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CSIR NEWS

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Team CSIR

CSIR Foundation Day Celebrations

Founded in 1942, the Council of Scientific & Industrial Research (CSIR), has completed 65 years of its dedicated service to the nation on 26 September 2007. The occasion was celebrated by the entire CSIR family of 37 institutes/laboratories, spread all over the country, with great enthusiasm. It was an occasion to celebrate the accomplishments of the year that had gone by and plan for the future to serve the nation with still greater dedication. It was also an occasion to accord recognition to excellence in science through the presentation of awards and prizes.

Seen on the dais during the CSIR Foundation Day Function at NPL, New Delhi *(from right)* are: Prof. P. Balaram, Director, IISc, Bangalore; Dr T. Ramasami, Secretary, DST, Government of India and Director General, CSIR; Shri Kapil Sibal, Minister of Science & Technology and Earth Sciences and Vice President, CSIR; Prof. M.S. Swaminathan, FRS, M.S. Swaminathan Research Foundation, Chennai and Dr Vikram Kumar, Director, NPL

CSIR Foundation Day Celebrations

The main Foundation Day function was held in the main auditorium of National Physical Laboratory (NPL), New Delhi. The function was attended by a large number of eminent scientists and dignitaries.

Shri Kapil Sibal, Minister of Science & Technology and Earth Sciences and Vice President, CSIR, was the Chief Guest and gave away the CSIR Young Scientist Awards and CSIR Technology Awards for 2007. Addressing the august gathering, Shri Sibal called upon the scientific community to rededicate itself to serve the nation with much greater vigour. Stressing the need for developing green technologies, Shri Sibal said that while Science is 'understanding the nature', Technology is 'respecting the nature'.

Dr T. Ramasami, Secretary, Department of Science & Technology and Director General, CSIR, extended a warm welcome to the distinguished invitees and guests and announced the winners of this year's:

- CSIR Young Scientist Awards
- CSIR Technology Awards
- Shanti Swarup Bhatnagar Prizes
- CSIR Diamond Jubilee Technology Award
- CSIR Award for S&T Innovations for Rural Development
- CSIR Diamond Jubilee Invention Awards for School Children

Prof M.S. Swaminathan, FRS, M.S. Swaminathan Research Foundation, Chennai, was the Guest of Honour. In his address he stressed the importance of synergy among technology, public policy and social engineering for rapid progress.

Prof. P. Balaram, Director, Indian Institute of Science (IISc), Bangalore, delivered the CSIR Foundation Day Lecture, titled 'Measuring and Assessing Science.'

Dr Vikram Kumar, Director, NPL, proposed a vote of thanks.

MEASURING AND ASSESSING SCIENCE

CSIR Foundation Day Lecture by Prof. P. Balaram, Director, Indian Institute of Science, Bangalore

It is a privilege to have an opportunity to speak on the occasion of Foundation Day of the Council of Scientific and Industrial Research. Since its inception in 1942, CSIR has been one of the flagships of the scientific enterprise in India. In today's presentation I would like to address a problem that must concern all those who practice and administer science. This is the problem of measuring and assessing science. Objective assessments of the quality and quantity of scientific output are increasingly being made by using the tools of Scientometrics. I will be providing a personal view of scientometrics in the Indian context.

There are two kinds of scientific activities that we can consider. Firstly, there is academic science, which is often of uncertain utility. Secondly, there is applied science, which generally has clear goals and targets. But, we must remember an assessment that was once made in connection with pharmaceutical research leading towards drug discovery namely, "Success in the laboratory does not always translate into success in the marketplace".

There are two ways of assessing scientific activities. One is simply to use personal judgments, which may be informed or prejudiced. This is what most of us do when we say that a particular scientific result is good or bad or useful or useless. A more elaborate and objective approach would be to use impersonal quantitation and that is really the subject matter of scientometrics.

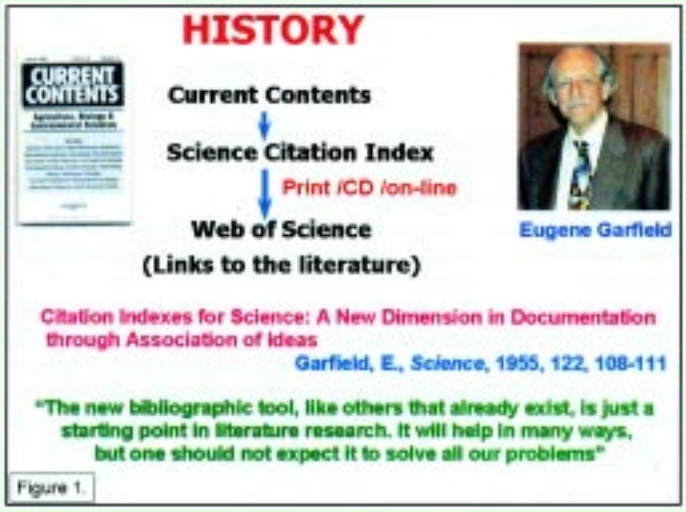


Figure 1.

