'The Indian Scientist'
Some Reflections

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Introduction

The role of science-based technology as a strong and effective force for development and the consequent improvement in the living standard of the Indian people was clearly appreciated by the builders of modern India. Jawaharlal Nehru, a seer of science-based humanism, lent his enormous prestige and power to the cause of building, encouraging and sustaining not only the institutions for technological research and development, but also the institutions devoted to the pursuit of pure sciences.

He had the courage to dream about a new India "whose temples were to be the universities and research laboratories". The message to the youthful scientists was that over and above the intrinsic adventure of participating in the scientific quest, they were also contributing to nation-building. It was heady and infectious: India committed itself to the task of implementing an ambitious scientific research program. Over the years the program was to grow into an enormous scientific-technical service which spurred on the next generation of students into the pursuit of science and technology. In addition to the various national laboratories and major research institutes and a few distinguished universities, the new Institutes of Technology got into the propagation of high-tech expertise with a vengeance. While many students from these high-tech institutions felt they should go abroad for higher learning, the level of advanced studies in science and technology in the country had already reached a new high. The scientific manpower is awesome in numbers. By some counts, it is the third largest in the world, surpassed only by the two superpowers.

Thus, there appeared on the Indian scene a new person, a symbol and product of a new national orientation, heir to the universal heritage of "truth unto its innermost parts", to go "where no man has reached" to follow "knowledge like a sinking star". On this person is pinned the hope of a nation to leapfrog into the prosperity associated with a technological industrial society. This new person, the harbinger of a new era, is the object of our study.
The Indian Scientist

This paper deals with the "Indian Scientist", a person of Indian origin involved in scientific research. Although most such people are found in their natural habitat, the Indian laboratories, research institutes and universities, a very substantial number are found to be associated with foreign institutions mostly in the West, particularly the universities and high-tech industrial laboratories of the United States. The American pool has been increasing rather rapidly with a large steady flow from major Indian universities (the institutes of technology are included). For our purpose, we shall take this phenomenon, that is, the existence of a large group of Indian Scientists in America, as a "given" of the system. We do not propose to discuss either the dynamics or the consequences of this migration but limit ourselves solely to an analysis of the scientist's condition and a little bit of his science, sociology and psychology. We do, however, suppose that this community is important enough to warrant a soul-searching examination. Before embarking on the subject proper, we shall state a few more shortcomings of the current effort. We wish to talk only about the structural aspects of the phenomenon of the "Indian Scientist". Therefore, no statistics will be given. Further, we plan to cover the broad subject by concentrating on the scientists working in America which will naturally exclude important and interesting but local Indian problems. But we shall outline how the American experience is a determinant for the pool of scientists in India.

We begin with a brief description of this group as well as a statement of its problem. The group is a large, competent body quite uniformly distributed over institutions of higher learning throughout the U.S. Although they have contributed adequately to the general body of scientific knowledge (that is, commensurate with their numbers), they can be credited with a disproportionately small number of fundamental, trendsetting, or strikingly creative contributions to science. A typical scientific career could be divided into three phases:
1) The early educational phase, which in the present context consists of graduate studies leading to a Ph.D. degree followed by a few years as a Post Doctoral Fellow or research associate. This phase lasts anywhere from seven to ten years, and, by the end of it, the scientist is approximately thirty years old (though exceptional people may reach senior academic ranks by this age). This turns out to be the golden period of his career. During this time, there are examinations to pass, courses and other assignments to complete, sundry well defined chores to finish, scientific interests to be identified, and possibly working alliances to forge. The average performance is excellent, and most of the Indian students end up at the top of the heap. There is a fair amount of encouragement from the research establishment, represented by the professor, and fellow students. This wonderful state is further sweetened by an increase in material comforts because the life provided by even a graduate assistantship is in many ways superior to a relatively deprived Indian middle class existence, and it is the middle class from which most of our subjects come. We believe, however, that deeper psychological reasons may have a lot to do with this optimistic and upbeat attitude. The fact, that the young person has competed with his American counterparts, in an American setting and with American rules, and succeeded, gives him a great psychological boost and a new faith in his destiny, and he feels ready to ask for the sun and the stars.

