

# OUR DISGRUNTLED SCIENTISTS

*Despite Rajiv Gandhi's emphasis on science and the need to enter the 21st century, the Indian scientific establishment is demoralised and directionless. What has gone wrong?*

Indian science rarely hits the front-pages but when it does, the news is usually dramatic: a nuclear explosion, a satellite launch and the like. Or at least, this used to be the case till a year ago. For most of 1987, however, whenever the scientists have made the headlines, the news has been uniformly bad.

Take the question of appointing a successor to Dr Raja Ramanna as chairman of the Atomic Energy Commission (AEC). On 16 January, two weeks before Ramanna was due to retire, a committee appointed to select his successor decided to recommend M.R. Srinivasan. This recommendation was kept secret till 30 January, while the nation's press speculated whether Srinivasan was going to get the job or lose out to P.K. Iyengar. Then at midnight on 30-31 January, Srinivasan's appointment was finally announced.

A view of BARC, Trombay

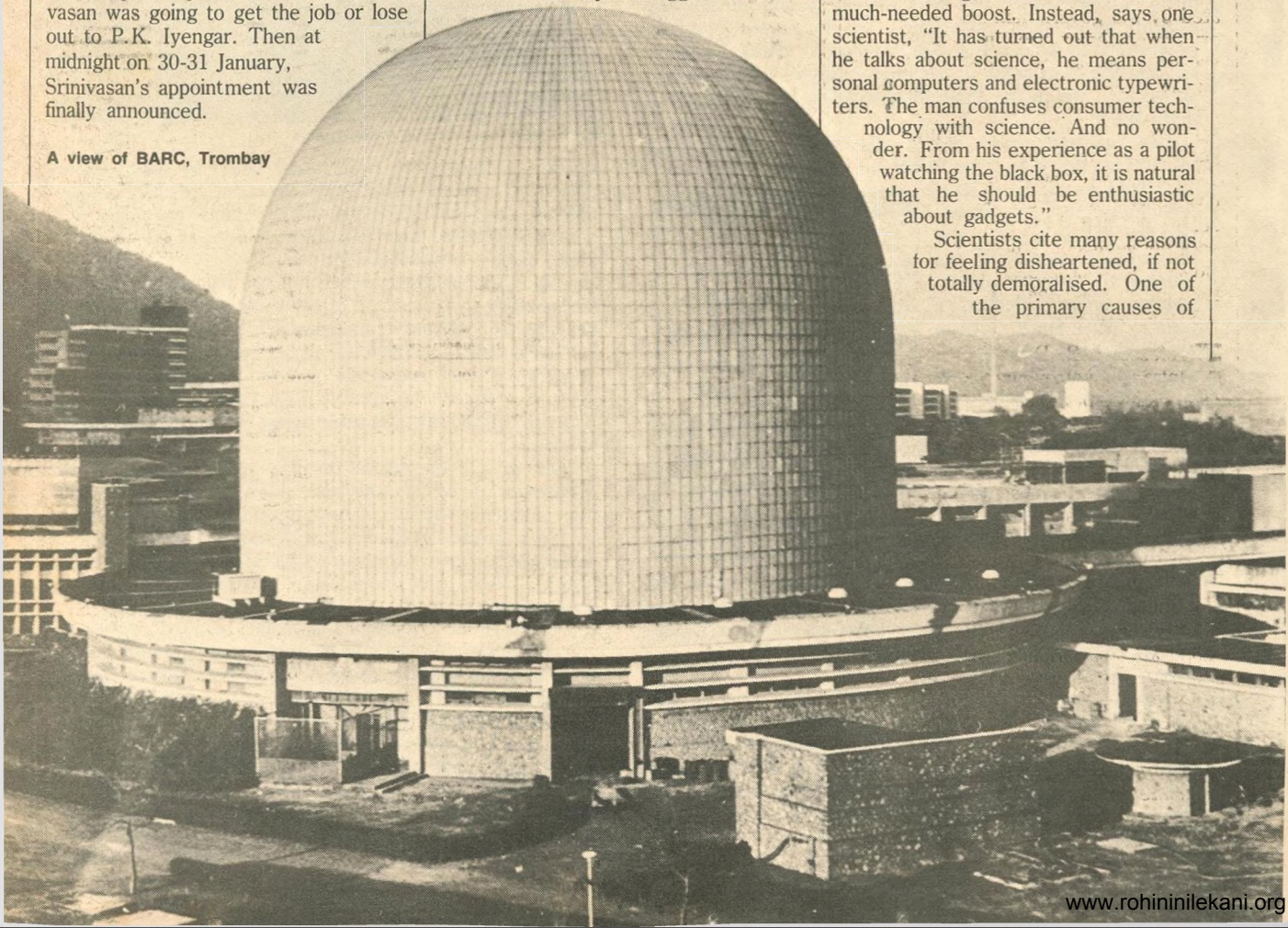
This set off a predictable uproar and Iyengar announced that he intended to quit. Terrified, the government quickly changed track, withdrew Srinivasan's appointment and granted Ramanna a special extension. This absurd state of affairs persisted for a full nine days while the rival candidates flew to Delhi and lobbied politicians and bureaucrats in the full glare of publicity.

