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EDITORIAL

Indian Science: The Need for Public Engagement

Scientists, especially the organized and apparently exclusive bodies that seem to be repositories of expertise, suddenly appear to be besieged by a blitz of critical scrutiny in India. The controversy over the *Bt* brinjal report, produced by six scholarly academies – whose membership spans the fields of science, engineering, medicine and agriculture – has been quickly followed by the ‘S-band spectrum’ saga, which has raised many questions on the credibility of decision making in large, monolithic organizations, that have acquired a special status over the years. Even before the ‘brinjal’ and ‘spectrum’ stories became the staple diet of media, hungry for scandal and sensation, the credibility of the IPCC projections on glacier melting was questioned, raising doubts on the abilities of scientific bodies to provide accurate and carefully worded assessments on matters of great public interest. The last few days have seen an escalation of the criticism that Indian scientists do not engage in contributing meaningfully to public debate and that scientific assessments on matters of public importance are sometimes provided in a casual fashion, with little regard for the complexity of the issues involved. The credibility of advice received from scientific bodies was severely dented in public perception by the dismissal of the Academies’ *Bt* brinjal report by the Minister for Environment and Forests, Jairam Ramesh, as a document without substance. More recently, the Minister has labelled ‘environment impact studies’ ‘a bit of a joke’. He is reported to have said that ‘even reputed government institutions do cut and paste jobs’ (*Times of India*, March 20, 2011); a clear reference to the reluctance of many groups to conduct a serious, independent study of the issues involved. The tensions between the imperatives of development and the growing awareness of the need to protect the environment make it very difficult to produce and accept scientifically dispassionate impact assessment reports on highly visible infrastructure projects. Beleaguered by many recent controversies, India’s science bodies may have little desire for public engagement.

A pointed critique by Sunita Narain, who heads the Centre for Science and Environment, a non-governmental organization (NGO), begins provocatively: ‘I suspect Indian scientists have retired hurt to the pavilion.’ The cricketing metaphor is particularly apt in view of the great interest in ongoing World Cup matches. In assessing

the response to the ill-fated ISRO–Devas contract she concludes that ‘while there is more to the story’ there can hardly be any ‘informed discussion’ if ‘the scientists who understand the issue are not prepared to engage with the public’. She adds that ‘the cynical public which sees scams tumble out each day, believes easily that everybody is a crook’. In a harsh commentary on the attitudes of the leaders of science, she argues that ‘the country’s top scientists have withdrawn further into their comfort zones, their opinion frozen in contempt that Indian society is scientifically illiterate’. She is pessimistic in her prediction, ‘that in future there will be even less conversation between scientists and all of us in the public sphere’ (*Business Standard*, March 14, 2011). Narain reflects on the revised Academies’ report on *Bt* brinjal: ‘The final report of the apex-science group is marginally better in that it includes citations but it reeks of scientific arrogance cloaked in jargon. . . . But the world has changed. No longer is this report meant only for top political and policy leaders who would be overwhelmed by the weight of the matter, the language and the expert knowledge of the writer. The report will be subjected to public scrutiny, its lack of rigour will be deliberated, its unquestioned assertion challenged’. Narain’s conclusions merit attention amongst scientists: ‘This is the difference between the manufactured comfortable world of science behind closed doors and the noisy, messy world outside. It is clear . . . that Indian scientists need confidence to creatively engage in public concerns. The task to build scientific literacy will not happen without their engagement and their tolerance for dissent. The role of science in Indian democracy is being revisited with a new intensity. The only problem is that the key players are missing in action.’

Coincidentally, even as Narain charged scientists with being unwilling to engage in public debate a piece authored by J. Gowrishankar appeared in *The Hindu’s* regular column ‘Speaking of Science’. This opinion piece entitled ‘GM crops debate: consensual versus adversarial approaches’ advances an interesting view that scientific progress relies on a consensual approach and not the adversarial approach, ‘as adopted in wars between nations, in courts of law between opposite parties, and in democracies, between Government and the opposition’. He argues, and here I suspect that many scientists will disagree that ‘peer review represents the epitome of a

