
CORRESPONDENCE

[Comments received on the articles "Excellence in Science" and "On excellence in Indian Science" published in *Current Science*, Vol. 52, August 20, 1983, pp. 747-754].

It is indeed refreshing to go through the two articles on 'Excellence in Indian Science' by two of our scientists of excellence, Dr. P. K. Kaw and Prof. C. N. R. Rao.

Kaw poses the questions 'Is there excellence?'; and answers it with a 'No'. As he so pertinently observes 'good science needs good students'. But where are they? It needs systematic, disciplined grooming. But how many of the students at the school or college level know what science is? In our country one has to wait till the post-graduate level, to get acquainted with science in the real sense of the word. Till then, to most of the students science is a sort of fictional history because that is how science is taught in most of the schools. Unless the true spirit of science and laboratory experimentation skills are built up at the school level, how can one expect a scientist, to suddenly bloom at the University level?

Kaw states, 'A scientific approach to problem-solving has to be developed in early childhood We need a greater number of *Community Science Centres*'. It might interest the readers to know that the late Vikram A Sarabhai, a visionary scientist, exactly foresaw the fast deteriorating conditions and climate for science in our country and established a Community Science Centre at Ahmedabad as early as 1966 to give a facility to children, right from the elementary level to the college level and also the community at large to foster the scientific temper. Visitors from all parts of the country including ministers and educational authorities eulogized the unique work of the centre and wrote in the visitors book the usual "we want such centres to come up in every district town of our country" and scientists from abroad opened that such an institution could be a model for their own countries! But if one knows - as I do over 15 years - how this centre has struggled to survive right from 1967, year by year with continued suspense of meagre grants of Rs 70,000/- (1967) to 8 lakhs (1982) and still happens to be the only Community Science Centre so far in this country, it should be sufficient testimony to the callous attitude towards fostering science in our country.

C N R Rao poses the question 'Where are all the flowers gone?' He points to the fact that we have lost one generation (1962-1982) of the most talented young scientists. If this is so, one can only imagine the

situation for the future when one considers the millions of children now at school, where the standards of science education are deplorably low. C. N. R. Rao rightly points to the 'increasing depravity of our educational institutions! Unless we go down the production line and have a good look at the quality of raw material being fed from the schools, creating 'schools of excellence' at the top, can hardly be expected to yield a quality product.

It may not be out place here to comment, with due respect to our scientific community, that to quite some extent our scientists have contributed in no small measure to the existing situation in science in our country today, with their, insulated behaviour and ivory-tower approach to the problems of the community. If our scientists gave of their own free will, a little of their time to aspects like improvement of science education at the school level, orienting the lay-public on the impacts of science and technology, and inculcate in them the scientific temper, our scientists not only would be enhancing the public image of science and scientists, but also raise science and everything connected with it to the level of respect, advance and excellence, it deserves. Perhaps organisations like the UGC, CSIR and INSA could think of awarding scholarships and young scientists award at the school level itself to make sure of tomorrow's science in our country.

Post-script:

An amusing comment overheard at a Science Conference. A foreign scientist asked 'How are the standards of science in your country?' Pat came the reply by an Indian Scientist 'Sir, ours is an agricultural country'!

23 August 1983.

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The views of the two eminent scientists on the reason for the lack of excellence in Indian Science make interesting reading. However, I feel they have not touched upon the fundamental reason for the poor state of Indian Science today. The main reason why this country has not produced men of excellence (in science) in numbers that would be consistent with our large population is that since we attained independ-

ence, bright young people have started finding it more and more difficult to get into educational institutions of their choice. They are being discriminated against on various grounds (like caste, language, domicile etc). Populist policies leading to the packing of our institutions of higher learning with mediocre and undeserving students on the basis of ill-conceived notions of egalitarianism have resulted in these institutions (excepting some like the IITs) producing graduates and postgraduates and even doctorates, who can at best be labelled only as 'Literates'. It will be a mockery to call them technically or scientifically trained people. Since most of the present-day teachers have also been selected from among such people they can not be expected to make any impact.

The solution will be to realize that, while equality of opportunity is the birthright of every citizen, equality in intellectual endowments is not a fact. Merit has to be given its right place and talent identified and encouraged. Once this is done everything else required to produce men of excellence will automatically follow.