2) Middle professional life: As a natural consequence of the scientist's coming of age, the godfather role of the professor is withdrawn. He even finds him as a competitor. This event ushers in a new era, in which the scientist must sink or swim on his own. It is during this time that the young person directly faces the scientific establishment in contradistinction to the earlier phase when he was but an extension of an established professor. Due to reasons that we shall discuss later, a strange new phenomenon appears on the horizon; there is a gradual deterioration in relative performance and productivity.
Local people who were far behind in the graduate school slowly forge ahead in matters that really count, i.e. references to their work, invited papers, tenures, and so on. The former state of euphoria gets highly diluted; the days of enthusiasm and optimism are gone for good.

Two distinct modes of behaviour appear at this stage. One group internalizes the discrimination, accepts the prevailing value system, and settles down to a safe but unexciting and scientifically colourless life, often at levels much lower than expected by or of them. They accept that they will simply fill the ranks, and must not hope to be in the forefront. The other group resists this tendency to succumb to the injustice of discrimination, and feel that there will be some redress of the unfairness; something will surely turn up. Usually, it is the more talented and more ambitious who do not give up the struggle. The result of this prolonged unwillingness to accept the brutal facts is not vindication, but disillusionment and bitterness. Scientific recognition is rare, the awards even rarer.

3) Mature professional life. For the first group who accept the fait accompli, later life is safe but also without much zest. They become hewers of wood and carriers of water, are well paid, and swell the ranks of scientific manpower. For the second group, life becomes a continual struggle; the disparity between what they expect and what they achieve is a constant drain on their creative energy. There is little appreciation for their past work and less for their continuing contributions, excepting from the local group which directly benefits from their research. Even there, the credit, if at all, is grudgingly given. But one cannot complain or air one’s frustrations: no one listens anyway. The consequences are quite grave; nervous tension sets in and heart attacks occur, often at an early age. Total lack of professional satisfaction drives most of this group elsewhere to seek solace and contentment. This results in a certain disinterest in science, not just in the scientific institutions, but in science itself. All these things
together lead to a definite reduction in scientific productivity, followed by feelings of guilt and further loss of status. This vicious circle culminates in a nonlinear explosive instability.

There are, of course, notable exceptions, but they are indeed few and far between, and may be viewed as statistical quirks. There are some others who also avoid said fate by the expedient of aggressively adopting a new value system, the ethos and character of the dominant culture.

Universality of Science?

Anyone attempting to understand this phenomenon must begin by digging into recent Indian history. It must be noted that there is no recent tradition of scientific research in India. There were individuals like Bose, Ray, Saha and Raman who did enrich the science of their times, but they were singularities, bright stars shining in a background which was indifferent to them, and who in turn left it almost unchanged. They did not create a tradition which could nurture and sustain a modern scientist and make him confident in his ability to independently produce quality science; they left even less which could inspire one.

There is a strong tradition, however, to which every Indian was heir. This is the tradition which comes of being a colonized people. During India's colonial past, critical and innovative thinking was definitely not encouraged, and often not tolerated. The most talented Indians were trained to learn traits which made them excellent sustainers of an already working program. The programs were always of the British, the problems were always defined by them, broad policies and solutions were always due to them. What was needed was the man power to put their ideas into practice. Excellence, for an Indian, simply meant that he carried out the instructions well, and to the satisfaction of the master. Indians performed at best "at the level of the field captain" and were responsible only for local interim solutions to some operational problems. The
success or failure of a pursuit was also decided by others. It was clearly understood that they did not belong to the select caste, and hence, planning, thinking, and chalking out the strategy for important issues was not their domain. One knew the limits imposed on are by birth in a subject country and one did not try to surpass them. This was the heritage common to all intellectuals: scientists, historians, economists and others. Could this be damning enough to create the 'condition' peculiar to a modern Indian scientist? The answer is no, not by itself. But a combination of the colonial tradition and the absence of a scientific tradition is quite formidable and is made lethal by a hearty dose of the much touted slogan "Science is Universal".

On the surface, everything is fine and noble with the concept of the universality of science. And, indeed, the language, the methodology, the content and the results of science are universal, as they must be to be meaningful. What is not universal, however, are the institutions of science. What constitutes interesting, important, and even moral scientific problems, how should scientific activity be optimally organized, what are the criteria for merit, how does the community reward good work, and several such questions will clearly be answered in different ways by different societies. It would be naive to expect that our sociopolitical and psychological biases would not enter into the institutions of science. After all, these institutions are finally controlled by scientists, who just happen to be as parochial, as prejudiced, as nationalistic and political as any other large group of people.