The history of scientometrics really begins with a remarkable paper published by Eugene Garfield over half a century ago. This paper was entitled "Citation indexes for science: A new dimension in

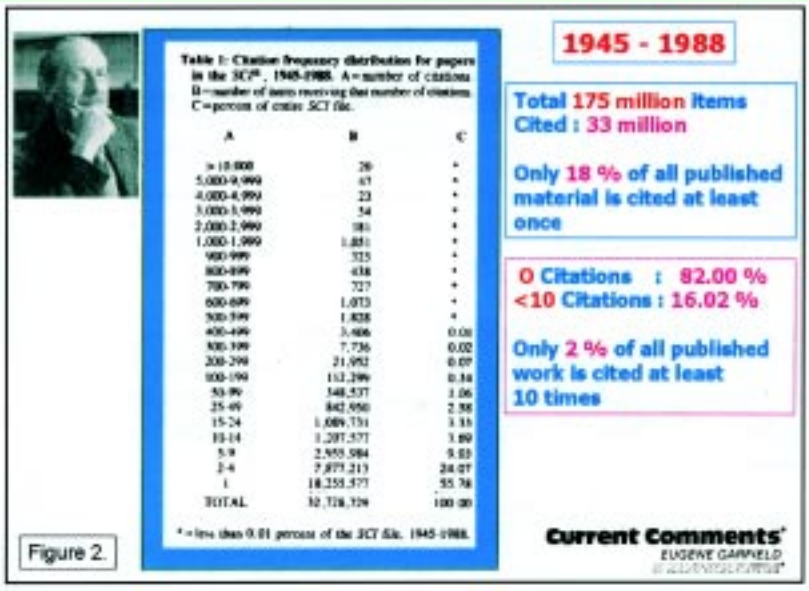
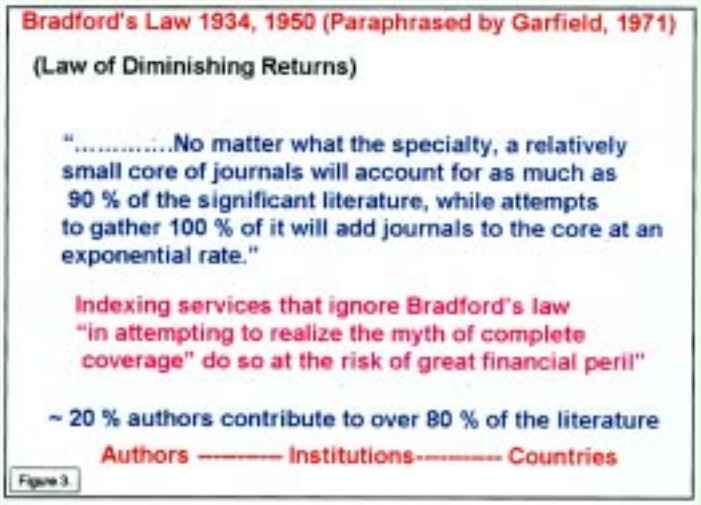
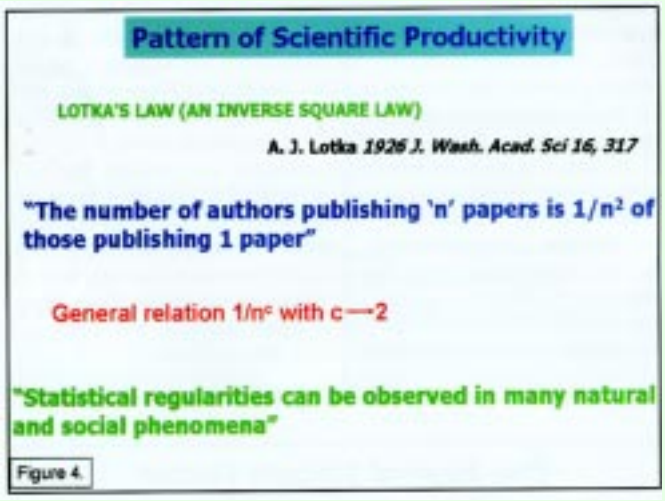
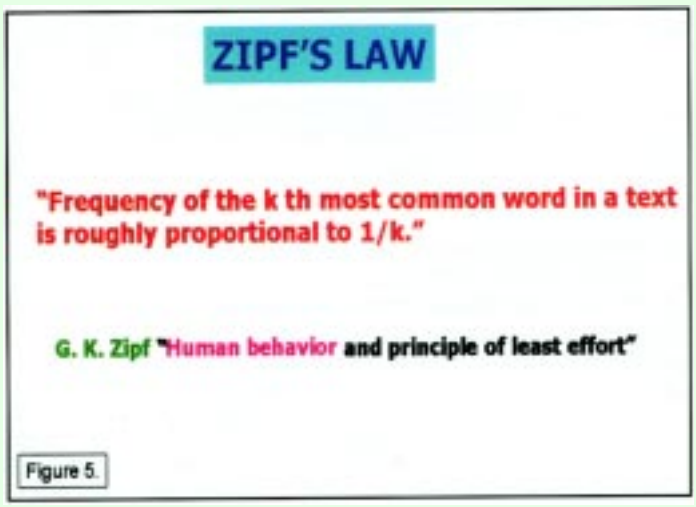


Figure 2.