Finally on 9 February, the government made up its mind again. It was going to be Srinivasan after all and the entire drama had been to no avail. Hardly had the country forgotten the AEC fiasco, when another leading light of the scientific establishment—The Indian Space Research Organisation (ISRO)—ended up with egg on its fusel-

age. At 5.00 am on 29 March, Prime Minister Rajiv Gandhi and a press party journeyed to Sriharikota for the much-heralded launch of the Augmented Satellite Launch Vehicle (ASLV-1). The lift-off seemed perfect but minutes later the booster rockets failed and the ASLV-1 exploded. It was yet another front-page fiasco.

The two incidents drew attention to a deeper malaise. Three years after Rajiv Gandhi came to power the Indian scientific establishment is demoralised and directionless. Scientific triumphs are rare and politics all-pervasive. It had been hoped that with his talk of taking the country to the 21st century, Rajiv Gandhi would show a real appreciation of science and give Indian scientists a much-needed boost. Instead, says one scientist, "It has turned out that when he talks about science, he means personal computers and electronic typewriters. The man confuses consumer technology with science. And no wonder. From his experience as a pilot watching the black box, it is natural that he should be enthusiastic about gadgets."

Scientists cite many reasons for feeling disheartened, if not totally demoralised. One of the primary causes of

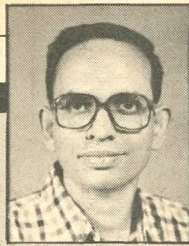


frustration is the sense they have of being controlled by "science managers", the bureaucrats who are in key positions in the various scientific departments. As Dr K.P. Jain head of the Laser Development Technology section of IIT, Delhi says, "There is an old boys' network that dominates scientific appointments, funding, project selection, etc. Though well-intentioned, Rajiv Gandhi has not been able to sidestep this network. The old guard is still there guarding their vested interests, and their stranglehold over science continues."

This "old guard" has been controlling Indian science almost ever since independence. Over the years, they have become a power-crazy group that has lost its sense of perspective. Elaborates Ashis Nandy of the Centre for the Study of Developing Society (CSDS), Delhi University, "After independence we inherited this vision of science as a liberating principle. We thought we were going to solve our problems through science. And to actualise that, we decided to keep science separate from politics. Scientists were not involved in the decision-making process. The whole business of science was handed over to the science bosses who established fiefdoms in the feudal style."

The system of fiefdoms is perpetuated by the government's policies. Every time a senior scientific position falls vacant, a bureaucrat is the first choice for filling it. The department of environment for instance, was headed by a scientist, Dr Kushoo. But today it has passed into the hands of an IAS officer: T.N. Sheshan. This usurpation by the civil service is a recurrent pattern. As a senior scientist comments, "The difference between a bureaucrat and a professional is that the professional is loyal to his subject, while the bureaucrat's loyalties are variable."

**P**rofessor R.R. Daniels, head of the Infra-red Astronomy Group of the Tata Institute of Fundamental Sciences, deplors this lack of loyalty and commitment to the cause of science over and above everything else. The bureaucratic pattern of "managing" science has made it into a profession—a nine to five job—which is too stagnant to produce scientists of stature. "There are no longer scientists like Ramanujam who was only an ordinary clerk who formulated mathematical theorems that other people are still working on... What Indian science lacks today are the non-physical resources—like way of thinking, ethics, motivation and commitment... Unlike abroad, men of science here do not return to their parent scientific institutions after working for the government.



**Madhav Gadgil: "The real tragedy is the university departments... Unfortunately they have not been able to develop a culture where people feel they must work hard"**



A rocket being launched from the ISRO facilities: one of those which succeeded

**Sam Pitroda: "Our concept of scientific work is Brahminian. Senior scientists think they should only sit and do research in the labs"**



It is considered a demotion to do so."

Salaries for scientists continue to be abysmally low, even after the implementation of the Fourth Pay Commission's recommendations. Top-ranking scientists may be getting acceptable salaries and perks—for instance, the chairman of the Atomic Energy Commission gets Rs 9,000/- per month—but the average middle-level and younger scientist feels that he or she will not be as well off as an engineer or a civil servant or a management specialist. As Dr Rajeev Srivastava of the Nuclear Power Board points out, "The cream of students in standard XII go to the IITs or into medicine. Those who really want to

continue in the scientific profession go for their Master's. But after that, many are lured into the management institutes, because with an MBA you can skyrocket to positions never given to people with scientific or technical qualifications."

