AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

150 YEARS • 1848-1998

A CELEBRATION OF DIFFERENCE: SCIENCE AND DEMOCRACY IN INDIA

ILLUSTRATION: ALLAN M. BURCH

SHIV VISVANATHAN

is an anthropologist of science and human rights researcher at the Centre for the Study of Developing Societies in Delhi. His books include Organizing for Science *(Oxford Univ. Press, Delhi, 1985);* A Carnival for Science *(Oxford Univ. Press, Delhi, 1997); and* Foul Play *(Banyan Books, Delhi, 1998), a study of corruption in India.*

India today stands as one of the world's great clearing houses and compost heaps for ideas. It keeps alive some defeated ideas without consigning them to the museum and reinvents others through translation. This is best seen in the attitude to its three greatest imports: democracy, the English language, and modern Western science. For Indians these were not alien ideas to be handled with suspicion but celebrations, which they had to internalize and reinvent for themselves. Indeed, the confidence and openness with which India greeted and scrutinized science constitutes one of the most fascinating chapters in the encounter between science and democracy. Unfortunately, the dialogues between science and democracy in India fell captive to the dullness of official science policy documents, which presented what was a festival as a set of thermometer readings. To grasp the drama of science as a cultural force I want to trace the development of Western science in India.

The institutionalization of Western science in India began with the establishment of the Great Surveys—the Geological, the Botanical, and the Trigonometric—under the inspired impetus of the Asiatic Society of Bengal, which was inaugurated in 1784. This was followed by the establishment of universities in the Presidency towns of Bombay, Calcutta, and Madras in 1854. As colonial creations these universities were not primarily concerned with improving the local culture and economy—such issues only became alive with the Swadeshi (local, indigenous, native) movement of 1904. In its aftermath Swadeshism produced the great tradition of debate on science and democracy, and it is on the continuities and discontinuities of this debate through the nationalist (1904 to 1947) and postcolonial (1947 onward) periods that I shall focus.

As early as 1900, Mahender Lal Sircar, the Calcutta homeopath who established the Indian Association for the Cultivation of Science (the first science laboratory outside colonial control), claimed that it was a scientific India that would humanize the aggressive West. In 1912, the nationalist Har Dayal advocated a celebration of science, which argued that the sacred cities of "Benares and Puri have had their day. What is there in Benares but fat bulls and fat priests, what is there in Puri but cholera?"* Har Dayal opined that Pasteur and Koch had done more for human welfare than all the nuns and monks, and believed that scientists would become the rishis (the sages and savants) of this era. But if hospitality to science was a hallmark of nationalism, there was also criticism.

A living ecology of knowledge. What the Indian National Movement did was to turn India into a theater, or a series of a thought experiments, where modern Western science would converse with other forms of knowledge. One can list a whole series of experiments in this context: the Theosophist attempt to look at childhood and nature in a new way; the movement to allow equality and reciprocity between various systems of medicine, including allopathy and homeopathy; the endeavor to incorporate local systems of technology and architecture in cities such as New Delhi; and the effort to evade the use of synthetic fertilizers while modernizing Indian agriculture. This search for a plurality of knowledge, this attempt to evade the monoculture of modern Western science, constitutes modern India's greatest contribution to democracy and democratic theory.

The debates about science in the nationalist era were debates about the politics of knowledge. They were not restricted merely to the uses of knowledge, of what one might call the applied science of good and evil; in addition, there was a concern about the grammar of violence implicit in science and about how science appeared at that costume ball called Indian civilization. It was a pursuit of cognitive justice, that is, of the right of different forms of knowledge to coexist without being marginalized by official, state-sponsored forms of knowledge. What was sought was a living ecology of knowledge, as expressed, for instance, in the debate between indigenous and new medical systems in 1923. Indian nationalism took the principles of liberty, equality, and fraternity and applied them to the world of knowledge.

Rethinking Gandhi. It is within this tapestry of debates that Gandhi must be located. To portray Gandhi as anti-science or Luddite, as the technocrats of the Nehruvian era did, is superficial. His ashrams, a combination of hermitage and laboratory, were locations for scientific experiments, especially on waste management. His theory of khadi (homespun cloth) was a theory of technological innovation, of commu-

The author is at the Centre for the Study of Developing Societies, 29 Rajpur Road, Delhi 110 054, India.

*Har Dayal, *Mod. Rev.* **12**, 49 (1912).

nities fighting obsolescence. Gandhi, the modern innovator, was a cultural idiot: He did not understand the death of communities forced into obsolescence by technology. A democracy that talked about nylon and synthetic dyes without considering the decline of craft communities was amnesic. Gandhi's *Hind Swaraj* (1908), a document to rank with *The Rights of Man* or *The Communist Manifesto*, was one of the great critiques of science and technology. It was an attempt to create a technological and scientific conscience for Nehru's India, which had no sense of the roots and tensions within modern Western science.