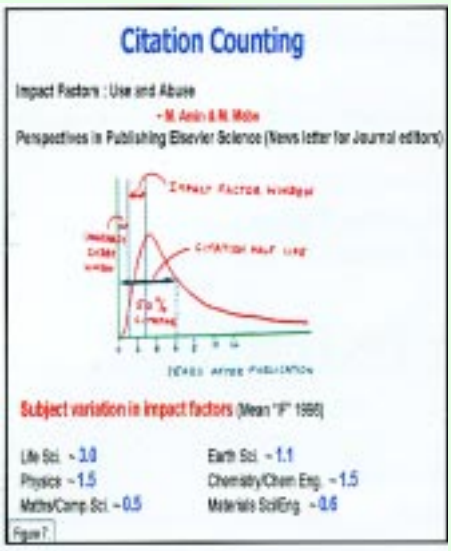






documentation through association of ideas" - E. Garfield, *Science 122*, 108-111 (1955). Garfield borrowed the idea of a citation index from the field of law, a fact that might surely please our Minister for Science and Technology who is an illustrious lawyer. Over the years, Garfield invented many wonderful ways of abstracting, indexing and correlating information about science and scientists. It was his work that led to Current Contents, the Science Citation Index, and Journal Citation Reports, eventually culminating in the Web of Science. When Garfield began he would never have anticipated the revolution that was to come in the area of computer technology and information science (Figure 1 p.324).

Scientometrics and the tasks of counting papers and relevant citations are relevant only because scientists must publish their results in order to communicate their findings to others. This was always not the case. Charles Darwin was reluctant to publish his work, so too was Isaac Newton. But, in modern times, publications are the key to scientists' success. A long time ago, Charles Dodson (more famously known by his pseudoname Lewis Carroll) said, "Man is an animal that writes letters". In the context of today's talk I can paraphrase this by saying that "Scientists are animals that like to publish papers". The key to scientometrics lies in the list of bibliographic citations that appear at the end of every published scientific article in all scholarly journals. These "reference lists" draw attention to prior work, related



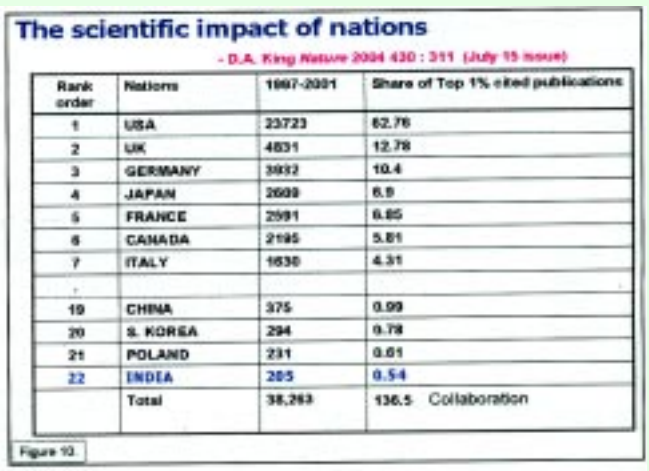
work and sometimes provide insight into the intellectual relationships between apparently different fields of science. Information technology now allows us to compile and analyse citation data from millions of articles published in the ever-growing scientific literature of the world. Over the years, many curious features have been highlighted by Garfield in his many insightful and often humorous essays published in Current Comments.

In an analysis of the world's scientific literature between 1945 and 1988, covering a total of 175 million items, he noted that only 33 million were cited at least once. This conclusion that only 18% of all published material is cited at least once must alarm all those who are not initiated into the field of scientometry (Figure 2 p. 324).

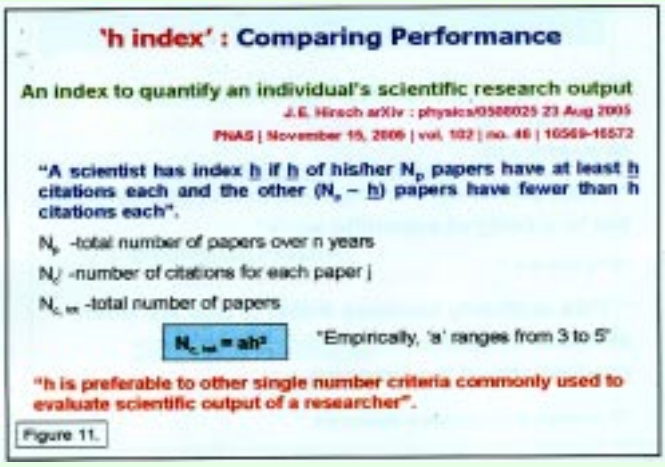
But here, I must introduce a law which will help us to think more kindly about publishing science. The law is called Bradford's Law and I might also call it "A Law of Diminishing Returns" in deference to the powerful role that economists play in the modern world. Only about 20% contributions might be expected to be significant (Figure 3 p. 325).