Another scientist illustrated the same point with a comparison: "In 18 years an IAS officer automatically becomes a joint secretary—and after that it is a matter of selection. But a scientist takes 25 years to come up to that position, and even then he does not enjoy the same status...for example, Professor Jayant Narlikar of the Hoyle-Narlikar effect would not be in a position to maintain a

car personally. This hurts scientists because it shows the deliberate, considered view that the government holds of them."

Given this trend, it is not surprising that even those young people who choose to go into science feel disheartened from the beginning. Professor Chanchal Mazumdar, recently appointed director of the Bose Institute in Calcutta, has no doubts about this. "Younger scientists in India don't get adequate financial and moral support the way they get in many western countries. Senior scientists have an easier time (though not always) in commandeering funds for their own projects." And yet, it is the young who will form the foundation for the science of the future. Prof. A.P. Mitra, director general of the Council of Scientific and Industrial Research (CSIR) in New Delhi also identifies this syndrome as a major problem. "The problem in our country is that students of basic science are at a disadvantage. Even gifted people do not always get proper jobs. The result is a trend on the part of many brilliant students to move away from theoretical science to more lucrative fields. But our younger scientists badly need recognition—their creativity needs to be protected. We should catch them young and give them reasonable salaries as well as a lot of encouragement." Instead, grumbles one senior scientist, "The people who are in charge of the government's science policies—people like Menon and Varadarajan—do not even bother to find out what the younger scientists are thinking and feeling."

In the absence of such encouragement, India is now suffering from both an internal as well as an external brain drain. Science in India is not being able to recruit the best people. And of those who do choose the field, a substantial number try to emigrate abroad where there is a better research climate. Most scientists have continued to bemoan the absence of a proper research environment through various changes of regime. For all the government's encouragement of science, as well as the seemingly generous allocations for certain projects (Rs 14,000 crores have been allocated for the production of indigenously developed nuclear reactors between 1986 and 2000 AD), many scientists feel helpless and frustrated when expensive lab equipments do not work, or are not supplied on time.

Perhaps the reason behind this is two-fold. On the one hand, government spending on science and technology is very low, in spite of the continued verbal emphasis on science as the major

answer to our problems. One senior scientist estimates that no more than one to two per cent of our GNP is spent on science and technology. This is also reflected in the bureaucratic structure. "The science and technology ministry is a *faltoo* ministry—it has no importance, no patronage," said Dr K.P. Jain. Clearly, in Delhi's corridors of power, it is the big bucks that get big privileges.

Worse still, in the scramble for funds that is inevitable, money is often allocated on the basis of favouritism and personal politics. Sycophancy, rather than good research, often determines whether a scientist will be able to carry on with his projects. Naturally, younger scientists who may have good brains but little training in diplomacy, or no connections, feel doomed from the start. And when they project themselves into the future, they see all the major scientific awards going to the powerful old scientists who lobby for recognition.

Historically, therefore, the tables have been turned. In the early days of India's independence, even though the role of scientists had been defined as apolitical, a Prime Minister like Nehru had to reprove a scientific giant like C.V. Raman for leading too much of an ivory-tower existence. Raman of course fired right back, "Science cannot exist in a government institution." Today, most scientists, even though they would prefer to engage solely in scientific research, feel they must invade government institutions for their own survival. Power, instead of coming from the barrel of a gun, comes from behind a bureaucrat's desk.

The late 60s and the early 70s saw the beginning of politicisation among the scientists. Today it is at an all-time high, whether it is in organisations like the BARC and the Indian Association for the Cultivation of Science (IACS), or whether it is in academic institutions like the IITs and the universities. Instead of

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Rajiv Gandhi addressing the 74th session of the

scientists remaining committed to science, individuals have started gathering loyal adherents to acquire political leverage. Factionalism is rampant. At the BARC, for instance there are Punjabi, Bengali and Tamil lobbies! Ad hoc positions have also been created to accommodate favourites of those in power.

The government is not providing any system of checks and balances to counter this trend. In self-defence, the scientists say that it is the only way they can safeguard themselves against the actions of a government that is not sincerely committed to scientific policy decisions. Even a supposedly progress-oriented Prime Minister like Rajiv Gandhi has not been able to do away with the 19th century rules and regulations which control the action and behaviour of the scientists.