Statist science. This symphony of pluralistic debates on science declined with independence in 1947. Nehruvian India was committed to a civics of development, industrialization, and eventually the national security state. This was a world where science policy and the scientific perspective was as important as the national flag. The Indian pursuit of scientific knowledge became bureaucratic, and science became a positivism without a sense of its genealogies or doubts. India proudly claimed that it had the third largest pool of scientific personnel in the world. The policy was technology transfer, embodied in the innovation chain with its three great links—invention, innovation, and diffusion. Invention was the turf of the expert scientist. Innovation was the world of technology, which was locally adaptable. Diffusion was democracy incarnate. So the question of science in India shifted from cognitive justice to popularization, to science as consumption. P. M. S. Blackett, the British Nobel laureate who was a consultant to Nehru, had to warn him that science was no magic wand that could bring prosperity. Nehru's idea of expert science resident in the complex of laboratories called the Council for Scientific and Industrial Research (CSIR) and the Atomic Energy Commission (AEC) was very different from Gandhi's vision of every man a scientist, every village a science academy.

"THIS SEARCH FOR A PLURALITY OF KNOWLEDGE, THIS ATTEMPT TO EVADE THE MONOCULTURE OF MODERN WESTERN SCIENCE, CONSTITUTES MODERN INDIA'S GREATEST CONTRIBUTION TO DEMOCRACY..."

Indian science became a bureaucratized grid of laboratories fumbling over import substitution. Homi Bhabha, the father of the Indian atomic energy program, observed that the creation of these mammoth bureaucracies had emptied the universities of outstanding talent who could have served as seeds of creative dissent. The fifties and sixties saw a celebration of official science where, to cite Nehru, "dams and laboratories became temples of modern India." The tragedy was that both were disasters. The CSIR laboratories basically produced second-grade research that was often a crude mimicking of some foreign paper, and the dams became a source of controversy, by creating a new generation of unrehabilitated refugees.

As bureaucratized science, knowledge lost its sense of play and was removed from the democratic domain. Critique was taboo, and even leading universities were ignorant or innocent of the works of Koyre, Kuhn, or Bachelard. As a result, when science returned to the democratic domain, the great debates on science and technology came not from the scientific academies but from political movements. It was local struggles against trawlers, missiles, pollution, monoculture, and industrial accidents that re-created the dialogue between science and democracy. These became the dissenting academies of Indian democracy.

Grassroots against science. Four events retrieved the debates on science, bringing it back to the democratic imagination. The first was the struggle against the Emergency, the imposition of dictatorship in 1977. The violence of the demolitions and the forced sterilizations were partly justified in the name of science, and this servile science began to be questioned by human rights groups. The second was Chipko, a movement against forest contractors in the Himalayas, which challenged forestry as a science, catalyzing interest in ecology. The third was the Bhopal Gas disaster of 1984, and the fourth was the fight against the Narmada dam; both emphasized that the resolution of scientific controversies could not be left to experts, but was part of citizenship, especially when experts were tongue-tied or illiterate on technical issues. Only a few scientists, like C. V. Seshadri and A. K. N. Reddy, realized that these debates were grist for the innovative science mill and that Third World problems demanded frontline science, not third-rate research in the guise of renewal.

In a strange sense, Indian science had become allergic to democracy. What should have been a partnership of openness had become a dull civics, where "the scientific method" as an ideology became a Victorian corset constricting creativity. What was worse was that scientific institutions themselves functioned undemocratically. Even a spate of suicides by scientists and the consequent parliamentary inquiries produced little change. One remained content to cite the names of Nobel laureates like S. Chandrasekhar and Hargobind Khorana or wax nostalgic about great physicists like C. V. Raman and Meghnad Saha. The fact that the latter two were the greatest critics of science in India was lost on the commentators.

The nineties inaugurated the era of globalization and liberalization in which the social impetus for science in India has come from disparate backgrounds. There is the middle-class dream of a second-rate America of supermarkets and science-cities, which clashes with the tribal scream against large dams (India has been producing more refugees from development projects than from war). Yet the very same dams that tribals were objecting to were part of Dalit (oppressed castes) demands which argued that modernity and science were ways out of suffering. Two ways of life, two modes of pain, are at right angles, catching each other on the question of science.

The conversation between science and democracy cannot be only questions of electronics, software, and risk theory. The everydayness of politics demands that we find more inventive ways of solving scientific controversies. Whether it is shifting cultivation, large dams, reproductive health, or the quarrel between urban environmentalists and trade unions, science can only survive if it faces these openly and courageously. In doing so it will add not merely to the annals of creativity but to the imagination of democracy.

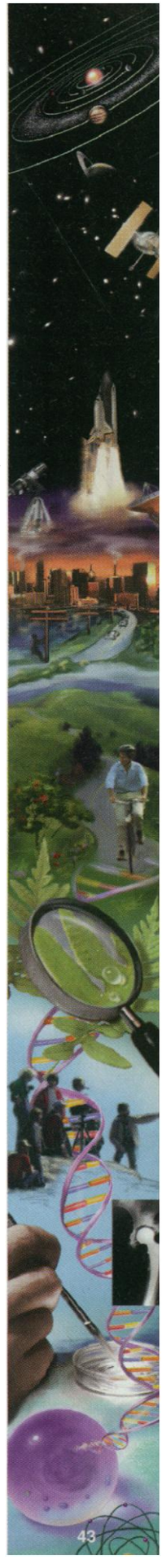

ILLUSTRATION: TERESE WINSLOW