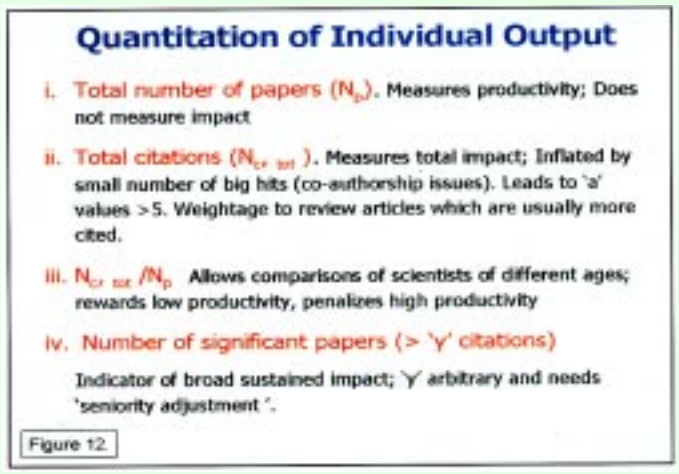
Scientometrics like many other fields also rest on some basic laws. In addition to Bradford there are two more: Lotka's Law (Figure 4 p.325) and Zipf's Law (Figure 5 p. 325). I will leave it to your imagination on how these two Laws, together with Bradford, helped in advancing quantitative assessment of science.

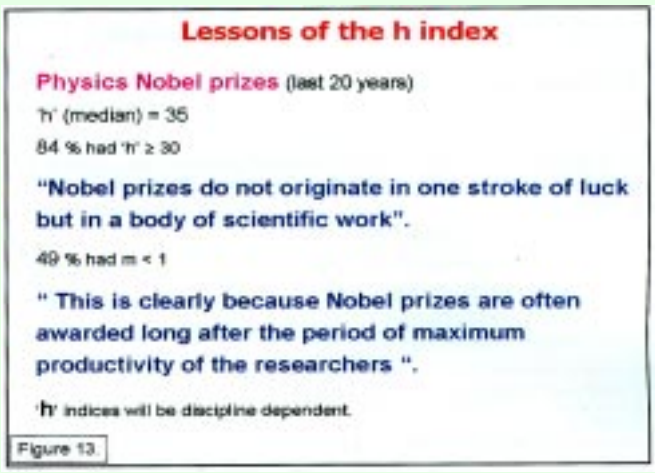
The CSIR has really propagated the use of scientometric analysis in India. In many years, as a simple minded scientist, I have watched with growing dismay the enormous

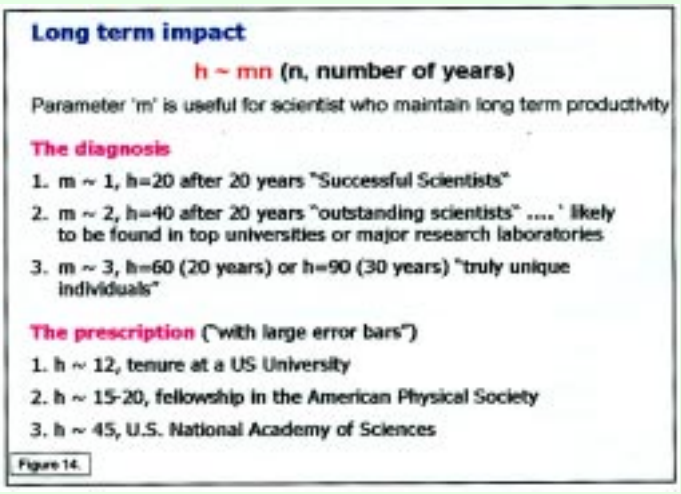


Rank order	Nations	1997-2001	Share of Top 1% cited publications
1	USA	23723	62.76
2	UK	4831	12.78
3	GERMANY	3932	10.4
4	JAPAN	2609	6.9
5	FRANCE	2591	6.85
6	CANADA	2195	5.81
7	ITALY	1630	4.31
.			
19	CHINA	375	0.99
20	S. KOREA	294	0.78
21	POLAND	231	0.61
22	INDIA	205	0.54
	Total	38,263	136.5 Collaboration









influence that quantitative methodologies have in ranking scientists, their journals and their institutions. The parameter that has been widely used is the "Journal Impact Factor" (Figure 6 p. 325). Often scientists are judged by their lists of publications, which, in turn, are judged by the impact factor of the journals in which *they* are published. Ingenious approaches for assessment have been advanced. For example, there is the insidious "average impact factor". Scientists have become so self-conscious that they now decide the journals to which they will send their papers on the basis of the latest impact factors. Scientometrics and its applications have begun to affect the sociology of scientists. In mentioning scientometric data, it is useful to remember that journal impact factors and related practices vary widely across the many disciplines of science (Figure 7 p. 326).