Somehow, this new breed of young scientists, especially in the third world countries, ended up romanticizing not only science (which is deemed to be a panacea for the third world's problems) but the scientist also. The word scientist immediately conjures up the kind and benign face of Albert Einstein, and one finds it difficult to associate with him anything mundane or commonplace. This romanticization could have been quite harmless if these scientists were never to interact with the real institutions in the West. Clearly, that
was not and is not possible. Modern institutions of science are creations of
the West, and they alone hold the keys to the august doors of modern knowledge.
The budding scientists from the third world countries had no choice but to come
westwards and imbibe this alien culture. In their desire quickly to jump into
this creative activity, they came to the West in droves. The ethos of the universal-
sality of science, or rather their understanding of this ethos made the scientists
look with disdain on the idea of creating institutions and knowledge
appropriate to the needs of their society. This colonialism in science was
accepted with hardly any resistance; in fact, people happily and willingly walked
into it. This was further helped by an extremely important post-war development
in the United States. The phenomenal prestige gained by the scientists due to
their success in the Manhattan project made it possible for them to launch immense
scientific projects for which trained manpower was sorely needed. The need be-
came even greater when the ambitions space project was launched. Thus, there was
the coincidence of wants, people from the third world desperate to come, and the
institutions in the United States that could definitely use most of them. The
situation is vaguely reminiscent of the "indentured laborers" who constructed
huge railroads, with the differences that this time the laborers came knocking on
America's doors (with their master's and doctor's degrees) and that the work was
physically less hazardous. Thus, this new relationship of complete submission to
the dictates of the American scientific establishment came about smoothly, will-
ingly, with a smile on the face of the Indian scientist and unconditional accept-
tance in his heart. It was made even sweeter by a significant improvement in his
material conditions, and consequent increase in prestige back home. He was also
able to fight and dispel any pangs of conscience that may arise from a feeling
of 'deserting' the society which educated him by invoking the dogma of the "uni-
versality of science" and the "scientist as a citizen of the world". In his utter na-
he probably believed in the notion that the scientist belongs to the whole world. W
must point out however, that these notions were taken seriously only by the budding
scientists from the third world; most of the Western scientists, even as they entered the profession, were quite cognizant of their nationality.

The Facts of Life

Let us reexamine the psychodynamics of the Indian scientist in more detail even at the risk of a repetition of the earlier discussion. This is how their little world begins: in pristine purity and childlike innocence. Several years later, when initial signs of discordance come, most scientists refuse to see them. When reference to their work (unless it is with a well established American in which case it is basically taken to be his idea) is not given, when the scientific societies are found to be a bit miserly in inviting them for talks, when the funding agencies are not particularly excited about seeing them as principal investigators, when tenure committees appear to be comparatively more demanding on them, the era of conflict begins. The scientist's first response is often a resolution to work harder. "If Mr. X made it, there is no reason why I should not be able to." Working harder, however, does not materially alter the situation, and it slowly dawns on them that the scientific institutions (which control most of their lives and careers) are not totally impartial: their universality is not entirely without exception. The discovery is quite shattering, more so because of the romance, awe and respect with which they viewed these institutions. The longer they resist, the deeper is the hurt.

Careful and cool reflection on the state of affairs reveals that there was no institutional resistance to their careers up to a certain level. As long as they were willing to play in an ensemble led by others, there were no problems. The resistance came when they tried to become the conductors of the orchestra. They were allowed, even encouraged, to be bright boys, but they were not expected to be powerful and trendsetting men. If ambition were to drive them towards these goals, the task would be uphill and frustrating. They do have a place in the scheme of things but with well defined limits, considerably lower than the sky.
Unfortunately, this realization comes rather late in the day. By this
time, the scientists have gotten accustomed to living in the West, with all
its pleasures and comforts, real as well as imagined. Further, their rela-
tionship with the land of their birth has grown more and more tenuous over the
years. In most cases, the relationship is limited to occasional visits to
relatives and eventual complaints and gripes about the prevalent inefficiency,
dishonesty, and stupidity of all that they left behind. Thus they find themselves
in this unenviable position right in the middle of their lives. There are a
wide variety of ways by which people learn to cope with the situation: a)
Adopt the typical immigrants' maxim "don't rock the boat" and accept their
fate. After all, there is life beyond one's work. This group, in all its
wisdom, would settle to what we would describe as a safe but scientifically un-
exciting life. In general, their scientific careers cease to afford them much
satisfaction, and they seek happiness elsewhere; in stock markets or real estate,
in aerobics, in electronic gadgetry, and perhaps indulging in social and religious
practices they wouldn't have touched back home. b) Some scientists choose to do
unto others what was done unto them. They behave like semi colonial masters
in their attitudes to scientists working in India, hiring practices con-
cerning Indian scientists, and collaboration with Indian scientists. In this
task, they are ably assisted by the very people they wish to ex-
plot. An associate professor in a respectable Indian University would happily
come to the U.S. as a post-doctoral fellow at a pitiful salary and be thankful
to the perpetrator of this injustice. c) Some others will fight, will become
very aggressive, will try to get their due by all means available. These people
end up spending much time in extrascientific pursuits with minimal results.

