

with Indian science. Also easy is to give suggestions as to what should be done. However, it seems very difficult to identify who should do it. I dare say that the top and more fortunate scientists themselves should take the initiative. The cat is there and the bell is there. Someone has to bell the cat. If necessary, by taking exemplary and brave steps.

K. SUBBA RAO

*School of Life Sciences
University of Hyderabad
Hyderabad 500 134, India*

Basic science

[*Curr. Sci.*, 1992, 63, 505]

All of us, members of the scientific community are very much concerned with the declining support for R&D in the country. In the case of R&D in basic sciences, it will be still harder because it cannot be linked directly to production or profits of the industry. Probably it may be worthwhile to emphasize the emergence of scientific temper and the outlook to look rationally at the problems of the community as an outcome of the R&D in basic sciences. In engineering sciences, it is time to put more effort on the linkages for utilization of the R&D output for higher productivity and competitiveness at international level. It seems that the public awareness of these advantages is not to the level that it should be. If the academies in the country and the other institutions/societies of engineers and scientists could form a common platform and organize in a structured way efforts to create awareness in the public and politicians, this could probably help better impact leading to greater appreciation of the R&D efforts.

W. S. KHOKLE

*Central Electronics Engineering
Research Institute, Pilani 333 031, India*

I fully share the concern regarding lack of adequate incentives and investment for R&D work in the country. The industry which is a major beneficiary, contributes very little for the purpose.

Although the Government has been funding R&D projects in a substantial way, the impact is yet to be felt. In the circumstances, the recommendation that a fillip needs to be given for R&D in our country merits consideration if it has to compete globally. You may be aware that IDBI is operating Venture Capital Fund (VCF) Scheme with an objective to promote indigenous technology leading to commercial applications. Under the scheme 70 proposals have been sanctioned assistance. Much still needs to be done in this area.

It may be mentioned that recognizing the capabilities of Indian scientists, the Finance Minister, in his budget speech for 1993-94, felt the need to encourage Indian industry to spend more on research and development by using the facilities offered by national laboratories and research institutions. For this purpose, he has proposed a weighted deduction of 125 per cent of the contribution out of income from business or profession for research programmes in approved national laboratories and institutions carrying out research and development in natural and applied sciences. I am sure, that this is a step in the right direction for encouraging R&D in the approved national laboratories/institutions by sponsoring through industries and commercializing the same.

K. C. VARSHNEY

*Industrial Development Bank of India,
Technology Department, IDBI Tower,
Cuffee Parade, Bombay 400 005, India*

The resource crunch in Government has inevitably meant that some belt tightening is called for from all sides. We have attempted to insulate key Departments such as those relating to Science and Technology to the extent it has been possible. The Prime Minister has also taken a meeting to review the budget of the Science & Technology departments with a view to ensuring that critical areas do not suffer from lack of funding. Government will continue to play a primary role in this regard. However, as has been the experience in many other countries, industry should also come forward for financing R&D as they would be the eventual beneficiaries.

We have also taken note of changes

taking place in the internal and external economic environment which have given rise to an urgent need for integration of the activities of scientific agencies with the programmes of various Ministries, educational institutions and industry. To meet these needs certain changes are being made in the Apex level bodies that address these issues including at the Cabinet level. We hope that these measures would enable us to give a concerted thrust to S&T activities in India.

A. N. VARMA

*Prime Minister's Office
New Delhi 110 011, India*

Delhi—the R&D capital of India

More than half of the 522 Central Government-run Research & Development institutions including Public Sector Undertakings (PSUs) are located in just nine cities of the country and only a few of them are situated in the mofussil areas.

The analysis is based on the latest information-friendly document *Directory of R&D Institutions* of the Department of Science & Technology¹, which reveals that Delhi with 87 institutions tops the list followed by Calcutta (43), Bombay (39), Bangalore (33), Hyderabad (30), Madras (18), Pune (14), Dehradun (12) and Lucknow (11). These altogether account for 54.98% (287/522) of the Central Government-run R&D institutions in our country.

Another 66 (12.64%) R&D outfits are distributed in 11 cities. These are Ranchi (8); 7 each in Chandigarh and Nagpur; 6 each in Ahmedabad, Bhubaneswar, Kochi and Thiruvananthapuram; and five each in Allahabad, Bhopal, Dhanbad and Kanpur.

And the rest 169—almost one-third (32.38%)—are located elsewhere in different states excepting Manipur and Tripura.

Barring a couple of major science & technology agencies (including PSUs), the headquarters of most of these organizations, as expected, are located in Delhi.

