

responding science university. No new buildings or senate halls need be constructed. They can be shared.

However, the charter for each science university should be spelt out as has been recommended for the proposed NSU. Steps should be taken to increase the interaction between these science universities and the existing national or regional scientific institutions, through co-operative projects, and shared teaching loads. The State Government or the Central Government should provide for the incremental expenditure required for such increased interaction.

Steps should be taken not to starve

the science universities. Donations may be asked for and received from the State Governments, from the NRIs belonging to that region, from industrial concerns, from philanthropic citizens, from cinema stars and from past students of the region.

The sections of the charter dealing with the new type of management and on the lines suggested for the NSU should be implemented as soon as the new science universities are formed. The management will be on the basis of a horizontal structure instead of a vertical structure. The youngest scientist will have as significant a role as the older ones in the programmes of teaching, areas of priority,

nature of the projects, etc.

With courage to question, ambition to achieve, and endeavour needed to leap-frog foreign developments in science along with the revised set up in science universities, I believe, that we will be able to generate excellence in science. It is only from excellence in science that new technology can develop. Otherwise India will be subjected to external punches of economical and political nature.

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Raising science in India á la NSU: the hunting of the Snark

Just the place for a Snark! I have said it twice:

*That alone should encourage the crew
Just the place for a Snark! I have said it thrice:*

What I tell you three times is true.

I have borrowed freely from Lewis Carroll¹ in the hope that for the cause of science he will not object. The snark and its hunt by a motely crew led by a captain who

'... had only one notion for covering the ocean,

And that was to tingle his bell'

makes a good parallel to the National Science University (NSU) proposal². The proposal, liberally criticizing the Indian University research and education, has been described and summarized in good measures, by people outside the Universities, in a recent issue of *Current Science*²⁻⁶. The NSU paper makes repeated assertions and searches through the problem of science in India to find the solution it wants. One difference being, for the snark story, Lewis Carroll candidly prefaces his piece with a tongue-in-cheek defence against the charge of writing nonsense. That such a proposal should be considered seriously at the implementation level is an indication of the extent to which the scientific and political leadership is divorced from ground necessities and social consciousness. There exists what is called, by C. Wright Mills in a different context⁷,

'The Power Elite' in our scientific and political milieu. Therefore, it will not be surprising if the 'extraordinarily naive' (to quote P. Balaram³) NSU proposal is accepted. This will lead to the formation of a new National Science University with an outright government grant of Rs 200 crores. However, that will be a sad day for the needs, requirements and direction of science and also education in India. The flip side will, of course, be that the NSU will be located at or near a major international airport making it within the reach of the bright young aspiring Indian research student who routinely travels via the liberalized open skies!

Present status and the need for improvement

'We have sailed many weeks, we have sailed many days,

(Seven days to the week I allow)

But a Snark, on which we might lovingly gaze,

*We have never beheld till now!'*¹

There is no gainsaying the fact that there are serious deficiencies in the education and practice of science in India. The last couple of years have seen in news media and science journals, a renewed discussion of the ills and shortfalls afflicting the scientific community and the extent of our science and technology development⁸⁻¹⁰. Our relative ineffective contribution to scientific development¹¹, the drop in the

quantum of students opting for science¹², the stultifying effect of the growth of administrative and bureaucratic machinery in Universities and Central Agencies—these are only some of the indicators of our quagmish situation.

The NSU proposal does highlight, akin to the way of the jester Tenalirama in our folklore, our status and need in science education and research.

What is to be done

'Come listen, my men, while I tell you again

The five unmistakable marks

By which you may know, wheresoever you go,

*The warranted and genuine Snarks.'*¹

It is obviously not reasonable or meaningful to provide one line summary solutions to the ails of science and technology having an etiology related to the history, socio-economics and politics of our land. But the prime cause definitely lies in the manner, delivery and orientation of our education—not only that of science. Careful and in-depth analysis of our education system has been made and remedial measures have been suggested earlier¹³⁻¹⁵. Our education system suffers from the irrelevance and rigidity of our curriculum, the unscientific teaching methods that destroy the inquisitiveness of the students, the lack of proper basic educational facilities, the outmoded examination sys-

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.

1. *The Complete Illustrated Works of Lewis Carroll*, Chancellor Press, London, 1990.
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3. Balaram, P., *Curr. Sci.*, 1994, **67**, 502-503.
4. Srivastava, P. N., *Curr. Sci.*, 1994, **67**, 508-512.
5. Balasubramanian, D., *Curr. Sci.*, 1994, **67**,

512-515.

6. Ramakrishnan, T. V., *Curr. Sci.*, 1994, **67**, 516-519.
7. Wright Mills, C., *The Power Elite*, OUP, New York, 1956.
8. *Current Science*, 10 & 25 Nov. 1992.
9. Padmanaban, G., *Curr. Sci.*, 1992, **63**, 509-511.
10. *Indian Express*, 10 Jan. 1993.
11. Arunachalam, S., *BioBytes*, 1993, **1(3)**, 3-6.
12. Report of the Working Group constituted by the Planning Commission to suggest ways and means to improve undergraduate courses in science at Indian Universities, 1989.
13. Report of the University Education Commission (Dec 1948-Aug 1949), Government of India Press, Simla, 1949.
14. Report of the Education Commission 1964-1966, Government of India Press, Delhi, 1966.
15. *Document of Education: Vidyabhyasa Rekha*, Kerala Sastra Sahitya Parishat, Trivandrum, 1983.
16. *Science Today*, December 1977.
17. *It is time...*, Tamil Nadu Science Forum, Chennai Books, Madras, 1989, p. 54.

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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