

or not getting good financial support or PDFs. They leave the country mostly never to return. Thirdly, those doing PhDs in different universities in India and trying to get good quality research publications, have to work under minimal pay scale and without any long-term job security. This is also one of the causes that makes most youngsters to go for MBA or other avenues rather than opting for research as a career. Those who want to carry out research are deprived of this

opportunity to work in institutions of repute due to not getting qualified in UGC/CSIR/NET entrance tests. Can anybody prove that only those who have qualified in these competitive examinations have the brain and aptitude to carry out research? These facts have to be kept in mind and there must be some rule which stipulates that students doing PhD in India should contribute something to the science and scientific community in India rather than to other countries.

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Indian Science Congress Association and the VIPs

M. K. Unnikrishnan¹ raises a serious issue about the Indian Science Congress Association (ISCA) and the so-called VIPs (Very Important/‘Isolated’ Persons). So far as the achievements of ISCA are concerned, there is nothing to criticize. It fulfills its objectives even today. Thousands of scientists meet, establish contacts and present their results. It is an important part of India’s scientific culture and needs to be continued.

I am not sure how many of us are familiar with the history of the ISCA and its objectives. Let me start with its commencement so that in the end we can judge whether VIPs were an important part and see how the political elements encroached into scientists’ terrain.

The idea of organizing a science congress was initiated by two British chemists, J. L. Simonsen and P. S. MacMohan (also sometime referred to as MacMahan or MacMahon), with the thought that scientific research in India might be stimulated if an annual meeting of research workers could be arranged. They were also of the opinion that not only would the direct personal contact of workers be of great value, but also the general public would be brought to realize the importance and value of scientific research². On 2 November 1912, the two Professors with 17 ‘foremost men of science’ in India held their first meeting in the Asiatic Society, Calcutta³. Due to the efforts of these persons, after the pattern of the British Associations for the Advancement of Science (BAAS), the Indian Science Congress was established, which held its first meeting in Calcutta from 15 to 17 January 1914 (ref. 3), under the

patronage of the Asiatic Society. In 1931, after adopting a constitution, ISC was renamed as Indian Science Congress Association². Since its foundation, a meeting of the ISCA has been held every year under the leadership of distinguished men of science.

Steven Tomlinson (Assistant Librarian of the Bodleian Library, Oxford, which possesses the previous records of the BAAS) informed me that, in general, the inauguration was done by a high-ranking scientist (private communication, 11 March 2003). However, in India, for good intended reasons we started the tradition of inaugurating the annual meeting of ISCA by the Prime Minister as stated below.

Our first Prime Minister, Jawaharlal Nehru, was associated with the ISCA even before independence. In 1938 he sent a message to the Silver Jubilee Session of the Congress, in his capacity as the Chairman of the National Planning Committee of the Indian National Congress⁴. List of past Presidents shows that only once, that is, in 1947, a politician, none other than India’s Prime Minister Jawaharlal Nehru, was elected as the President of the 34th Session of the ISCA. His progressive ideas towards science and technology were known to every scientist of the time, thus his election is not surprising. More importantly, it was the time of the transfer of power from the colonial government to an independent India. India was passing through hard times due to separatist movements. Thus Nehru’s election was a symbol of the solidarity of the scientific community. There was no reason to complain about

the inauguration of the ISCA by him in the next four to five years. In the euphoria following Independence, Nehru truly represented India. In my opinion, the first five lectures delivered by him at the session of the ISCA were inspiring and dealt with scientific policies and development⁵.

After some years, scientists like C. V. Raman, criticized the continued practice of inauguration of the ISCA by a Prime Minister. In an article, V. T. Srinivasan quotes Raman’s protest as follows: ‘Can you give me the example of any other country in which Science Congress is inaugurated by politicians? Every year, for 17 years continuously, the organizers of the Indian Science Congress could think of only Prime Minister Nehru to inaugurate it. And now they have caught hold of his daughter to do it. How self-respecting scientists can go on listening to piffle spouted by politicians in a ‘Science Congress’ is something which I have never been able to understand.’⁶

Let us see what Nehru thought about these invitations. On 2 January 1952 at the 39th Session Nehru said: ‘It has become the custom of this Science Congress or its Reception Committee to invite me year after year to these annual sessions and for me to come here and, well, utter, if I may say so, some platitudes. Well, I come here realizing that I do not throw any particular light on a situation that you might have to consider. Nevertheless, I come here, partly because it satisfies me and I am interested in the development of science in India.’⁷ Once again, after five years, at the 44th Session in Calcutta, Nehru becomes even

more clear: 'I consider this a great privilege and honour for a variety of reasons although *I sometimes fear that repetition of a practice makes it rather stale*'⁸ (emphasis added). Next year at the 45th session in Madras, Nehru repeated almost the same words⁹.

