

also should be evaluated by the students. 7. There are NRI scientists who consider themselves as custodians of science for our country and for whom certain Indian scientists and topics of study alone matter. If NSU were to be promoted by these scientists it is very remote that NSU serves the country. More than the prestige that we do science comparable with that of developed countries by showing up a few experts acceptable to the scientists elsewhere, we need to build up confidence in our youth that we are capable of original work (not tinkering as of now) which the rest of the world will have to value and which is of use in our country and for our country.

8. Any concessions shown in fund generation and certification should be strictly audited by an independent and competent agency.

9. There has been so far no assessment of the spending in the institutions of national importance some of which have the cover of agencies like DAE or the Planning Commission. It is high time that the investment made by the government in them inclusive of the expenses of experts in visits abroad in terms of money and material is let known to the public. The outcome of this investment in terms of significant work which had impact on world science or the life of the common man in our country should also be evaluated dispassionately by a committee which consists of experts not connected with these institutions from India and abroad. Such an evaluation would help in arriving at proper priorities for the NSU.

10. The NSU should not be concerned only with post-school science education. The choice of personnel for NSU should be in such a way that they show concern in cultivating interest in and popularizing science and original thinking in children right from the primary stage.

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Swadesh Mahajan's proposal to set up a National Science University (NSU) in India reflects that our NRI colleagues are beginning to show concern for the development of scientific environment in 'Swadesh'. It seems that Mahajan is completely disillusioned with the prevailing state of affairs in the field of science and technology in India. But what appears like an allegation by Mahajan – that scientific establishment in India is managed by a few extremely powerful people – was, in fact, a necessity in the initial post-Independence period. The country needed such important and powerful persons who had full faith and support from its leaders. And it is these very people who laid the foundation and raised a platform with basic amenities and a reasonably good number of laboratories to quench our thirst for science. Their efforts put India (once considered a land of snakes and sadhus) in tune with the league of international scientific community. These 'powerful persons' had one thing common among them, viz. in spite of their personal differences they worked as a cohesive force and their combined efforts resulted in the development of a science policy, planning, management and different scientific departments at governmental level.

It would be unwise if we wholeheartedly ignore their capabilities. Mahajan or other leading personalities are now in a position to condemn the affairs of Indian science and scientists only because they know we have sufficiently equipped laboratories and potentially competent younger generation of scientists, who in spite of all the hardships have carved out a 'small niche' for themselves in the scientific community. The erstwhile powerful persons are aware of this sort of development and circumstantially they are now sitting in the outer periphery of scientific management. Establishment of NSU at this stage will again put the strings in their hands because as per Mahajan's proposal the management trust of NSU will consist of retired academics, intellectually oriented politicians and doyens of industry. These persons will obviously be selected/nominated by the so-called earlier powerful persons and in the process another lot of powerful persons will form a new coterie of science managers. Being one of the supreme and highly budgeted organization, NSU managers will have a natural edge over others.

In order to avoid such a situation, a long-term policy needs to be drawn to attract and absorb fresh trained scientists on completion of their Ph.D. To start with they may work as scientific assistants for 2–3 years and then get absorbed in the mainstream of scientists after proper scrutiny and selection. For a better future, therefore, instead of looking to the western world, NRIs and NSU for lucrative offers, we should consider the Indian conditions and take care of our young frustrated scientists who are unable to find their place in science and society due to their temporary and *ad hoc* positions.

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## A layman's views on 'Science in India'

After going through the special section on NSU in *Current Science* (1994, 67, 502–520), I would like to express some long-standing, personal views on 'Science in India', as a lay-person.

In our (primary and secondary) education system there is no method of identifying the aptitudes of children. Talent exists among students of all schools, irrespective of their academic stature or location (rural/urban). Methods need to be devised to identify aptitude for science among school children. One classic example is that of Ramanujan, whose genius in mathematics was not detected at a very early stage.

Children are not aware of science as a profession. Ask children what they want to become in future, and the answers one gets are 'doctor', 'engineer', 'IAS officer', etc. But it is hard to spot children who want to become scientists. Excepting places where there are research institutions, people in general are unaware of science as a profession (?), or of any serious research being done in India. This is partly because of the fact that majority

of our scientists are not doing research relevant to the society at large. For most of our children (and also lay-people) scientists are a breed long extinct and evoke the memories of Newton or Einstein. Our scientists need to do research useful in solving the problems faced by the society. An awareness needs to be created among children that 'scientific research' is also a creative profession useful to the society.

