



*Ever since the setting up of a string of national laboratories by CSIR there has been a debate regarding the migration of talented researchers from the universities to these well-endowed laboratories. It is interesting to note that Bhatnagar had also thought through this issue and answered some of this criticism in a convocation address which is excerpted below. He has also addressed the problem of student unrest in universities which seems to have started in early 50s. A brief history of CSIR written by S Sivaram serves as a backdrop to this address by Bhatnagar.*

*Editor*

The genesis of CSIR can be traced to the persistent effort by Sir Arcot Ramaswamy Mudaliar who as a member of Viceroy's executive council persuaded the Government of India to set up a Board of Scientific and Industrial Research. Bhatnagar was invited to pilot this and through his efforts the Council of Scientific and Industrial Research was formed on September 26, 1942 as an autonomous institutions.

Shanti Swarup Bhatnagar was called upon by Jawaharlal Nehru to build the scientific and industrial infrastructure for the newly independent India. The conceptualization of such an organization began even before the formal transfer of power. The Governing Body of CSIR approved the proposal of Bhatnagar to establish five national laboratories. The foundation stone for the National Chemical Laboratory at Pune was laid on 6 April 1947, four months before India became independent. National Physical Laboratory, Delhi, National Metallurgical Laboratory, Jamshedpur, Central Fuel Research Institute, Dhanbad, Central Glass and Ceramics Research Institute, Calcutta and Central Food Technological Research Institute, Mysore were established in 1950.

From this humble beginning, CSIR has now grown into a chain of forty laboratories with a total scientific and technical staff strength of 10,000. CSIR is amongst the largest scientific organizations in the world. The laboratories of the CSIR are grouped under five disciplines, namely, physical and earth sciences, chemical sciences, biological sciences, engineering sciences and information sciences. The total annual operating budget of the CSIR exceeds Rs.1000 crores. CSIR earns an income of about Rs.250 crores per annum by way of extra budgetary resources, mainly out of R&D services. The annual industrial production in India based on the CSIR know-how is approximately Rs.5000 crores. CSIR files about 1000 patents per year with roughly half in countries outside India. CSIR has also played a stellar role in promoting scientific research in universities through award of junior and senior research fellowships to students and research grants to faculties.

CSIR today is a resurgent organization, with an outstanding research infrastructure and a wealth of experience, poised to take on new challenges. CSIR's mission is to provide scientific industrial research and development that maximizes the economic, environmental and societal benefit for the people of India. Its portfolio of projects encompasses strategic, societal and industrial spheres. In the last few years, CSIR has also emerged as a credible platform for competitive R&D based on high quality science for several global companies.

*S Sivaram, NCL, Pune*



## Universities and National Laboratories

By S S Bhatnagar

The most distinguished scientists are those who are able to convey, to the layman the results of their findings in neat and understandable language. This faculty is best developed by a study of humanities. It is evident that an engineer who is not conversant with industrial psychology or who does not look after the welfare of the labour under his charge will not be able to go a long way, however eminent he may be in his own special field. Considerations of this nature have led to the inclusion of humanities as a part of our general technical education programme. A beginning in this direction has already been made by including literature, economics, industrial psychology, social welfare, general knowledge, etc. in the curriculum of the Institute of Technology at Kharagpur. The University of Roorkee has also been thinking on similar lines and we may expect some of these subjects to be included in the syllabus of that University shortly.

### Spirit of Adventure

A French proverb says, "Forty is the old age of youth, fifty is the youth of old age". According to this, you and I are youths at various stages of life. Your youth is however the season for enterprise and adventure and mine, the harvest-time for reaping the benefits of my old youthful exuberance. Live as long as you may, the first twenty five years are the longest half of one's life. Most of you present here are in that happy period of life.

Does your university education damp your enthusiasm for daring and adventure, or does it inculcate and stimulate it? Any educational system which kills the spirit of adventure requires to be overhauled. I am afraid, the sad outlook on life which our politicians and leaders of parties present to the youth have reflected adversely on the quality of thinking in our youth and the spirit of daring and adventure in them. Strikes and dissatisfaction which have recently marred the happy university life in India are largely the outcome of a sense of frustration created by misinformed and, very often, interested persons who declare that there is no future for university graduates, by the unhappy financial status of teachers generally, and the lack of teaching facilities and equipment in certain universities. I do not advocate strikes by students as disputes in a family should never be settled in this direct manner.