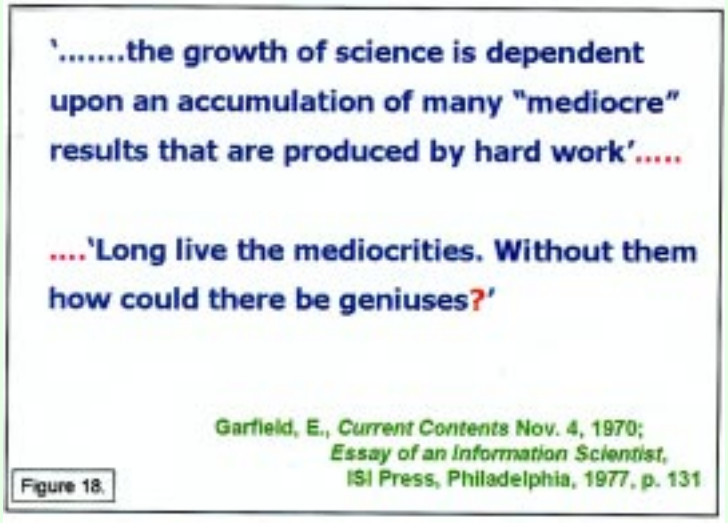
In the rush to publish, contentious problems have arisen, where a large number of individuals contribute towards a scientific project. These are some unique infectious diseases which have emerged. Two of the most common are the "First Author Syndrome" and the unavoidable issue of "Honorary Authors". I need not elaborate on this to an audience, which presumably consists of publishing scientists.

Quantitative tools are useful for policy makers. Scientometrics is a dangerous weapon in assessing individuals; on the contrary, it is a valuable and sometimes essential technique in assessing the scientific output of large institutions and nations. Many have viewed the report published by a Japanese group from Shanghai some time ago, rating the top universities of the world. The parameters they used were rigorous (Figure 8 p. 326). The list they produced (Figure 9 p. 326)

may not necessarily have pleased everybody. But I must draw attention to one point. If we used simple prejudice (personal judgment) we might have largely agreed on the names of the top 10 universities in the world. They are all in the United States or the United Kingdom. This is undoubtedly a legacy of history. A little later, David King, the Scientific Advisor to the UK government, produced an assessment of the scientific impact of nations (Figure 10 p. 326). India's position must cause some concern.

Scientometrics is a constantly evolving field. New parameters for comparing the scientific achievements at periodic intervals are being added to the literature. I would like to draw your attention to the single number index known as the "h index" (Figure 11-14 p. 326-27).

Thinking about institutional performance, we might go well beyond the constraints of citation counts and journal impact factors. I list in Figure 15 (p. 327) some parameters that might serve as a guide in assessing institutions. India today is faced with the formidable challenge of creating many world class educational and research institutions. In Figure 16 (p. 328) some important issues are highlighted. All of us will agree that the most important factor in building successful, productive and happy institutions is to create an ambience. This could be difficult. I have listed in Figure 17 (p. 328) some points that might be considered.



In concluding this address, I must draw your attention to Garfield's conclusion on the growth of science reached in the early years of scientometrics (Figure 18 p. 328). A recent critic of quantitative analysis made an interesting point. A commentary entitled "Measures for measures" (S. Lehmann *et al.*, *Nature*, 444, 1003, 2006) reached the following conclusion "There have been few attempts to discover which of the popular citation measures is best and whether any are statistically reliable..... Institutions have a misguided sense of the fairness of decisions reached by algorithm; unable to measure what they want to maximize (quality), they will maximize what they can measure". I must conclude the presentation on a more cheerful note by quoting a man who had little love for the quantitative method. Mark Twain famously identified "three species of mendacity, each worse than the one before - lies, damned lies, and statistics".

Address by Prof. M. S. Swaminathan, FRS, M. S. Swaminathan Research Foundation, Chennai

I am happy to be here when the CSIR family is celebrating its 65th' birth anniversary. CSIR owes its origin to the vision of Sir Arcot Ramaswamy Mudaliar who was Member for Commerce in the Executive Council of the then colonial Government. Its growth and development however was greatly influenced by Jawaharlal Nehru whose vision was converted into action by Dr S. S. Bhatnagar. Nehru's passionate commitment to science will be clear from the following statement he made on 21 January 1950 on the occasion of the inauguration of the National Physical Laboratory, where we are meeting today: "*When I think of the tremendous adventure in Science in the past and the tremendous adventure that I hope it is going to be in the future, I am fascinated by this prospect and I feel how much better it would have been for me to be the Director of this institution, if I had the competence, than to be the Prime Minister*".

Over the years, CSIR has had the good fortune of having eminent Presidents, Vice-Presidents and Director Generals as well as dedicated scientists, engineers and technologists. Shri C. Rajagopalachari who served as CSIR President during 1946-47 mentioned in one of his addresses, "*I hope the several national laboratories which are in the course of establishment will soon grow up and put India prominently in the map of science in the world*". The speed with which the Jawaharlal Nehru - Bhatnagar combination stimulated the growth of CSIR will be evident from the fact that eleven new laboratories came into existence during the short period of 1950-53. Rajaji also advised CSIR scientists not to be discouraged by bureaucratic hurdles, but go ahead in their creative endeavour on the conviction, "*we shall overcome* ". Over the years CSIR has many achievements to its credit. Its major goal has been to convert our natural and human resources into jobs and wealth. It has however been criticized for its inadequate linkages with industry and for its lack of a sharp focus in its research and development programmes.