It is necessary that we nurture scientific temperament in children. Parents, in general, do not encourage experimentation or exploration, which they consider as dangerous tendencies. When children conform to the established norms, do rote reading and score good marks, parents feel happy and successful in their roles. The catch phrase is 'curiosity killed the cat'. But this curiosity is the very basis of all discoveries and inventions. How many parents kill the curiosity of their children to save cats. We need to encourage our children to be curious (of course, in non-destructive ways), to have more scientists in future.

Students finishing their 10th standard with good marks continue their +2 in science stream. This is not due to aptitude in science alone; there are parental and societal compulsions. After +2 those scoring very good marks opt for professional courses like medicine and engineering. The second best continue undergraduate studies in science. On graduation many opt for civil services and other competitive examinations. Many students also pursue management studies (MBA). The rest continue for M Sc. After M Sc many bright students go abroad for doing Ph.D. Among those who pursue doctoral research in India, many who work on good topics, in better institutions, under well-established, well-known and well-connected guides leave the country for better places, most often to developed countries. This migration is not for monetary benefits only. People failing to get even an assistantship here have made it big elsewhere. The residue of this repeated desertion (selection?) constitute the majority (but surely not all) of our scientific manpower.

Brain-drain is held responsible for the low quality and quantity of research in India. May be it is true to some extent. But the question is: Are we able to provide a conducive atmosphere for doing 'good science' to the draining brains? As

long as we are unable to do that, why cry about them? Many of those brought back from abroad with much fanfare are disillusioned and frustrated. Some of the 'super brains' who come back are mediocre persons, who just managed to go abroad. Often we fail to identify local talents. For want of methods to assess the real worth of a person, we accept a 'foreign-returned' stamp as sure evidence of 'greatness'.

It is often stated (quite boastfully at times) that India is the third largest scientific manpower in the world (hope we are not trying to improve our position!). Having a large scientific manpower means huge expenditure in salaries and perks. By spending much what are we getting in return? Is it a matter of pride to have one of the largest scientific manpowers? We are the second largest population in the world and we are not proud of that. On the contrary, we are trying to control population growth by all means. What is not known is where we stand in terms of scientific output. Are we 3rd or 30th? A country which is at the nth position in the size of scientific manpower and also at least at the nth position in terms of its scientific output has a reason to be proud of.

Drastic reduction in government funding has created much despair and anguish. Government attitude is variously described as 'benign indifference' and 'benign neglect'. The previous governments were as much at fault in keeping science dependent on government funding as the present one is in drastically cutting the assistance. Self-reliance and self-sufficiency can be achieved only gradually (over a decade or more). If only the mistake is realized and corrected, our scientific institutions, painstakingly built over a long period, have a chance for revival and survival.

The stopping (reducing?) of recruitments and the promotion policies have made our research institutions 'top-heavy'. The situation is that there are many senior scientists, but there are very few at junior levels (JLAs, SLAs, JSAs, etc.), resulting in scarcity of people who work in laboratories and in fields. Senior scientists interested in working feel as if their hands are tied. Those who consider a job in a research institution as a long, well-paid holiday have an excuse for their 'non-delivery' of goods.

Majority of our people struggle for food, clothes and shelter. Do we need to do research on ways and means to solve their problems or send a rocket to the outer space? In and around our major cities there are huge slums in which people migrating from villages live under subhuman conditions. These people are forced to leave homes, and near and dear ones for want of gainful employment in their native villages. They are happy in their villages if they get less than half of what they earn by doing odd jobs in cities. Our scientists need to develop technologies (i) for village industries using locally available raw materials (resources), (ii) for feeding these people, for providing them low-cost clothing and housing, and (iii) for remedying their diseases and containing the ever-increasing population, on priority.

Without correcting these basic flaws, there is no way science can progress (and prosper) in India. Establishing a National Science University needs to be considered seriously. But these underlying anomalies need to be corrected first.

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## On Current Science

### Not so current

I am reading *Current Science* regularly and find that most of the pages in the journal is devoted to history of Science and Scientists which I think is not all that relevant to the present day science. Another type of articles where too many pages are devoted is on history of 'Academies'. Thus, there is, very little in print on science currently done in *Current Science* as one reads in the journals *Science* or *Nature*. In fact, these general articles on history of science, scientists and academies are no better than those popular articles appearing in *The Hindu*, Wednesday, Science and Technology issues. I am sure that the readers like me would like to see current