence, then we find almost the same set of persons with minor changes here and there. Obviously, the policy makers believe that there are only a handful of such high-calibre competent scientists. As a corollary, if the NSU comes into being, the honorary faculty of the JNCASR or such other 'eminent' scientists will be appointed in that also. Therefore, assuming that ideally whatever is proposed in Mahajan's scheme gets

implemented, there will be marginal impact on Indian science, there will be no depletion of faculty from the universities, and for ordinary scientists it will be irrelevant. Why should we be alarmed? The JNCASR was established without any open discussion. Why? Is the NSU proposal being criticized because the group of powerful scientists perceive this as a threat to their monopoly? One talks of NRI arrogance, but have the Institute scientists ever realized their own arrogant behaviour towards the University and college teachers? The Academy paper<sup>1</sup> approves the recommendations made by the Planning Commission Working Group for a three-tier scheme. Tier I is aimed at 0.5% of the estimated total UG science students in a year, with the allocation of funds of the order of 22% of the total grant. And in tier III 83% of the students will also get almost the same amount, i.e. 22%. I cannot imagine if any idea can be worse than this, and fully endorse Sriram's rejection<sup>4</sup> of this 'few highly talented' syndrome.

2. *Criticism of science establishment.* Many readers have felt offended by sweeping condemnation of feudal science establishment (or coterie) by Mahajan. While it is true that the language used by Mahajan is unpleasant (or pedestrian according to Murthy<sup>5</sup>), the criticisms are valid. The Academy paper<sup>1</sup> makes a general statement without any study: 'In most universities and affiliated colleges, one finds low educational standards and a poor academic environment.' According to Sriram<sup>4</sup>: 'In fact, scientists in our country miss no opportunity to declare that our universities have low standards and poor academic environment.' Not only commoners do not need resources, they can be denied basic dignity! From my experience I have found that rapid decline in teaching has occurred

primarily due to misplaced unimaginative policies and schemes formulated by eminent scientists, i.e. centres of excellence, frontline research, and promotions linked with Ph D. Ironically, such policies have been lauded in ref. 1. In the centres of excellence, costly equipment are inaccessible to the students and teachers, the personnel appointed are mediocre and pliable, the so-called frontline research activities pursued are done in isolation within the faculty, and control of funds in few hands leads to exclusivity and negative impact on the general teaching environment.

Returning to the existence of coterie, I shall give a recent example of powerful coterie in action. On 16 February 1995, during a Discussion Meeting of the JNCASR at Banaras Hindu University, C. N. R. Rao delivered an evening talk on Indian science, in which he was harshly critical of CSIR laboratories, their Directors and Bhatnagar Prize winners. Although several of them were present, none expressed even mild resentment. Interaction with students and teachers of the eminent scientists was cosmetic. The whole exercise seemed to be a demonstration of the powerful coterie.

In my opinion the crucial factor responsible for the creation of this feudalism in science is the exalted position granted to the science administrators close to the political power, and lack of transparency in the policy matters. For example, Arunachalam<sup>6</sup> has made very pertinent comments on the election of the Secretary, Department of Science and Technology (DST), as the new President of the Academy.

3. *Patriotism.* Swadesh Mahajan is a nonresident scientist in the US, so why not attack his patriotism? Many comments have appeared<sup>7</sup> implying that the concern shown for India by NRIs is of

doubtful nature, their hidden aim is to promote their self-interest. I think NRIs are not necessarily opportunists, and those working in India are not necessarily inspired by nationalism – we must recognize this. It is better to remember that for C. V. Raman, J. C. Bose and M. N. Saha patriotism was an article of faith which came to them naturally. Bhabha essentially introduced the concept of what I call contractual nationalism in science. Most of the scientists who have returned to India have done so after prolonged bargains. And the patriotism of quite a few top scientists is so shaky that slight dilution in their status or facilities and funding makes them repent their stay in our country. I refer to an interview<sup>8</sup> and quote C. N. R. Rao's reply: 'Probably I should have left India long ago'.