The examples quoted above clearly demonstrate that Nehru was a sensible and honest person. Evidently, he would not have deprived a scientist or a member of the managing committee of the privilege, if he had not been invited.

Another important point to be mentioned about Nehru is that he took care to be punctual. Only once, that is, on 2 January 1953 on the occasion of 40th Session he was late. About it he said: 'I must apologize for my unpunctuality. But the fault was not mine really. I sat for three hours at the Delhi aerodrome waiting for the fog to lift and the fog was reminiscent of, well, the worst type of London fog.'¹⁰ I wonder if today's politicians are conscious of the impropriety of coming late or ever apologize for it.

From Raman's and Nehru's statements one point is quite clear, that is, it was not the Prime Minister who was responsible for this misdeed. The fault seemed to be on the side of the Managing Committees.

From a historical point of view, we should verify whether such invitations have had a positive, negative or no effect

on the achievements of scientific community. If there are more positive than negative results, the tradition should be continued.

So far as the issue of the so-called VIPs is concerned, a discussion can be started on: Whether the Organizing Committee should have VIPs and who should decide who is one? Why are politicians needed at the time of inauguration? Why cannot the inauguration be carried out by the President of either the ISCA or INSA, or IASc or by any world-famous scientist?

To discuss this issue, there cannot be a better platform than *Current Science*, which has a tradition and in the past often published detailed information such as the Presidential Address, etc¹¹. Let me refer to the editor of *Current Science*, who about seventy years ago, wrote¹², 'No excuse is needed for making this issue of *Current Science* a special Science Congress Number.' In fact a Supplement on the 20th Indian Science Congress 1933 (Patna) was brought out.

I hope the present editors, who are well informed about the Indian political and scientific scenario may consider to start discussion on the above questions.

1. Umnikrishnan, M. K., *Curr. Sci.*, 2003, **84**, 484.

2. Fermor, L. L., *Curr. Sci.*, 1933, **1**, 196–205.
3. Chaudhuri, J. C., *Indian Fellows of the Royal Society and Others*, Academic Publishers, Calcutta, 1992, p. 60.
4. Singh, B. (ed.), *Jawaharlal Nehru on Science Congress – Speeches Delivered at the Annual Sessions of the Indian Science Congress*, Nehru Memorial Museum and Library, New Delhi, 1986, Foreword.
5. Singh, B. (ed.), *Jawaharlal Nehru on Science Congress – Speeches Delivered at the Annual Sessions of the Indian Science Congress*, Nehru Memorial Museum and Library, New Delhi, 1986, pp. 4–39.
6. Srinivasan, V. T., *Bhavan's J.*, 1970, **17**, 65–68.
7. Ref. 4, Singh, B., 1986, pp. 27–32.
8. *ibid*, pp. 54–59.
9. *ibid*, pp. 60–67.
10. *ibid*, pp. 33–39.
11. See *Curr. Sci.*, 1933, **1**, 196–205; *Curr. Sci.*, 1934, **2**, 255–264; *Curr. Sci.*, 1936, **4**, 495–516.
12. *Curr. Sci.*, 1933, **1**, 193.

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Cost of developing and commercializing transgenic crops

Subsequent to the *Current Science* issue¹ with a special section on transgenic crops, *The Economist* of 28 March carried several articles on biotechnology. A significant statement therein says: 'Developing a marketable transgenic strain is almost as costly as developing a new drug, and this kind of control of the market helps to make investing in transgenics worthwhile'². The cost of developing a modern medicine is currently estimated to be upwards of US \$800 million³. This also partly answers the question raised by the guest editors in the editorial – 'How is it that while in the laboratories a large number of transgenics have been developed, very few are in the field?'

The actual costs may be marginally lower in the public sector institutions in India than the estimates based on privately funded research laboratories in US. Nevertheless, it is obvious that the cost of developing and commercializing a genetically engineered, transgenic crop cultivar/hybrid would be substantial. The overall cost has five major components – (i) transfer of the desired gene into the crop species with adequate expression levels, (ii) development of crop cultivar/hybrid combining other desirable agronomic and quality parameters, (iii) nutritional, toxicological and other bio-safety evaluation in laboratory and field experiments to meet the requirements of

the regulatory process, (iv) agronomic evaluation in field experiments, and (v) seed production and distribution. The last two are similar to crop cultivars developed using conventional plant breeding methods. Elsewhere⁴ it is stated that 'the time span and expense of rigorous field studies that conform to regulations often far exceed the resources available to researchers, particularly academic scientists funded by research grants'. The statement is made in the context of relatively well-supported academic scientists in US. It would be extremely difficult for Indian scientists working in public institutions on project-based funding to generate data to meet regulatory requirements.