

tem, the pernicious influence of caste and religious attitudes, the elitist bias, the alienation it produces in students and the decreasing allocation in terms of our GNP for education by the Government.

Remedies for these lie in pressuring the Government to implement the suggestions accepted on the basis of the Commissions and Working Group Reports. An alternative education structure with a slant towards self-sufficient primary and +2 stages, vocational orientation of courses and encouragement of respect for all forms of labour will reduce the penchant for students being enrolled for qualification purposes. This will help in delivering better quality of subjects to more interested students. The wherewithal for this lies in the question of monies meted out by the Government for Education and Science & Technology. However, the driving force must come from the commitment, attitude and effort originating 'from anyone who cares for, and is concerned about, our scientific future'.

An example that this is not pure rhetoric but is feasible is provided, at the school level, by the success of the Hoshangabad Science Teaching Programme (HSTP)^{16,17}. A major objective of the programme, which was initiated by choice, was to

attempt changes within the organized education system through innovation and modification of pedagogic methods and curricula, rather than to prove, by opening some new schools, the viability of a few islands of possible excellence.

'But oh, beamish nephew, beware of the day,

*If your Snark be a Boojum! For then
You will softly and suddenly vanish away
And never be met with again!'¹*

At the University level, attempts to foster excellence and productivity through creation of massively endowed Universities, whatever the arrangement of the nitty gritty details, will only be deleterious to the cause of improvement in overall standards of research and education that such adventures espouse. It will further the stratification and erosion amongst our students whilst condemning the existing infrastructures to the ruins of history.

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National Science University—Imported drug for an impoverished patient?

Current Science brought out a special section dealing with a so-called new concept 'National Science University', the proposal (in an edited form) and some reactions. Having read the articles, and being a 'Mere Resident Indian' (MRI) working scientist, I could not help reacting a little and putting down my 'Swadeshi' views on this topic, at the same time echoing some of the thoughts expressed by D. Balasubramanian and T. V. Ramakrishnan.

My very first reaction on reading through the 'Mahajan proposal', particularly the beginnings was one of extreme familiarity, as I have been hearing and experiencing all that is said, in the last eighteen years of my working life here. Anyway, the ills mentioned are nothing

special for science—it is just the Indian ethos reflected in every walk of life. However, in science these ills look worse because of a general feeling that, practitioners of science ought to be above common desires. Coming to the suggestions for the National Science University, does one really believe that making available US \$ 50,000 would simply make the person change his/her basic instincts? Having an International(!) Advisory Committee and freedom from bureaucracy make one a better scientist? Regarding the general performance, is it a fact that the scientific standards are low in all other institutions except the two mentioned in the report? What is the criterion that one should adopt for comparison of intra-institutional performances within the

country? How much introspection has been made in this context and why should an NRI proposal be considered as the answer for putting Indian science on an international pedestal at a cost of Rs 200 crores of the Indian tax payers? From the report and the articles that appeared alongwith, it almost looks that 'the NSU is *fait accompli* and if so it may not be of much use to discuss anything now. If it is not, it is very pertinent to discuss the particular points raised by both D. Balasubramanian and T. V. Ramakrishnan regarding the role of NRIs in this venture and for the demand of a new set of framework exclusively for NSU.

Further, as they both point out, the report on the one hand points a finger at the 'quota' system as being responsible

for poor performance but yet wants a reserved 'quota' for NRIs! If one wants to use the scientific talent available outside India, why restrict it to NRIs? It is altogether a different matter, if these NRIs are going to raise the funds completely from their own resources and industries and not ask for any funding from the Government of India

One of the main contentions of the NSU proposal is the 'missing link' between research and teaching in the existing Indian institutions. Though it is a fact, I for one could not understand as to how this gap gets filled by starting from just the under-graduate studies alone, while the cream of students are going away to professional courses (technical education) just after the XII standard, before even knowing what science is! Looking from this point of view, one can see for oneself that the real malady in Indian science comes not because the research scientists do not go and teach, but because there is not really a receptive and inquisitive input into the science stream of the under-graduate and graduate programmes. It is again obvious that this is linked to the socio-economic standards of the country, whose society has not yet recognized (and has forgotten what was practised in the past) the role of good education! This cannot be changed by having just one National Science University for a small section with NRI connections, as the proposal does not mention anything about the mode of selections either of the students or of the faculty!

One would think that what is needed mostly, to induce young and promising

talents to science, is to make the profession conducive to compete with positions in public sector (bureaucratic) and private sector (managerial). Whether one likes it or not, today's society respects just power and money, neither of which exist in practising science. From this point of view the Mahajan proposal of giving \$ 50,000 for a scientist looks good, but restricting this to a selected hundred or so, would only make things worse! Moreover, the change needed is in the total working conditions in the existing institutions on the one hand and providing better living standards to the scientific community on the other. Just starting a new set up to help a few NRIs to have a 'working holiday' every year at the expense of Indian tax payers, would only increase the frustration among the existing scientific community of the country and create a wider gap between working scientists and science managers which could become totally detrimental for science in India.

Having looked at the bleak view, it is necessary to see what needs to be done and whether there are certain aspects in the proposal that could be useful. Again, as many have already pointed out, the proposal brings forth many of the common ills that are ailing the scientific edifice of the country, and in order to set it right the entire scientific community has to work hard and objectively. It is often quoted that India has the third largest scientific manpower of the world. This really is not true; for just having degrees in science does not make one a scientist. Science needs to be practised both profes-

sionally and morally and to this end what is required is a sound foundation of education. Thus one needs to build up for the nation a good and solid foundation of basic education in various aspects of life, viz. scientific as well as humanitarian values. Unfortunately, in the last couple of decades, the emphasis in education has been only on information content and not on knowledge. Someone who can rattle off a large amount of facts and figures is considered 'brilliant' and if the person can spread himself/herself wide, without being deep, he or she is even considered 'knowledgeable'. Of course, the main reason for this is our competitive examination systems in all walks of life which is often called 'objective tests', but is actually a 'memory test'. It is true that in the modern world of 'information technology', one needs to learn much more than what students did thirty years ago; but the emphasis in science needs to be more on understanding and thinking rather than collecting. This can be imbibed only if the basic (primary and secondary) education is given a proper perspective. One ought to consider these aspects more thoroughly and if the Government can afford, the extra money should go to basic education. One cannot build any structure without a proper foundation and even for doing good science, the foundation has to come from basic education.

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Support NSU but!

It is gratifying to note that Mahajan's proposal¹ for National Science University (NSU) has triggered a long over-due discussion on education and science. The Guest Editor of *Current Science* Balaram² hopes to have a debate which could 'prove valuable in setting an agenda for the future'. Earlier this year John Maddox has written an article on 'Science in India' (*Nature*, 1993, 366, 611-626). P. N. Srivastava has raised a number of issues concerned with science, education, excellence and accountability in his

Presidential address to the Indian Science Congress (January, 1994). NSU proposal could not be looked in isolation from the prevailing situations in education and science in the country.

We had excellence both in science and education in our universities when they had eminent scientists such as P. C. Ray, J. C. Bose, C. V. Raman, M. N. Saha, S. N. Bose, K. S. Krishnan and many others. They produced many students who joined universities and proved excellent teachers and also did good science. How-

ever, things changed after the independence with the coming of H. J. Bhabha and S. S. Bhatnagar on the scene of Indian Science. They were close to Pandit Nehru and they initiated the concept of big science and big institutions for science removed from the universities. A number of good scientists moved from the universities to various institutions set up by AEC, CSIR, ICAR, DRDO and others. The Universities became poorer not only in men but also in finances since the institutionalized science needed big