### Science establishment

Science education cannot be discussed in isolation; support and funding for science and technology cannot be divorced from the socioeconomic conditions of the people on the one hand and obligations of the scientists towards the society on the other. For a serious discussion, obsession with excellence, and undue importance given to science administrators and managers must go. Excellence in the midst of common people emerges naturally, and it can be easily identified if the intentions are honest. Raman demonstrated this in his life, and fortunately his views on 'centre of excellence' have also been recorded by Ramaseshan<sup>9</sup>. I quote a few sentences: '...I strongly believe that fundamental science cannot be driven by instructional, industrial, governmental or military pressures.... Among the many qualities called for in a person who assumes this responsibility are scientific integrity, vision, receptiveness to new ideas and the enlightened outlook to let younger people grow unhindered to their full height...'

The scientists in top positions have shown ideological elasticity to suit political leadership of the day. To take a very important example, at the Prime Minister's initiative in 1976, Indian Science Congress focused attention on rural development. Since then started the convention of focal themes. The idea as such is quite good. But what has happened to this? The task forces were established, and recommendations for follow up actions were made<sup>10</sup>. I list some of them:

'... Social responsibilities of scientists; Assessment and improvement of biofertilizers utilizing genetic engineering techniques wherever possible and the possibility of their utilization on a large scale in agriculture; Protection of tribals and weaker groups from exploitation of their natural resources; Universities and institutions should be adequately funded in order to (a) revise the standard of scientific education, (b) provide long- and short-term training for young scientists to deal with socioeconomic problems, and (c) operate extension wings to enable laboratory findings to reach the rural areas; Engineering expertise should be pooled and tied up with prime plant manufacturers for standardization of plants and equipment, which may reduce lead time and optimize investment.' These are very significant and relevant suggestions for the country, but the science establishment has not shown any enthusiasm and commitment to implement them. Today economic liberalization has led top scientists to find virtues in privatization of higher education, university-industry interaction, marketism of R&D, and shift from rural people to limiting 'tertiary education' for selected few. The conclusion is that not only have they (i.e. top scientists) failed, they cannot be trusted for an independent and fair stand.

It has been advised that the science administrators who have failed to deliver the goods should retire<sup>11</sup>, and the demand for a white paper has been made by C. N. R. Rao<sup>12</sup>. Both the suggestions deserve to be implemented.

### Corrective measures

Attention is drawn to the suggestions made earlier<sup>13</sup> with some clarifications here. The reason for the abolition of centres of excellence in universities has already been elaborated in the present article. However, in case of doubts their performance and the psychological impact of these centres on the rest of the faculty may be evaluated in open and transparent manner. The newly set up National Accreditation and Assessment Council of the UGC may look into this matter. I shall briefly state few more corrective measures. No person after retirement should be appointed on any administrative, Government's policy-making body or in the selection committees. The system

of students' union and teachers' association in the universities and colleges should be abolished, instead, a scheme for redressal and a vigilance council may be formulated. The hierarchical system of teaching positions should be discontinued. To check inefficiency and corruption in the administration, a computerized system and reduction of present ministerial staff to less than 25% should be considered.

### Role of academies

In a recent editorial candid observations about the Academy have been made by Balaram<sup>14</sup>, and first report on higher education by the Indian Academy of Sciences has been published<sup>1</sup>. It is interesting to note that in UK a group called National Academies Policy Advisory Group was established in 1992, and the first report has come out on Intellectual Property and the Academic Community<sup>15</sup>. Whether our Academy has been inspired by that is not important, the step taken is most welcome. S. W. Hawking was elected FRS in 1974 'while holding the lowly position of research assistant at Cambridge'<sup>16</sup>. Perhaps the Indian Academies need to be made broad-based, and to learn from such examples for recognizing excellence. Arunachalam's comment<sup>6</sup> merits serious consideration. I think as a policy the office bearers of the Academies should not be chosen from amongst those holding administrative posts in the government.