consensual approach in scientific discourse'. He is right when he says that 'adversarial arguments begin from an assumption of mistrust between the parties'. He may be naive when he suggests that the 'consensual approach' favoured by scientists 'rests on an assumption of trust and all the parties are expected to self-declare conflicts of interest'. As commercial interests dominate many areas of scientific research 'conflicts of interest' are often suppressed, sometimes emerging only when a controversy erupts. In Gowrishankar's analysis: '... several aspects of the debate in this country on genetically modified (GM) crops and foods have adopted the adversarial approach rather than a consensual one. Furthermore, academic scientists have been drawn into the discussions on unfamiliar terms and territory that have been dictated by activists and the lay public. ... Scientists are not trained to hold placards, shout slogans, mobilize crowds, or denigrate their so-called opponents and hence have been unable to match the activists in their strategies and actions. Indeed, the scientists of this country are being exposed for the first time to practices previously encountered by their counterparts in the developed world' (Gowrishankar, J., *The Hindu*, March 10, 2011).

Are there well documented examples where Western scientists have allayed the fears of the lay public about new technologies? By a curious coincidence, an account of the history of MIT that I alluded to in my previous column (*Curr. Sci.*, 2011, **100**, 599) describes an example of 'How community outreach catalyzed the life sciences at MIT' (Durant, J., In *Becoming MIT: Moments of Decision* (ed. Kaiser, D.), The MIT Press, Cambridge, Massachusetts, 2010, pp. 145–163). The early 1970s saw the birth of 'genetic engineering' and 'recombinant DNA technology'. The ability to create 'hybrid DNA' raised the question of whether organisms with modified genetic characteristics could pose a hazard. Two scenarios appeared troubling. Durant lists them: 'What if genes conferring resistance to specific antibiotics were recombined into naturally pathogenic bacteria? Or what if genes causing cancer were transferred from viruses into the normally harmless bacteria that inhabit the human gut?' These and other scenarios were discussed within the growing community of 'molecular biologists' in the United States to weigh the risks of many proposed lines of research. In a famous letter that appeared in 1974 a panel led by Paul Berg proposed a 'voluntary moratorium on designated categories of rDNA experiments and urged the establishment of an experimental program at a secure facility to assess potential hazards'. Durant notes that 'many of the scientists who became involved in the rDNA debate in the 1970s worked with a heightened sense of social responsibility that had everything to do with their experiences of the movements and political battles of the late 1960s, especially the role of science and technology in the Vietnam War'. The 'adversaries' in the early phase of this debate were from within the

community of biological researchers. Many young 'activists' within the community would later embrace the new technologies and contribute immensely to the scientific resolution that followed, which led to modern biotechnology. While the Berg letter was intended to initiate informed debate within the scientific community it was not long before 'there was a full-blown public controversy over wider health, environmental and defense issues as well as the role of citizens and their representatives in helping to determine what sorts of DNA research should be done'. Durant describes the public hearings held in Cambridge, Massachusetts in mid-1976, which would decide the future of molecular biology research at Harvard and MIT. The hearings were presided over by Cambridge's colourful Mayor Alfred Vellucci. His opening words may have some relevance in the present context of science and public policy in India: 'The subject matter ... is important to all of us. No one person or group has a monopoly on the interest at stake. Whether this research takes place here or elsewhere, whether it produces good or evil, all of us stand to be affected by the outcome. As such, the debate must take place in the public forum with you the public taking a major role'. Durant describes the unprecedented public engagement between the proponents and opponents of rDNA technology which eventually led to a resolution in early 1977. Durant suggests that there are lessons to be learnt from this story. The Cambridge Experimentation Review Board (CERB) which included many members of the lay public was viewed by some 'as an inspirational model of how citizens can engage constructively with scientists in decision making on socially and politically sensitive areas of research'. Such an engagement is possible only if scientists follow Mayor Vellucci's memorable injunction at the start of the public hearings: 'Refrain from using the alphabet. Most of us in this room ... are lay people. We don't understand your alphabet, so you will spell it out for us so we know exactly what you are talking about because we are here to listen.' In reflecting on MIT's response to the controversy, Durant notes: 'The Institute rose to this challenge. It did not retreat into the ivory tower. Instead, it reached out in a process of constructive engagement with citizens and community representatives.'

Narain's charge that Indian scientists have 'retired hurt' into the seclusion of their laboratories and Gowrishankar's plea for 'civilized debate' drawn attention to the great need for scientists to engage actively in enhancing the public perception of science and its role in development. The range of contentious issues keeps increasing. We will have to engage in public discussion of the safety of nuclear power, genetically modified crops, climate change mitigation strategies, ethical issues in health research and implications of nanotechnology in the future. This engagement will require scientists and their institutions to return to the field of play.

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