Sir Francis Crick, the co-discoverer of the double helix structure of the DNA molecule once said, "*it is better to tackle 10 fundamental problems and solve one, than tackle 10 trivial ones and solve all*". Chasing too many scientific butterflies will result in getting none in the net. I recall in the early seventies when I was a Member of the Executive Council of CSIR and also a Member of the Sarkar Committee which went into the working of the CS1R, the then President of CSIR, Indira Gandhi, emphasized the need for effective partnerships between CSIR institutions and small and medium enterprises. Other than small farm agriculture and micro-retail, the small and medium enterprises provide the maximum opportunity for employment to educated youth. Symbiotic relationships between

small and medium industries and CSIR laboratories will help to foster job-led economic growth. Curtailment of industrial pollution is essential for the sustained growth of our industry and economic well-being. Internationally, it is now accepted that good ecology is also good business. In this connection, I wish to pay a tribute to the work of the Central Leather Research Institute, Chennai, which under the distinguished leadership of Dr T. Ramasami, currently Secretary, Department of Science and Technology and Director General, CSIR, developed a methodology by which numerous small tannery owners can get together in the form of co-operatives for the control of pollution. The leather and textile industries occupy a very important position in our national economy. Both are unfortunately associated with water and soil pollution problems. CLRI combined social engineering with pollution control technology to promote a dynamic

leather industry free of pollution problems. It is only through synergy among technology, public policy and social engineering that we can achieve rapid progress in improving the productivity, profitability and sustainability of both small and large industries.

It would be useful for CSIR to set up a Joint Scientific Panel with the Indian Council of Social Sciences Research in order to bring about the desired synergy between science and society. For achieving integrated expertise in technology development and social engineering, we need a new breed of professionals committed to the following principle enunciated by Albert Einstein, *"Concern for man himself and his fate must always form the chief interest of all technical endeavours in order that the creation of our minds shall be a blessing and not a curse"* It would be useful if CSIR establishes a Staff College where staff members ranging from young scientists to Directors can get exposed to methods of combining science and technology with humanism and ethics . In fact the National Institute for Advanced Studies (NIAS) was established at Bangalore by JRD Tata for the purpose of breeding professionals who combine scientific humanism and humanistic science. This year marks the centenary of the establishment of the Tata Steel at Jamshedpur. It will therefore be appropriate to quote Jamshedji Tata, the founder of this pioneering company , *" Be sure to lay wide streets planted with shady trees, every other of a quick-growing variety . Be sure that there is plenty of space for lawns and gardens. Reserve large areas for football, hockey and parks. Earmark areas for Hindu temples, Mohammedan mosques and Christian churches"*. Jamsetji Tata was thus not only concerned with the production of steel, but also with improving the quality of life of the inhabitants of Jamshedpur. Fortunately, Nehru and S. S. Bhatnagar inculcated the same philosophy in the design of the campuses of CSIR institutes. JRD Tata who was Chairman of 'Tata Steel for forty-six years (1938-84) also set the following guiding principle. *"Nothing is worth attempting that will not benefit the nation"* Tata Steel is now 100 years old and has been following the philosophy, *"Grow old along with me - the best is yet to be"*. This is a good principle for all institutions growing old, in order to instill the principle of sustained dynamism.

This approach is particularly important since CSIR's Xlth plan paper states that the emphasis will be on *"technology led accelerated inclusive growth"*. CSIR should help to bridge the technological, digital, gender and genetic divides which are now leading to the emergence of a shining urban India and a suffering rural India. We are now in a favourable environment for leapfrogging in many areas of human and national development. For example, modern information and communication technology has made it possible to take the right information at the right time and at the right place through a combination of the Internet and - community radio or cell phone. Small-scale fishermen operating catamarans can now access data on wave heights and location of fish shawls through the cell phone. To bridge the rural-urban divides in the application of science and technology in day-to-day life, CSIR started in the early nineteen seventies a science based integrated rural development project in the Karimnagar district of Andhra Pradesh. This programme initiated under the leadership of Dr Nayudamma did not yield the expected results since there was little synergy among agriculture, animal husbandry, fisheries and industrial technologies. In contrast, the Chinese Academy of Sciences initiated over 25 years ago a SPARK programme in villages based on the principle, "Innovation is the soul of a Nation". The major aim was to create opportunities in rural area for skilled non-farm employment. In China, the strategy for rural prosperity included concurrent attention to on-farm and non-farm employment. The SPARK programme, which helped to shift over 100 million rural men and women from farm to non-farm employment within seven years, grew into what was subsequently coined as "Township and Village Enterprises (TVEs)". This was the beginning of the economic revolution in China. A recent book edited by former Agriculture Minister He Kang titled, "China's Township and Village Enterprises (2006)" describes in detail the evolution and progress of this unique movement linking agriculture, industry and business in a mutually reinforcing manner. China's ability to become a global outsourcing hub for manufactured products is largely due to the emergence of TVEs.