Whatever path the scientist may choose to follow, his scientific produc-
tivity often goes down; his interest in science also diminishes. He strongly
resists being driven to this state, is confused and disheartened, and feels at
home neither here nor there. He cannot just pack up and go, certainly not from his scientific work, but he cannot stay and be happily productive. He is not allowed to belong as a full citizen to the institutions which control his career, and at the same time cannot leave whatever crumbs the system offers because there is no place secure enough to go. This situation can become unbearable over a long period of time.

We notice that the entire spectrum of reactions proclaims demoralization, and contains very little ongoing and positive thinking. Unfortunately, these are also the reactions of a very shortsighted and selfish group of people with practically no social responsibility and concern for the future. We would like to believe that almost all of them (highly intelligent as they are) do indeed understand or at least feel the basic causes of their dissatisfaction. Therefore, ignorance or lack of awareness could not be the root of their inaction. It is the nonexistence of a life-support system for the community; that is, the lack of scientific institutions of their own, built and controlled by themselves, which drives them to this unenviable situation.

Cultural Determinants of Science

It is only natural to ask at this point whether the fate of the expatriate Indian scientist is of more than peripheral interest to the larger question of the fate of the third largest pool of scientific manpower and also whether there is something intrinsically irreconcilable between the culture and tradition of the educated Indian and the modernity represented by contemporary science. We deal with the latter question first especially because there are concerned social critics who are questioning the wisdom of the country's commitment to a science-based modernization.

Before enquiring into the cultural heritage of the typical Indian scientist and its bearing on his mind-set in relation to modern science and its "relentless value-free search for the laws of nature", we digress to deal
with the question of a possible conflict between modern science and classical Indian culture. It is curious that such a question should arise since classical Indian thinking came very near the preceding definition of a scientific world view not only with regard to the external world but to life and any possible after-life. No predetermined values barred the quest in any field that was investigated. The sanctity of the Vedas was questioned by the Jains, the Buddhists and the Lokayats. God, constraining or condemning man, rarely appears in the classical schools of philosophy. The Jains and the Buddhists, in their relentless search for causality and the apparent inequality in endowments or circumstances, formulated their respective theories of karma, and God is not involved in any way in the causal chain. Among the six canonical "systems" of philosophy, sānkhya, nyāya, and vaiveṣika are equally daring. The philosophic tradition of ancient India is that of valueless, fearless, free inquiry. How could that tradition clash with modern science?

Some social scientists are apt to point out that these philosophical systems are the expression of the "high, elitist" stream while the folk culture was fatalistic, animistic, and Karma dominated. But this is a double standard: when we judge the scientific world view we do not equate American science with newspaper advertisement of miracle diets or teen cosmetics, by advocates of pyramid power and the Bermuda triangle. Nor does the ever popular astrology column in the newspaper reflect current scientific views on celestial dynamics. Instead, we take the best and the highest as the norm! So if the philosophic tradition of religions originating in the Middle East, studded with their own values and taboos, was no bar to the age of modern science in the West, how could one look to Indian philosophic systems to be the bar to a full fledged development of science? We must look elsewhere for the answer.

India is an extremely inhomogeneous society. There exist marked differences not only in food and clothing, but in language and customs; not only
from State to State geographically but within a state, between the educated city dweller and majority of the villagers. However, in the midst of this awesome diversity, there is a common amorphous culture of the urban middle class which provides most of the scientific and technical manpower. We believe that the culture of the urban educated Indian youth is not of
1) Classical India: He is not aware of the philosophy of Kapila, Gotama, Yajnavalkya, nor the science of Kanada; and in most cases if he has any acquaintance with their names it would be through children's books like Amar Chitra Katha,