It must, however, be confessed that certain powerful people have a wrong notion that ruthless suppression of a strike or emphatic refusal to accede to the students' demand,

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Excerpts from the Address by SSB at the third Convocation of the Maharaja Sayajirao University of Baroda, 10 October 1953. Titled by the editor. From the Private Papers of SSB, STAR, NISTADS, New Delhi.



whether they are right or wrong, is the criterion of the strength of an educational organisation. Nothing can be farther from reality. If the powers that can succeed in crushing the spirit of irresponsible youth, they succeed only temporarily in establishing their authority. What they succeed in getting is nothing in comparison with what is lost by the almost certain 'killing' of the spirit of adventure and enterprise in our youth. Strikes can always be avoided if the students and the authorities concerned meet in all academic atmosphere, free from political controversies. It is possible to succeed with the student community if the authorities controlling educational institutions have the practical experience of teaching and living with university students. The rod of political power should not be used for beating down a demonstration by young students. Gentle persuasion and a heart-to-heart talk would nearly always succeed in preventing a strike. There should be an unwritten understanding between the students and the authorities that no strike will be resorted to by students and a patient hearing will be given to the students' grievances by the authorities. "Admonition must descend as the dew upon the tender herb or like the melting flakes of snow; the softer it falls, the longer it dwells upon and the deeper it sinks into the kind." I am not speaking as a theorist on this subject. I have moved and mixed and have had my being in the student community. I claim that there never is any discontent among students against a really able and sympathetic teacher. In a country which has been under foreign rule, it is of the greatest importance that the spirit of daring and adventure should be cultivated rather than suppressed.

This suppression of the spirit of adventure is visible in many phases of student life. Flocking of students in universities for a degree is one example of it. Over-crowding of classes in certain subjects which held prospects in the past for some kind of employment is another example. Lack of desire to explore not commonly traversed fields and professions is ultimately to be traced to the timidity which our students have acquired under an alien rule. As a result of this, we notice that requests from university students for taking our voyages of exploration or expeditions to conquer high peaks of mountains, or to achieve swimming records or to cover on foot or bicycle the whole globe are comparatively few and our students suffer terribly in comparison with students of other countries. It is a happy augury that State and Union Governments are thinking of starting a school of mountaineering in India which will be named after Tensing, the Indian conqueror of Mt. Everest.

Some time ago, I wrote to the Prime Minister of India requesting him to see that, as far as possible, no foreign expedition or exploration party is allowed to operate in this country without a suitable Indian as one of the party. I am glad to see that he has passed orders to that effect and we hope in this way to inculcate in young men of our country the spirit of exploration and adventure and to learn the technique of such operations.



Most expeditions of this nature, however, require, a great deal of money and organisation. Our purse being limited, it may not be possible to accord priorities to such expeditions over other more pressing activities and items that are essential for our national existence, but it is possible for any adventurous group of students to make a beginning in a humble way. Columbus found a whole new world and he had no charts and no cruisers or large ships.

There is considerable scope for students of Indian universities to take greater interest in field exploration – archaeological, botanical and zoological. I have already referred to mountaineering. During its short career, this university has already set an example to older institutions by avoiding beaten tracks and venturing into new fields. I am sure the university authorities will actively encourage students to undertake such work and sympathetically consider requests for assistance for this purpose. During my visits abroad I have come across several instances of great achievements resulting from the voluntary efforts of students. I have seen many herbariums which owe their existence to the initiative of students.

## **Devotion to Duty**

I would like students of Indian universities to develop a greater sense of devotion to duty and hard work. “The force, the mass of character, mind, heart, or soul, that a man can put into any work is the most important factor in that work.” In the case of a nation, “the greatest asset is the spirit of its people and the greatest danger that can menace it is a breakdown of that spirit, the will to do work and the courage to work.” “A nation’s welfare depends on its ability to master the world, on its power of work and on its power of thought.”

We in this country are in the midst of a huge development programme and much has to be done in all spheres of national activity to effect progress. If our students take interest in the developments which are taking place and shoulder a part of the burden, they will be assisting in the progressive march of the nation. Achievements of students in Russia, America, Germany and several other countries provide inspiring examples which Indian students may well emulate.

## **Universities and National Laboratories**

Kindly references to the national laboratories have been made in the two most recent convocation addresses at Madras and Poona. It appears, however, that some people’s ideas of the role of these laboratories *vis-a-vis* the universities are still not clear. Recently the vice-chancellor of the Andhra University wrote to me that several responsible persons



were expressing the view that as the country has a chain of excellent national laboratories in most branches of science, it is not necessary for universities to undertake advanced work in science. I would like to take this opportunity of dispelling any misconceptions which still exist on this subject and of re-emphasizing that universities and national laboratories have complementary functions to perform. I have dwelt on this topic on several occasions. In my speech at the opening of the National Physical Laboratory, I stressed the fact that national laboratories are not intended to supplant but, to supplement the work of individual or collective industrial concerns and universities in respect of research. The scope of research work may be likened to a “continuous spectrum, at one end of which is pure academic work of the highest quality and at the other the technical development of processes and equipment.”