Shortly after his accession to power in February '85, scientists from all over India met in Delhi for a two-day seminar. Having seen Rajiv as a beacon of hope, they called for fundamental changes in the present administrative, financial and personnel policies, which "do not take into account the specialised nature of scientific and technological endeavour". They demanded amendments in the rules of conduct, such as the Official Secrets Act, so that there could be greater scope for dissent and a freer atmosphere of research. More than two years later, nothing has changed. The annual session of the Indian Science Congress, which used to be traditionally opened by the Prime Minister of India,

# 74<sup>th</sup> SESSION OF INDIAN SCIENCE CONGRESS PLENARY SESSION 7-8 7 BANGALORE UNIVERSITY



Indian Science Congress (plenary session) at Bangalore

has not been attended by Rajiv Gandhi even once. The Prime Minister's Science Advisory Committee has not met for over a year!

Have the scientists themselves played no role in this drama of erosion and disintegration? There are plenty among the scientific community who will say yes. In the early days following independence, the political executive made a habit of only hiring people who promised to deliver. Many senior scientists fell into the trap of making unrealistic promises and thus lost credibility.

The state of the university departments has added another element of disappointment to the popular vision of the scientific community. As Dr Madhav Gadgil, professor of ecology at the Indian Institute of Science in Bangalore says, "The real tragedy is the university departments... Unfortunately they have not been able to develop a culture where people feel they must work hard. They are not in the mode of wanting to excel, so they have never risen above the level of mediocrity. For instance, in ecology, there is hardly a culture of going out in the field. There is no relation between what is going on in the countryside, and what they are working on. Therefore they are never excited about what they are doing."

Perhaps, this is because, as S. Pitroda of the Centre for the Development of Telematics (C-DoT) in New Delhi says, "Our concept of scientific work is Brahminian. Senior scientists think they should only sit and do research in the labs. They leave the application of re-

search, the field work and the testing of equipment, to lower-level people who do not have real knowledge and expertise. This is what accounts for technological failures like the ASLV-1."

**A**nother destructive factor at work within the scientific community is the inability to accept or provide constructive peer criticism. Any criticism is taken personally. In most scientifically advanced countries, scientists welcome being judged by their peers, and research work thrives on controversy, suggestion, and exchange of ideas. For Indian science to really acquire the respect both of our people and of the international peer group, it is essential to become result-oriented, not personality or theory-oriented.

Accountability would also improve the functioning of existing scientific organisations—which is vital before any improvements can even be thought of. A senior scientist mentions the Helium Processing Plant at the Tata Institute of Fundamental Research (TIFR), one of the very best scientific institutions in India today. Investigation revealed that this piece of machinery, worth Rs 30 lakhs, had been sitting idle for quite some time for lack of replacement of its nitrogen trap which costs around Rs 2 lakhs. And yet, a report said that the requirements in the Bombay area have been met.

According to most scientists, Indian industry has not played anything like the supportive and sustaining role played by industry in most western countries.

Organisations like the Bell Telephone Co. or GEC in the USA, have patronised and promoted scientific research through their R&D units. Scientists feel very strongly that Indian industry should have emulated this. In the absence of such support, scientists, particularly chemists, suffer actually. They need a lot of equipment for their lab work. So they either have to be contented with second rate products (and feel alienated and frustrated in their home base), or they rush to take advantage of the new liberalised import policies to buy foreign products.

Prof. A.P. Mitra of the CSIR senses a slight reversal of this trend lately. Certain industries have been setting up their own in-house R&D units. But there is still a wide gulf of misunderstanding and distrust between science and industry.

So what are the answers for science in India? Can it really guide us into the 21st century? Many are optimistic because they feel that our potential is great. On an individual basis we have great, creative scientific brains in India. But it is vital for us to de-bureaucratise science as well as to lower our scientific sights to suit the needs of the country. Technology should be developed, not in imitation of the west, but in the context of our own unique Indian reality. High-tech space ventures like the ASLV-1 may provide "a great spectacle for the middle classes and the media—but it is so divorced from public life that it is a substitute for real science," comments Ashis Nandy.

As things are, a lot of understanding is necessary, both on the part of scientists, and on the part of the government. Many senior scientists complain that Rajiv Gandhi makes imperious and unreasonable demands on scientists, and expects instant answers. Mrs Gandhi, on the other hand, had more patience and was willing to listen to scientists' problems. Perhaps the government needs to steer a course between these extremes. Dr Pitroda's suggestion of an open forum where the issues of science and technology can be debated before policy decisions are made, is a valuable one. But the current darkness of pessimism badly needs the reflected light of new directions. Pure science and applied technology have to feel interlinked as a two-pronged approach to development. And while the 21st century waits for every country, India must develop her own particular vision—more modest and less euphoric than that of many other countries—in order to have a successful tryst.

**Chitrita Banerji in Calcutta and Delhi with Olga Tellis/Bombay and Rohini Nilekani/Bangalore**