In so far as the private sector in-house R&D units including state public/joint sector undertakings as recognized by the Department of Scientific & Industrial Research are concerned, Maharashtra tops the tally with 398 units followed by Tamil Nadu (122), West Bengal (103) and Delhi (101).

As regards the academic sector, i.e. universities, deemed universities and institutes of national importance, Delhi has the distinction of having 11 such places where R&D has a major role to play through various medical colleges, engineering colleges, science departments, etc., in the overall nation-building programme. These are the Delhi University, Indira Gandhi National Open University, Jawaharlal Nehru University, Indian Agricultural Research Institute (IARI), Jamia Hamdard, Jamia Millia Islamia, National Museum Institute of History of Art Conservation and Museology, School of Planning and Architecture, Shri Lal Bahadur Shastri Rastriya Sanskrit Vidyapeeth, All India Institute of Medical Sciences and Indian Institute of Technology (IIT).

A similar trend is available in the case

of scientific periodicals. In fact the tremendous growth in organized science of the post-independence era could easily be noticed by taking an account of the number of scientific and technical periodicals currently published in India. There were hardly 140 periodicals existing prior to 1947, whereas the current figure is a whopping 1991. These data are contained in the latest directory of Indian scientific periodicals², brought out by the New Delhi-based outfit of the Council of Scientific & Industrial Research—the Indian National Scientific Documentation Centre, popularly known as INSDOC. It is once again, as expected, the city of Delhi which brings out the maximum number of periodicals, 495, followed by Maharashtra (328) and UP (258). Our industrial strength is revealed by the 630 (31.6%) titles belonging to engineering and technology and the strong agricultural base by 327 titles. The third largest category of journals numbering 297, however, belongs to medicine.

Delhi is really proud of having both the National Science Library and the National Medical Library. Time is not far off when the excellent libraries of,

say for instance, the IARI may be declared in the near future as the National Agriculture Library and similarly the IIT one as the National Technology and Engineering Library.

Besides these, several international, foreign and UN agencies like the South-East Asia Regional Office of the World Health Organization and a number of NGOs are actively engaged in this R&D endeavour in one way or the other.

1. Anonymous, *Directory of R&D Institutions 1992*, Department of Science & Technology, Ministry of Science & Technology, New Delhi, 1992, pp. 5–26, 53–58, 61–104, 107–113.
2. *Directory of Indian Scientific Periodicals 1992* (Compilation: Joseph, A., Bhatnagar, I. M. S., Katin, K. L., Ramachandran, M., Pal, R. B., Saxena, S. K., Dhama, Sawita, Singh, Sube, Kumari, Sudershan and Rajalakshmi, V.), Indian National Scientific Documentation Centre, CSIR, New Delhi, 1992.

N. C. JAIN

Indian Science Writers' Association
B II 6/6, New Minto Road Apts.,
New Delhi 110 002, India

NEWS

Brainstorming session on development and differentiation in plants—cellular and molecular aspects

Plant developmental biology is the study of how a single cell gives rise to the entire plant with all its different cell types, tissue and organs which function in an integrated way. The overall plant development is regulated by hormones, nutrients and environmental factors. Much of the earlier work in this area was of descriptive nature. However, during the past few years with the advent of several new techniques, the molecular mechanisms of the ultimate basis of development of form and function in plants are beginning to emerge and major advances in our understanding of regulation of gene expression and mechanism of hormone action, are occurring.

Recognizing its importance, 'develop-

ment and differentiation in plants' was identified as a challenging area by the Department of Science & Technology. The Programme Advisory Committee on Plant Sciences has organized a series of brainstorming sessions (see *Curr. Sci.*, 1992, 63, 112–114 and 1993, 64, 161–162) in order to formulate specific measures for encouraging scientists to take up research in the identified challenging areas and to help in evolving meaningful projects.

A brainstorming session entitled 'Development and differentiation in plants—cellular and molecular aspects' was organized at the Indian Institute of Science, Bangalore between October 29 and 31, 1991 under the Chairmanship of Prof. M. M. Johri, Tata Institute of

Fundamental Research, Bombay.

In his keynote address, Johri summarized some of the contemporary ideas, concepts and techniques that have drawn increasing attention in recent times. He also discussed the role of developmental biology not only in basic research but also in agriculture and biotechnology.

Lead talks on various aspects of development and differentiation were given by experts. N. S. Rangaswamy presented a comparative account of the subcellular structure of seed embryos, somatic embryos and pollen embryos. The embryogeny *ex ovulo* is highly plastic and is greatly influenced by the milieu. V. Jagannathan gave a detailed account of the biochemical and mole-