On the occasion of the 60th anniversary of our "Tryst with Destiny", I request CSIR to consider initiating a PAN-CSIR

Project relating to the generation of opportunities for skilled, non-farm employment in rural India. Such a rural non-farm livelihood initiative may be started, to begin with in the 31 districts identified by the Government of India as agrarian hotspots, leading to suicides by farmers. There is a vast array of technologies in CSIR laboratories in relation to post-harvest processing and value addition, biomass utilization and efficient natural resources management, which if transferred to the field will bring immense joy and benefit to rural families now in distress. The PAN-CSIR Rural Non-farm Livelihood Initiative could develop partnership with the appropriate institutions of ICAR, CSIR, DST, DBT, DIT, Agricultural and Animal Sciences Universities, Women's Universities etc, as well as with China's TVE. CSIR's New Millennium Indian Technology Leadership Initiative could include such a programme designed to create multiple livelihood opportunities in rural India. We are on the threshold of remarkable changes in science and technology. What is now important is to ensure that there is equity in access to the new marvels of science. This was the purpose for which CSIR was established and was nurtured by successive Prime Ministers and the Central and State Governments. On this day it would be useful to go back to the basics and rededicate ourselves to the cause of sustainable human security and happiness. I wish the CSIR continued success in this important goal.

SHANTI SWARUP BHATNAGAR AWARDS: 2007

Instituted in 1957, the Shanti Swarup Bhatnagar Prizes are the most coveted S&T Prizes in the country. These prizes, each carrying a cash award of Rs 200,000, a citation and a plaque, are awarded annually for notable and outstanding research, applied or fundamental, in (1) Biological, (2) Chemical, (3) Earth, Atmosphere, Ocean and Planetary, (4) Engineering, (5) Mathematical, (6) Medical and (7) Physical Sciences. Any citizen of India engaged in research in any field of Science and Technology, who is not more than 45 years old on 31 December of the year preceding the year of the Prize, is eligible. He/she should have made, in the opinion of CSIR, conspicuously important and outstanding contribution to human knowledge and progress – fundamental or applied- in the particular field of endeavour, which is his/her specialization. The prize is awarded on the basis of contributions made through work done primarily in India during the five years preceding the year of the prize.

Eleven scientists have been selected for the Shanti Swarup Bhatnagar Prize for the year 2007:

Biological Sciences

Dr Upinder Singh Bhalla
National Centre for Biological Sciences, Bangalore

and

Dr Narayanaswamy Srinivasan
Indian Institute of Science, Bangalore

Chemical Sciences

Dr Amalendu Chandra
Indian Institute of Technology, Kanpur

and

Dr A. Ajayaghosh
National Institute for Interdisciplinary Science and Technology (NIST), Thiruvananthapuram

Earth, Atmosphere, Ocean & Planetary Sciences

Dr Anil Bhardwaj
Vikram Sarabhai Space Centre, Thiruvananthapuram

Engineering Sciences

Dr Rama Govindarajan
Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

and

Dr Budaraju Srinivasa Murty
Indian Institute of Technology Madras, Chennai

Mathematical Sciences

Dr B. V. Rajarama Bhat
Indian Statistical Institute, Bangalore

Medical Sciences

Dr Pundi Narasimhan Rangarajan
Indian Institute of Science, Bangalore

Physical Sciences

Dr Yashwant Gupta
National Centre for Radio Astrophysics, Tata Institute of Fundamental Research, Pune

and

Dr Pinaki Majumdar
Harish-Chandra Research Institute, Allahabad

CSIR TECHNOLOGY AWARDS 2007

CSIR Technology Awards, given annually, were instituted in 1990 with a view to fostering and encouraging in-house multi-disciplinary team efforts and external interaction for technology development, transfer, marketing and commercialization

'Team CLRI' at Central Leather Research Institute, Chennai, wins the CSIR Technology Award- 2007 for Physical Sciences including Engineering

and

'Team IIP' at Indian Institute of Petroleum, Dehra Dun, wins the CSIR Technology Award- 2007 for Innovation

Each of the above awards carry a cash prize of Rs 2 lakh, a plaque and a citation.

'Team CLRI' has won the award for developing chemo autotrophic activated carbon oxidation (CAACO) technology for the treatment of wastewater. The technology involves biological and catalytic oxidations coupled in a single reactor. Biological oxidation of constituents of wastewater is accomplished by the immobilized aerobic and anaerobic bacteria (chemo autotrophs) in the meso pores of activated carbon and catalytic oxidation is carried out at the active sites of activated carbon.

Team CLRI — winners of CSIR Technology Award 2007 for Physical Sciences, including Engineering with Shri Kapil Sibal; Dr T. Ramasami; Prof. M.S. Swaminathan; Prof. P. Balaram and Dr Vikram Kumar

CLRI has also developed a packed bed reactor (CAACO Reactor) for the treatment of wastewater. The CAACO technology has been implemented in more than 50 installations to test its efficacy for the treatment of wastewater discharged from different industries, software parks, residential colonies, etc of varying capacities.

'Team IIP' has won the award for developing new catalysts for sweetening of lighter and heavier petroleum fractions. IIP after consistent R & D efforts has developed novel sweetening catalysts namely cobalt phthalocyanine sulphonamide for extractive sweetening of LPG/ lighter petroleum fractions and cobalt phthalocyanines dichloride for fixed bed sweetening of heavier petroleum fractions. Successful trial run of cobalt phthalo-cyanines sulphonamide catalyst was undertaken in FCC LPG Merox unit of BPCL Mumbai and LPG Merox unit of RIL, Jamnagar and the performance was found comparatively better than the commercial catalyst. IIP has filed 21 patents for this innovation. Currently IIP is in the process of transferring the know how for the commercial production of these catalysts. The catalysts, being techno-economically superior, have the potential of replacing the existing catalysts world over.