It is not too late for our rulers to realize this and reverse the headlong rush to mediocrity that this country is experiencing now.

8 September 1983

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I have read with interest the two articles on "Excellence in Science" by Kaw and Rao. I feel that certain core points should also be considered as mentioned below.

There may be a distinction between Science Managers and scientists. In the former they must have distinct record of managing research projects and establishing a research laboratory successfully. Scientists really feel insulted, when they find that certain committee members who are evaluating them in interviews or in research progress, have no idea of the speciality of the Scientist. In my own field "Biosurface Technology" very few people are available who can do justice by their comments, but in India many will be eager to evaluate the work and sometimes will not even hesitate to give wrong comments. Therefore, it seems to me that rewards recognition or promotions are based on friendly dealings instead of, on real progress of a scientist.

Another point I would like to mention here, is related to appointments. In some organizations, it

seems B.Tech, M.Tech, M.Sc., Ph.D. may all be appointed at the same level. When a person coming from abroad with post Doct. experience finds that he is equated with a fresh M.Tech, he will psychologically feel that he has been put down and so his interaction will automatically be unhealthy among his colleagues. In this situation how good science, can emerge? Situation gets further worse, when authorities give all facilities liberally to some people while others have to develop their own independent programmes. In this way a less qualified individual after getting all favourable situations will be rewarded without justification. The independent scientist, on the other hand will be further psychologically depressed. In these situations I don't know, why our authorities want to attract foreign trained scientists to India.

For a healthy atmosphere our authorities have to develop certain norms and uniformities at each level, keeping the future of the institute in mind before accepting the recommendations of their colleagues or committees. Our authorities have to change their attitude and listen to scientist and attempt to face the truth and rectify the defects. In case they do not want to change, certainly it's a bad luck for India. I sincerely feel that the policy 'you scratch my back and I scratch yours' in various meetings and conferences should change and efficiency and competence should be the sole criteria for encouraging scientists.

This correspondence reflects my independent opinion, which has been discussed with authorities in the past.

8 September 1983.

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I was highly delighted to read both the articles of P K Kaw and C N R Rao on "Excellence in Indian Science" (*Curr. Sci.*, 1983, 52, 747-751).

I fully agree with the views expressed by both the authors and any attempt to understand and alleviate the existing crisis (as authors have aptly put it) which is complicated by the financial stringency and bureaucracy would greatly help the Indian Scientific Community to make larger strides further.

1. It is true that higher learning in science has in particular become highly expensive, and the Government should come forward with better financial aid to

the students of science. (students... uneconomical; P K Kaw). Consequently, most of the talented young generation would be compelled to opt out subjects like Humanities and Behavioural sciences.

Even though, a student with his first degree itself is able to show his mettle, the bureaucracy, be it of UGC (or DST or CSIR) or of an Institute or University, does not allow the student to register himself for doctoral degree. Universities and funding agencies, strictly adhering to the requirement of a higher qualification for registration for a doctoral degree, are depriving a student of his strong urge to contribute his inherent innovative talent to the research of his choice. Nor could the student do Master's degree for obvious financial commitment in earning a higher qualification. The fantastic thing about all this affair is that no one wants to relax the rules, however idealistic the motto and objectives of the Institute or University may be. This situation often reminds me of adage "Said is easier than done".

Though I have presented my own case here, many of my counterparts elsewhere may certainly have the same in common with me in this regard.

2. I also submit that almost all universities and many of the research institutions in India have failed to recognize the important areas of research that warrant immediate investigation and time-bound results. Recently Dr P M Bhargava and Anita Gambhir in a series of articles, (Published in Indian Express Sunday Magazine: May 22 — July 17, 1983) opened that a Government policy must come forward, reflecting its stand, as to the research related to Genetic Engineering of all types including Recombinant DNA technology, and Somatic Cell Hybridization, Tissue Cultures both of plant and animal cells Photosynthesis and other items. (Prof C N R Rao Promotion of Excellence: Choosing the right research problem is half the job).

Here I would like to elaborate the status of research on photosynthesis in India as I am very familiar with this for the last six years. In spite of this country being agriculturally dependent, the research on photosynthesis is confined to a couple of Institutes (IARI, New Delhi and BARC, Bombay) and a few Universities (JNU, Delhi, Madurai-Kamaraj University, Madurai and S V University, Tirupathi). Further, research on the Light Phase of Photosynthesis is very meagre in view of the necessity of highly sensitive infrastructure.