2) Medieval India: Aryabhatta, Bhaskara, Al-Biruni and Amir Khusro are strange names that he sometimes comes across in a scholarly book but their discoveries or worldview has no discernible influence on him. He may pay lip service to J.D. Bernal, Schrachansky or Joseph Needham but he makes no common cause with them,

3) Colonial India: One reason may be that one tries to suppress the memories of the merchants-and-missionaries (accompanied by the guns and soldiers of an island country) who created the sterile but orderly edifice of colonial India. But the more operative reasons are two: first British governance in India made it clear that, scientific or scholarly abilities notwithstanding, men were not born equal. Even in areas like textile technology, the superior Indian technology was to be replaced by imported mediocre technology. India's role in the industrial revolution was only to finance it with its treasury but not participate in it. The other operative reason was Jawharlal Nehru's conscious decision that modern India was to be based on the new paradigm of scientific humanism, and the colonial past was no great inspiration for it.

The Land of the Free

So then what is the heritage and cultural background of the Indian Scientist? Our understanding is that it was an amalgam of several half-truths and half-
myths fostered by our system of education and strengthened by the exclusive use of English as the vehicle of communication in the realm of science and technology. Some of these half-myths are listed below.

The Western Man has built up the entire edifice of the sciences and arts, law, political science and economics. (We must remember that Greece, Soviet Union are all part of the "West" as far as India is concerned; we have difficulty in considering Japan as "West"). Though we were courted, colonized and plundered by the Western man with his military and applied technology, it was his science, technology and culture that was held up and accepted as superior and worthy of emulation.

With growing awareness of the west over the last four centuries we have come to distinguish between the various subspecies of the Western Man: the British, the German, the French, the Russian and most recently the American. In the post-war era it was very difficult not to be influenced by the greatness, generosity, strength, vigour and the immense resources and resourcefulness of the Americans. We did not want to like the British colonial overlords (though we actually did admire them); the Germans were quite advanced and methodical but we thought them lacking in humanity (we were, in fact told that they were quite devilish); the Russians had become merciless communists. So the Americans had to be the favourite nation for free India to admire, associate with; and emulate. We "knew" that they were against colonialism whether benign or despotic; they were for justice, democracy and economic prosperity for all. After all they rebuilt Europe and dealt generously with and humbled Japan. The discordant notes sounded by John Foster Dulles were firmly ignored, and his meddlesomeness regarding Kashmir was taken as an aberration to the tradition of democracy and fair play. After all it was Americans who proclaimed "All men are born equal" and "Democracy is the government of the people, by the people, and for the people". They were the people who had
erected the Statue of Liberty gracing the maritime approach, and seeking out the dispossessed and the oppressed. Their manners were more natural and friendly. Finally, they were the most innovative people, who not only exported massive quantities of food, but also had harnessed the hidden energy of the atomic nucleus to such demonstrably awesome purpose. The post-war ascendancy of American science made believers out of the severest agnostics. For those whose scholarship did not extend that far, there were the captivating folksy Reader's Digest and Mr. Dale Carnegie.

It is, then, no wonder that the science student in India looked to the American institutions and American scientists as the best of the best. The most ambitious and the most promising ended up in the United States. While the Statue of Liberty issued an open invitation, the Immigration and Naturalization Service took care that the imported crop was "top of the line". Those that came generally went to the better institutions, and were usually euphoric about the academic opportunities, and were no doubt pleased by the ease with which graduate fellowships were given out. The assessment and acceptance by the scholars at American institutions then became the norm for the better group of young Indian scientists. While the aging academic administrators and civil service officers talked about the great British (and sometime Continental) institutions, the young scientists saw that America was the scientific equivalent of the British Museum: the best from many lands was brought there. The result was a subtle but significant transformation: it was not British but American science and technology that was to be the model and the beacon.

It was not only the physical transport of sentient beings but also the change in the point of view of those that stayed home, which brought about the transformation. Even those that stayed and worked in India looked to the American institutions for moral support and sustenance, and it was American recognition that was sought. The physics papers must be published in the "Physical Review" to be "counted". Meaningful reference to one's work must
come from scientists at the leading American institutions. Personal success in the chosen field must include a faculty appointment offer from a major American university. In this context it is quite clear that to understand the "Indian Scientist" we must study the contrast between the expectations and actualities in the Indian scientist's encounter with the American scientist, not just with American science.

This contrast and its devastating effect on the productivity of the mature scientists is seen most clearly in the professional life cycle of the Indian scientist living and working in the United States. The perceptive reader could see that most of what we have said about the expatriate applies equally well to the homebound variety.

