

Visions and nightmares

The old 'millennium' is thankfully over and the new one is upon us. Mercifully, we can be spared further talk of Y2K, problems and all. The continuity of time is self-evident and despite fond hopes of science fiction writers (and the aging population, which of course, includes all of us) time's arrow speeds along in only one direction. The new year, century and millennium are then, but an artificial punctuation mark imposed by the grammar of the Gregorian calendar. But, like all punctuation marks it has made us pause; in some cases it has catalysed reflection and in most, almost inevitably, celebration. The impending 21st century was first publicly sighted by our late Prime Minister, Rajiv Gandhi, in the mid-1980s; surprisingly, there was little talk of the 'third millennium' then. In the intervening decade and a half we have been flooded with visions for the future, some modestly targetted to the early years of the new century, while others are more ambitious in venturing optimistic forecasts, which may eventually be forgotten. Unsurprisingly, most 'visions' invoke a major role for science and technology in shaping the future; after all we live in an age of science. Most of these public 'visions' are authored by key functionaries in the apparatus of government science; unfortunately, much of science in India, like many other activities, remains a completely, centrally controlled and funded operation. Any 'vision', which envisages a role for science, cannot be taken seriously if it is completely myopic about the state of science and higher education in science in the country.

Over the last few years, two areas of crucial importance to the cause of science have deteriorated dramatically. Firstly, University science departments, with very few exceptions, have been fighting a losing battle on several fronts; diminishing budgets, declining quality of enrolment, inability to hire new faculty, the gradual disappearance of active research groups with professorial retirements and most importantly, the poor appreciation of most University administrators for the special requirements of science departments. Secondly, our research institutions, specialized laboratories and the mechanisms for funding research have been under increasing strain. The dimi-

nished purchasing power of the rupee, the extraordinary salary burdens imposed by the last Pay Commission on vastly overstuffed institutions and most significantly, the rapid decline of administrative mechanisms within funding agencies are matters that need to be urgently recognized and addressed. Few senior administrators of science are willing to even concede that there is a problem; for them it is business as usual. While dramatic improvements are hard to achieve, the least that one can hope is that the tide of deterioration can be stemmed.

A key element in the conduct of basic science is the support of individual investigator generated projects, which go through the elaborate process of peer review. In addition, infrastructural support in the form of regional sophisticated instrumentation centres has been important in making accessible major equipment, which are essential for the conduct of modern research. The Department of Science and Technology (DST) and the Department of Biotechnology (DBT) are two of the key funding agencies, which have contributed greatly to raising the level of science in India over the last two decades (the extramural activities of other agencies like the CSIR, ICMR, ICAR, DAE and DRDO are more limited). However, in recent times both the DST and DBT are beset by internal difficulties. The average time for sanctioning a grant has increased; the time taken to receive the first instalment of money is alarming and the likelihood of receiving subsequent instalments on time, decreases continuously.

The ostensible reason for this situation is the diminishing resource base for science, coupled with the whimsical interpretation of financial rules that have been in place for over half a century. Strangely, the very same procedures were in effect over ten years ago, when the flow of grants was smoother. The funding agencies are manned by a staff trained in science, often armed with doctoral degrees. But, unlike their counterparts in the administrative sections of other ministries, they are shackled by their specialization, to work in the same department for inordinate lengths of time. The absence of mobility and fresh challenge can very quickly act as a dampener for even the most enthusiastic entrant. The

perceived superiority of the financial officers contributes to sagging morale. Many scientific officers at the agencies are inevitably caught in a crossfire between their internal financial sections on the one hand and the laboratory scientists on the other.

Another dangerous trend, that has surfaced and almost became institutionalized, is the tendency to support mega projects of apparent 'societal impact' and the creation of major new laboratories, with little regard for the quality of leadership and manpower that will eventually man these structures. While projects with an expenditure of several crores of rupees can sail through a 'green channel', the minor individual projects, which determine the fate of small and active groups are consigned to the slowest possible tracks of officialdom. It is easier today to consider the possibility of eliminating AIDS, malaria or tuberculosis with a magical (and sometimes mythical) vaccine as part of a 'national mission'; to evaluate the possibility of an Indian mission to the moon; or to promise safe, cheap and unlimited power through nuclear energy, than to address the problems of ordinary scientific research that is being done in hundreds of laboratories across the country. Presumably, the many minor advances that have resulted from these incremental researches are easily forgotten.

As part of the grand bouts of introspection that have accompanied the death of the 20th century, countries all over the developed world have reexamined their science and technology infrastructure and decided on new initiatives and set new priorities. In the West, change is always contemplated; the calendar is not the sole catalyst. The acceleration of the pace of scientific change worldwide, places developing countries at a decided disadvantage. The playing fields of the present and the future will be anything but level. Even a traditional establishment like the Chinese Academy of Sciences has

embarked on an ambitious and wide ranging plan for revamping the infrastructure for science (*Science*, 1999, 286, 1671). Japan, Israel and Canada have in the recent past set in motion major reform processes. The Europeans have unobtrusively consolidated and revamped their science journals, in a clear move to face the increasingly difficult challenge of keeping pace with American journals. Across the developed world, academies and scientific agencies are acutely conscious of the need for purposeful change. We, on the other hand, have been content as a community to wait for initiatives to emanate from politicians, who sometimes have little interest in their portfolios. Science is neither glamorous nor is it a subject with a wide public appeal. The few initiatives that have emerged appear fatally flawed, like the Swarnajayanthi Fellowships (DST) scheme or the companion schemes envisaged by the DBT. Some of the special award schemes are hard to justify in an environment where money is in short supply for routine research grants. The argument that these schemes will promote 'excellence' appears hollow with each passing day. These initiatives appear to be based on the premise that personal awards attract greater attention, than a focus on the detailed mechanics of research funding. No one would cavil at schemes to promote recognition of scientific merit, if equal attention and enthusiasm were devoted by the agencies towards the streamlining of their financial and internal administration.

Visions for the future, even in the limited area of scientific research, must be based on the ground realities of the present. There is an urgent need to rebuild the institutions associated with the conduct of science. The dawn of a new century can provide an excuse for action if the visions for the future are not to turn into nightmares.

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