The Governments in the UK, the USA and the USSR have set up independent institutions, which function under the administrative control of Agricultural Councils and the Department of Energy, for research in Photosynthesis. Such an institution is essential for an agriculturally dependent country like India. The

National Bio-technology Board, which is so far an infructuous organisation, constituted one year ago, must immediately start its activity towards identifying the problems concerning the initiation and execution of research projects on the above mentioned areas of priority, diffusing the clouds of confusion that shrouded many of these areas in vagueness and rendering suitable help to those farmers and entrepreneurs who have to capitalize on the findings of such fruitful research in those areas, having relevance to the contemporary needs of our present society.

3. Finally the universities do not provide proper expertise in all subjects as to allow the students to make their own choice of a subject and research. If a Professor in a department is a specialist in a subject, the entire department will be filled up with specialists of the concerned subject itself. It will undoubtedly lead to the centralization of the expertise and it is indirectly compelling students, having different research interests, to migrate to any other place where a research of their choice is available. Students who could not afford such a migration due to financial constraints have no other option but to accept the situation without question.

4. The idea of allowing students during vacation and at appropriate time of their education to work with good scientists in leading laboratories is highly welcome. They must be given short term research projects with some financial support. With my own limited research experience (approximately five years), I found that the ideals and revolutionary ideas have no place in many of the research institutions today. Particularly the suggestions of young and talented scientists have been interpreted as attempts to violate the authority of the senior scientists (Training: P K Kaw). It may take several decades to transform such bureaucratic thinking of scientists into an idealistic approach. Creativity and original thinking must be instilled into the minds of students by allowing them work freely with senior scientists in leading laboratories, as pointed by Prof. C N R Rao

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I have read with interest the two thought provoking papers "On excellence in Indian Science" (P. K. Kaw) and "Excellence in Science" (C. N. R. Rao) published in August 20th issue of *Current Science*. Please permit me to share my thoughts with your readers.

I venture to suggest the following short term experiment. This consists in searching for talented men and trying to make them the nuclei for future growth of excellent science. This presupposes that all good scientists are not created equal, that science is not merely a method but it has also a culture, that leadership should go to only those who have competence in both, and of course, that the present system is rotten. Professional competence and stature are important and should be respected but those qualities alone cannot breed excellence.

The experiment, in outline, is this. Set up a committee of fair-minded men of science to search for all outstanding papers on work done in India in various fields, published in the past, say 10 years. After finding out about the authors, ask those who are still in India, to give their honest assessment of the contribution to the advancement of Science (idea, experimental design and execution and so on). Invite all those who have made real contribution to a place for a sort of a workshop to discuss the problems of excellent science

in India. Ask each one to present a short paper on his or her personal experience. During the workshop initiate a process by which to assess whether some of them have the requisite qualities of leadership and vision to form the nuclei for future growth. Give special assistance to the research programmes of those who have laboratories, and provide laboratories for those who do not at different parts of the country, with a view to converting these laboratories as National Centres if they come up to expectations. Attempts should also be made to ameliorate the problems raised during the workshop. But real success cannot be achieved in the absence of long term reforms referred to earlier.

26 September 1983

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ANNOUNCEMENT

ROVING WORKSHOP-CUM-CLINIC-ON LEAD ACID BATTERIES: CARE AND MAINTENANCE

The Battery Society of India (BSI) is organising two-day Workshop-cum-Clinic on Lead Acid Batteries: Care and Maintenance at New Delhi (28-29 Oct. '83), Bombay (7-8 Nov. '83) Secunderabad (10-11 Nov. '83), Calcutta (14-15 Nov. '83).

The programme, which will be conducted by a (BSI) technical staff in association with experts drawn from leading battery manufacturers in the country, will cover the following topics: Battery construction, Bat-

tery operation, Battery performance, Shipment inspection and storage, Dry charged batteries, Charging of batteries, Factors affecting battery life and capacity, Battery failure and defects: causes and remedies.

For details please consult: The Secretary, Battery Society of India, B-6,7 Shopping Centre, Safdarjung Enclave, New Delhi 110 029.