Can Science be Done in India?

The analysis that we have presented is not a pleasing one: after all, it tells us that the American scientific establishment is less than fair to its most outstanding imports. Many will vehemently deny it; others would consider it to be only marginally relevant. We ourselves are not happy to identify this root of the decline of productivity: but we must protest against any attempts to blame it all on the alleged eternal "fatalism" pervading the body-politic of India and its scientists. Indian classical culture was anything but fatalistic. Teachers and propagandists like Buddha, Mahavira, Ashoka, Nagarjuna, Sankara, and many others actively set out to change the society and its modes of thinking. Medieval India showed remarkable flexibility and adaptation. Its traditional culture survived against the onslaught of the dynamic and irrepressible Islam.

And most of all the modern science-technology student, (say at one of the Institutes of Technology) is a pushy, ambitious, aggressive brat, not essentially different from his counterpart in the prestigious American schools. Even the Indian peasant did not find his concern with karma any hindrance to adopting the hybrid strains of wheat, the herbicides, and chemical fertilizers
to increase his productivity many-fold.

Another "red herring" is that of the poverty of India. In a land of starving masses, where there are a multitude of pressing problems demanding attention, how can science flourish? Perhaps only a few societies can sustain and nurture science? These could be relevant if the practitioners had sufficient social consciousness to be perturbed by this problem, or if the government hesitated in allocating funds for research. Neither of these obtain. The government wisely enough has recognized that the foundation of basic science and research (at the state of the art in science and technology) are essential if the country is to adopt "leap-frog" development rather than "follow-the-leader" approach.

Epilogue

The principal aim of our paper is to draw attention to a sad but true fact, and get a discussion started among the scientists-technologists themselves and with the social scientists. It is a symptom of the malady that there are no proper organizational means to air, and possibly resolve this problem. Appropriate organizations are sorely needed.

Before we undertake, or even recommend a massive construction program, it is pertinent to ask: Why can the existing scientific institutions in India not serve the purpose? A detailed examination of this question is beyond the scope of this paper and is also somewhat beyond our expertise. What is relevant here is the perception of these institutions which exists within the community. We have already pointed out that an average scientist in India is rather eager, even desperate, to come to the United States. Thus the general impression is that barring a very few highly placed scientists, only powerful scientific bureaucrats and other scientists of indeterminate merit stay back. These very scientific bureaucrats, whose achievements and activities are modest, pose and behave as scientists which indeed gives credence to the charge that
science is not done properly or science is not done at all in India. Therefore, any institutions controlled by this set of people are not likely to excite any enthusiasm among the scientists living in India or abroad, particularly the ones living abroad.

This then is a description of the phenomenology as well as an analysis of the underlying reasons for the state of affairs of the Indian Scientist. The paper is in no way meant to be an attack on the American institutions of science. We simply wish to point out that these institutions are neither universal, nor infinitely benign: no human institutions are. Any large group of people with no organization of their own is likely to feel discriminated against, and unrewarded.

One hopes that this analysis of the past and present could be helpful in pointing some directions for the future. An inevitable conclusion of our analysis is that the Indian scientists must learn clearly to differentiate between "science" and the institutions of science. This realization naturally must force them to create structures suitable to their needs; institutions which safeguard and perpetuate their interests. It is of utmost importance that these institutions must be built on solid foundations, they must have a large number of competent, well-trained scientists, and they must perform their role honestly and seriously. Only then can the majority of scientists have faith and trust in these institutions, and look to them for guidance, encouragement, and intellectual sustenance. We must not forget that a pure scientist can look forward to few rewards: peer appreciation and recognition given by the scientific societies (which is again peer recognition). Their research is often not cashable, depriving them of the most obvious reward (This is to be contrasted with technology and other ventures where money provides the primary motivation). In addition to these rewards, the scientists very highly value the freedom to decide what research to undertake,
and to be able to set trends for the guidance of younger people. The only way the Indian scientists could hope to have scientifically free, exciting, and creative lives is to become their own masters. This is possible if today's scientists start building institutions which will secure and guarantee these privileges for themselves. They will have to rise above their current state of confusion and despondency, and furnish shoulders on which the next generation can stand. They must build schools, their own schools so that there will emerge from this vast body of dedicated professionals, a proportionate number of trend setters, extraordinary thinkers, and original creators: and let it be hoped that they will not find it hard to distinguish between the universality of science and the politics of scientific establishments.