Generally speaking, universities are concerned mainly with fundamental research while the activities of national laboratories lie essentially in the domain of applied research, though these laboratories are not precluded from taking up investigations of a fundamental character. In appraising the role of universities we have to bear in mind the difficulties facing them, shortage of equipment, personnel and finance. The Scientific Man-power Committee, over whose deliberations I had the honour to preside, recognised these difficulties and recommended to the Government that substantial grants should be made to universities for purchase of scientific equipment, appointment of scholars, etc. Large sums of money have been spent to meet their requirements. The CSIR have also assisted in the development of science in universities in several ways. For instance, the Central Leather Research Institute, Madras, has now assumed responsibility for a large part of the teaching of leather technology at the Madras University. In Bombay, the Council assists the University Department of Chemical Technology by maintaining a school of dyestuffs chemistry. In Delhi, there is close collaboration between the National Physical Laboratory and the Delhi University in teaching, loan of equipment and provision of research facilities. Many schemes of a similar nature are under consideration and their implementation will, I am sure, lead to a much greater and closer collaboration between the universities and national laboratories. The Atomic Energy Commission has made grants to universities for encouraging teaching and research in nuclear physics.

This collaboration could have proceeded at a much faster pace but for several factors. Research work at universities is of a changing nature, depending as it does, mainly upon the interest of the teacher in a particular branch of the subject. In national laboratories, on the other hand, the work is continuous and intensive, requiring defined techniques and directed to specific ends. The research staff is permanent and not migratory and this facilitates attention to the various research problems in the laboratories.



## Government and Universities

Another factor affecting the pace of collaboration is the suspicion that suggestions and assistance from outside affects the autonomy of universities. Autonomy can be misused like any other form of power. Increasing dependence of universities on public funds has raised the question of some sort of control by Parliament over their spending. Moreover, the need for costly equipment and adequately trained personnel requires that individual universities may have to confine their activities to a limited number of subjects and turn out well equipped graduates in those subjects. These complex problems are exercising the minds of thinkers in every country, as in most countries the universities have been leaning more and more on government aid. In England, the problem has been partially solved by the organisation of a University Grants Committee. This body is the virtual custodian of the autonomy of British universities and a spirit of partnership and forbearance has been created which has led to harmonious relationship between the universities and the government. The universities fully recognize that they have a special obligation to observe strict economy in the expenditure of public monies and that continuance of financial privileges is dependent on the exercise on their part of a strong and evident sense of financial responsibility, which the quinquennial system itself fosters. Moreover, while without State aid the universities cannot obtain sufficient funds to enable them to do their work, without the universities there would be no way of obtaining the men and women adequately trained in advanced knowledge to hold positions of responsibility in government, industry and professions.

The danger of indirect government guidance of academic policies of universities is, however, more serious. The inter-dependence of government and universities is so strong that no purely administrative device, such as the University Grants Committee or the quinquennial grant, can by itself secure the independence of universities. The continuance of academic autonomy depends not simply on the degree of good sense and moderation displayed by universities. It depends above all on the extent of public understanding of the reasons why academic autonomy is important and why such autonomy should continue.

In India, as in Great Britain, all university institutions are not exactly alike. Within the existing general pattern, there is much scope for experimentation. The University Grants Committee in U.K. has noted with satisfaction the existence within the universities of an appreciation of the need for self-criticism and self-examination. Universities cannot remain static if they are not to lose their vitality; and while the attitude of universities to new demands will be determined by the prevailing view of their functions, the concept itself must be kept under continuous review and it should be responsive to the needs of a new age and society.



## Are there too many Universities?

I may refer here to the misconceived opinion prevailing in certain quarters that there are far too many universities in this country and that a good few of them should be closed down. Standards of university education have deteriorated and the craze for university degrees as a means of securing employment is widespread. The situation merits careful analysis. Why is there so much emphasis on university degrees for appointments in diverse fields? Every employer may be expected to know what sources he should tap to select recruits for the jobs under him. If he insists on university degrees, it is because he is convinced that a particular degree or diploma is a hall-mark of certain standards he wants his officers to possess. The Government itself accepts university degrees and experience in specified fields as criteria for appointments in its services. Doubts regarding the adequacy of the degree as a criterion for employment have been occasioned by the falling standards of university education.

It is necessary not only to arrest the fall in the standards of education but also to raise them as far as possible to the highest level of efficiency. The situation can be redeemed by university men themselves. The teaching profession, it is said, is ill paid and neglected and the Government is blamed for the plight of the teacher. At no time in world's history has the teaching profession derived its respect from the monetary status of its members. The pre-eminence of the teacher was due to his selfless devotion to duty, intellectual vigour, purity of life and nobility of thinking. He set an example of what is best and what is highest in human values. It is the selfless endeavour of the teacher that succeeded in snatching away the value that pedigree had in the matter of employment and replaced it with a university degree. While economic factors do exert an influence on the work of the teacher, in the ultimate analysis, it is the philosophy of life which gives the teaching profession its exalted status and eminence. Let us hope that Government and educational authorities, both public and private, will better the financial position of the teachers, who in their turn will continue to practice their philosophy of life.

While I would like to see that rigorous standards are imposed in selecting students for university education, I do not think we have an over-abundance of graduates in this vast country. The cry for closing down universities may at best be regarded as an emotional outburst and cannot be considered practical or desirable. It is true, we should raise the quality of university training. We need more and better teachers, more equipment and more books. If our means do not permit us to train vast numbers of students, we shall rather reduce the number but not sacrifice the quality.