Team IIP — winners of CSIR Technology Award 2007 for Innovation with Shri Kapil Sibal; Dr T. Ramasami; Prof. M.S. Swaminathan; Prof. P. Balaram and Dr Vikram Kumar

CSIR YOUNG SCIENTIST AWARDS 2007

Introduced in 1987, these awards are open to scientists working in CSIR system who have not attained the age of 35 years by 26 September of the preceding year. The awards are given annually for outstanding contributions made by the young scientists, based on work done primarily in India, in the following fields: Physical Sciences (including instrumentation); Chemical Sciences; Biological Sciences; Engineering Sciences; and Earth, Atmosphere, Ocean and Planetary Sciences. The scientist should be a regular employee of CSIR, holding a post of Group IV (Scientist 'B' or above) and should have joined the CSIR laboratory on or prior to 26 September of the previous year. The awards carry a citation, a plaque and a cash prize of Rs 50,000 with a grant of rupees ten lakh spread over a period of five years for pursuing research project independently.

The recipients of the CSIR Young Scientist Awards for the year 2007 are as follows:

Chemical Sciences

Dr M. Jayakannan

Chemical Science & Technology Division
National Institute for Interdisciplinary Science and Technology
Thiruvananthapuram

and

Dr Souvik Maiti

Proteomics and Structural Biology Unit
Institute of Genomics & Integrative Biology [IGIB]
Delhi

Engineering Sciences

Shri Rabibrata Mukherjee

Central Glass & Ceramic Research Institute
Kolkata

and

Dr Sundergopal Sridhar

Indian Institute of Chemical Technology
Hyderabad

Physical Sciences

Dr N. Vijayan

Materials Characterization Division
National Physical Laboratory
Dr K.S. Krishnan Marg
New Delhi

No Awards were given in the areas of Biological Sciences and Earth, Atmosphere, Ocean & Planetary Sciences.

CSIR Young Scientist Award-winners with Shri Kapil Sibal; Dr T. Ramasami; Prof. M.S. Swaminathan; Prof. P. Balaram and Dr Vikram Kumar

CSIR DIAMOND JUBILEE TECHNOLOGY AWARD 2007

The CSIR Diamond Jubilee Technology Award, given annually, was instituted in commemoration of CSIR's Diamond Jubilee in 2003. It is given for technological development in the country by Indian innovators and which meets the highest global standards. The award carries a cash prize of Rs 10 lakh, a shield and a citation.

The CSIR Diamond Jubilee Technology Award for 2007 goes to Mahindra and Mahindra Limited for the development and commercialization of *Scorpio*.

Announcing the award CSIR Director General Dr T. Ramasami said that with the development of *Scorpio*, Mahindra & Mahindra had joined a handful of companies, which have designed and produced world class vehicles. This development has enabled the company to move into international league of automobile manufacturers. Its cutting edge diesel engine technology, voice-assist system, lower NVH (noise, vibration and harshness) and 5 zone cushion suspension make every drive an exhilarating experience. The product with its style, convenience, comfort and safety is popular with individuals and institutions in India and abroad. The CSIR Diamond Jubilee Technology Award, it is hoped, will inspire and motivate the industry further to take up many more daring and challenging initiatives.

CSIR AWARD FOR S&T INNOVATIONS FOR RURAL DEVELOPMENT

The CSIR Award for S&T Innovations for Rural Development was instituted in 2006 to recognize those S&T innovations that have helped transform the lives of rural people or alleviated the drudgery of the rural people or have helped in generation of employment. Only successful S&T innovations that have been implemented at ground level are considered for the award. The award carries a cash prize of Rs 10 lakh, a shield and a citation.

The CSIR Award for S&T Innovations for Rural Development – 2007 has been jointly won by

National Research Centre on Yak, Dirang for "Improvement of Sustainable Yak Husbandry Practices in Himalayan Region"

and

Nimbkar Agricultural Research Institute (NARI), Phaltan alongwith **National Chemical Laboratory (NCL), Pune,** for "Use of the *FecB* (Booroola) gene in *Deccani* breed of sheep, to increase lamb production and thereby the incomes of Shepherds".

Announcing the award the CSIR Director General Dr T. Ramasami pointed out that in the Himalayan region of the country, the life revolves around Yak. On one hand the animal is source of products such as milk and wool and service for agriculture and transportation, while on the other, when dead it is used for producing leather, implements, rugs, tents and bones are used for carving, etc. A major limitation with this species has been its poor reproductive efficiency due to its inherent problems of late maturity, poor estrus expressivity, seasonality of reproductive pattern and prolonged inter-calving intervals.

Drastic decline in yak population in India and all over the world has become a cause for concern. Thus, conservation of yak genetic resources has got worldwide attention. NRC-Yak has successfully standardized the protocol for super ovulation, embryo recovery and transfer in yak. Due to this unique effort, the dwindling Yak population has been stabilized in the states of Arunachal Pradesh, Sikkim, Himachal Pradesh and Jammu & