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EDITORIAL

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'We can see today the dim lights of a new dawn in the distant horizon of Indian progress. These faint radiations are not the vanishing streaks of our glorious past; they are the sure signs of a new birth full of promise and glory for the future. This dawn represents the birth of the industrial movement in India.'

— Shanti Swarup Bhatnagar
Lecture delivered at Bombay in 1938; *S. S. Bhatnagar on Science, Technology and Development 1938–1954*, ed. Krishna, V. V., Wiley Eastern, New Delhi, 1993.

1942 was a turbulent year. The Second World War had reached its bloody midpoint. The turning points of the war, the battles at El Alamein and Stalingrad would happen only as the year drew to a close. In the east, the Japanese armies had overrun Malaya, Singapore and Burma. The eastern seaboard of India appeared vulnerable. On 8 August 1942 the Congress adopted the Quit India resolution; the sun had begun to set on the British Empire. In these difficult and trying times, plans for the reconstruction and development of independent India had already been drawn, by men of vision and conviction. In 1939, even as the exigencies of war led to the demise of the Industrial Intelligence and Research Bureau, Ramaswamy Mudaliar was lobbying for the creation of a Board for Scientific and Industrial Research (BSIR), which came into being in April 1940. Shanti Swarup Bhatnagar was its Director and its charter was to advise the government and to support research on a broad front. In September 1942, the Council of Scientific and Industrial Research (CSIR) came into being; an autonomous body, constituted as a Society, which now acquired a new mandate to facilitate 'the establishment, maintenance and management of laboratories, workshops, institutes and organizations to further scientific and industrial research and to exploit any discovery or invention likely to be of use to Indian industries'. Mudaliar and Bhatnagar were the men who persuaded the government of the times to establish the CSIR. Today, the CSIR is 60 years old, celebrating its 'diamond jubilee' year, in an environment which is undoubtedly much less turbulent than the year of its birth.

Bhatnagar, the founder of CSIR was by all accounts, a remarkable and indefatigable organizer and builder of institutions. In the brief period between 1947 and 1954, as many as a dozen national laboratories were started; among them the National Physical Laboratory, Delhi; the National Chemical Laboratory, Pune; the National Metallurgical Laboratory, Jamshedpur, the Central Drug Research Institute, Lucknow, the Central Leather Research Institute, Chennai (then Madras) and the Central Food Technological Research Institute, Mysore. Bhatnagar's institutions were spread across the length and breadth of newly independent India. They covered in their disciplinary spread almost every area of science and technology, having an immediate bearing on national development. Supported completely by Jawaharlal Nehru, Bhatnagar's pace of institution creation appears breathtaking, in retrospect. His goals were clear; the tools of science must be brought to bear on the problems of development in a post-war, post-independence period. The struggle of the early phase of the building of CSIR is best illustrated in Bhatnagar's address as President of the National Institute of Sciences (now the Indian National Science Academy) at Patna in 1948: 'With the great change in the outlook of political India with the advent of Independence, events in the world of science are bound to march forward. It is no doubt true that the political developments and rioting which followed the partition of India brought to a standstill the programme of development which was in hand, particularly in the northern regions. Our construction programmes of the National Physical Laboratory, National Chemical Laboratory and the Central Glass and Ceramic Research Institute were completely stopped. With great difficulty we are restarting, though slowly. Nevertheless progress has been spontaneous in many directions.' Bhatnagar did not live to see the full flowering of the institutions that he had conceived. He died in 1954, on the eve of a new year, at the age of 60.

Bhatnagar was not without his critics. The idea of building a chain of national laboratories, separated from the academic science of the universities, attracted strong criticism from some of the most prominent and accomplished scientists of the times. Meghnad Saha advanced the view that the national laboratories would drain the universities and compete for scarce resources: '... the National Laboratories which you have erected will not satisfy our needs... . You must gird up your loins and find out money so that we render sufficient assistance to the

universities and revitalize their activities' (op. cit., Krishna, V. V., p. 17). C. V. Raman was characteristically more acerbic: 'Shah Jahan built the Taj Mahal to bury one of his favourite women. The National Laboratories were built to bury scientific instruments' (quoted in *Journey Into Light*, G. Venkataraman, Indian Academy of Sciences, 1988, p. 517). Even Homi Bhabha, a confirmed builder of institutions was critical of the CSIR: 'All these laboratories were brought into existence in the same way. A Planning Officer was appointed for planning the work and building of each laboratory. The plan was usually drawn up on the basis of the work of similar laboratories abroad, divided into divisions and sections, and an estimate of the staff required made on this basis. An attempt to fill the posts was then made on the basis of advertisement...' (*Journey into Light*, p. 463).

Sixty years after its founding the CSIR consists of a network of 40 laboratories spread across the country, from Jammu in the north to Thiruvananthapuram in the south and from Bhavnagar in the west to Jorhat in the east. This network of largely, scientifically autonomous laboratories, is welded together by a centralized headquarters in Delhi. In keeping with the times, a visit to the CSIR website will reveal that the office in Delhi is called the 'Corporate Headquarters'; a clear reflection of the changing perceptions of the organization in a rapidly changing world. With a total strength of about 22,000 people, the CSIR must undoubtedly have surpassed the size that Bhatnagar envisioned for his organization. During the last few decades of its development, CSIR has been the public face of organized, government-supported science. Other organizations like the Department of Atomic Energy or the Defence Research and Development Organization have been sheltered from public scrutiny by the cloak of strategic concerns. The Indian Space Research Organization has had a sharply defined focus and objectives that readily receive public approbation. In contrast, CSIR with its chain of widely dispersed laboratories, separated both by geography and disciplinary interests, comes across as an organization which is vastly overstretched in its objectives. CSIR's laboratories must interface with industries as diverse as pharmaceuticals, leather and food on the one hand and aerospace, electronics and heavy engineering on the other. The wide-ranging involvement of CSIR with all aspects of science and technology development in India, has often resulted in CSIR bearing the brunt of public criticism when the fruits of technology do not materialize. In reflecting on the ups and downs of this mammoth institution, it is worth recalling the events of the late 1970s, when a move to transfer some laboratories to 'user ministries' gathered strength. These storms have been weathered and CSIR appears to have undergone a transformation in recent times, corporatising its image and emphasizing the importance of laboratories earning a significant portion of their budgets. But, even as the ship has steadied there are many disturbing signs. Recruitment of scientists has been slow, promotions have been effected with little discrimination, resulting in laboratories which are top heavy with senior scientists, who are often uncomfortable with the practicalities of everyday science. The laboratories have also differed widely in their output, with the excellent performance of some institutions compensated by the indifferent results from others.

In its early years, CSIR appeared to be confirming the worst fears of its detractors; pulling scientific talent away from academic institutions. But, over the last four decades or so, CSIR has been a major supporter of academic science. The organization, through its extra-mural arms has consistently supported individual-investigator driven projects across the country, provided national level fellowships for research students and postdoctoral associates and provided the platform for publication of some of the best scientific journals in this country. More recently, CSIR has attempted to promote the forging of inter-institutional collaborations focussed on finding solutions to key issues of local importance, through the New Millennium Technology Initiative (NMITLI). It is these wide-ranging programmes that have permitted CSIR to build extensive links with academia. For many scientists working in CSIR however, the national laboratories appear to have periodically changed their attitudes towards in-house basic or fundamental research. There is no denying the fact that the laboratories of CSIR were created to address the many practical issues of national development. Bhatnagar was unequivocal: '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' (op. cit., Krishna, V. V., p. 17). In the absence of well-orchestrated applied projects with defined targets, large numbers of scientists in national laboratories have drifted into areas of research, which are neither productive in basic science nor hold any potential for application. This situation has arisen largely because of a peculiarly hierarchical ambience that prevails in many national laboratories, which encourages a top-down approach to science.

The CSIR has been the cornerstone for the development of science and technology in independent India. In moving towards its platinum jubilee and centenary, the CSIR may eventually have to consider extensive restructuring, shedding much of the flab that it has accumulated over decades. This is a feature common to old, established institutions. When that happens, a new phase in the scientific and technological development of India would have begun. Shanti Swarup Bhatnagar would be proud of the status that his creation has achieved over six decades. In thinking of the future we might well recall the Christian dictum, which may be as applicable in judging institutions as individuals: 'Not what thou art, nor what thou hast been, ... , but what thou wouldst be'.

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