In my opinion, the role of Academies in revitalizing Indian science and education can be very profound. Awareness, action and accountability could be the focus of attention.

'Awareness. Information dissemination on policy matters, and forum for discussion and debate on the issues. *Current Science* has done praiseworthy beginning in this direction. The editorial<sup>17</sup> has made explicit this policy; however, I may remark that even now only less than 10% of the space is devoted to this aspect (e.g. less than 90 pages out of 976 pages in volume 66 (1994)), which includes all categories of articles published on the policy matters. Further the reach of the journal is limited; therefore, a cheap volume of reprint collection of the articles published during the last 3–4 years on this topic may be published by the Academy for students and teachers in

colleges. A scheme whereby the subscribers of *Current Science* may be motivated to gift one year subscription to someone in colleges may be initiated.

**Action.** The Academies can do certain things without depending on the government policies. For example, making available small grants for writing books to college teachers, and setting up of a national teachers scheme. In the latter case, the fellows selected as national teachers shall be required to spend a minimum of one month in a college, and three months in an academic year at different colleges. During their stay, formal lectures and informal interaction with the students and teachers will be their main duty.

**Accountability.** Corruption in various forms has become rampant in research and teaching. The Academies can play a very effective role in dealing with this problem. Scientists and Academics found guilty in plagiarism or other frauds<sup>18</sup> can be blacklisted: their work will not be published, their fellowships or titles

awarded by the academies shall be withdrawn, and their names along with their malpractices shall be made public.

### Conclusion

We have enough strength and capability, which need to be properly utilized; there are many creative minds, they only need to be identified. The sense of belonging and involvement in the system by all ordinary scientists and Academics should be cultivated. Frustration, helplessness and servile mentality must go; obviously, hard and unpleasant (for few) actions may be necessary for that to happen.

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## NEWS

### 1994 Kalinga Prize

The 1994 Kalinga Prize for the popularization of science has been awarded to Nikolai Nikolaevich Drozdov, Associate Professor of Biogeography at the Moscow State University.

Established by UNESCO in 1951, it is an annual award of £1000 based on a grant to UNESCO from B. Patnaik of the state of Orissa, India, the founder and President of Kalinga Foundation Trust. With the 1994 awardee, the tally now stands at 49 personalities from 19 countries (Jain, N. C., *Curr. Sci.*, 1994, 66, 618-620).

A graduate of Moscow University in 1963, Dr Drozdov has done his doctorate in 1968 on the ornithofauna of the deserts of the USSR.

While working at the Australian National University (Canberra), he pub-

lished a book called *The Flight of the Boomerang* about his journey through Australia, about animals, nature and nature conservation. It instantly became a best-seller and over 100,000 copies of its two editions published in 1980 and 1988 were sold out within a couple of weeks of its release. For the last twenty-three years Dr Drozdov has been presenting a bimonthly television programme called *In the World of Animals*. This highly popular one-hour programme on animal life in the vast CIS territory is watched by approximately 200 million viewers. In 1992 he won the **Golden Panda** for outstanding achievement at the Wildscreen Festival in Bristol. In 1989 he was included in Global 500, a list drawn up by the United Nations Environment Programme of the world's leading

ecologists and specialists in environmental protection.

### New appointments

Dr V. S. Ramamurthy, 53, has taken over as Secretary of the Department of Science and Technology in place of Dr P. Rama Rao on 1 July. Ramamurthy, a nuclear physicist, was earlier the Director of the Institute of Physics, Bhubaneswar.

Dr R. A. Mashelkar, 52, has taken over as Director-General of the Council of Scientific and Industrial Research in place of Dr S. K. Joshi on 1 July. Mashelkar, a chemical engineer, was the Director of the National Chemical Laboratory at Pune.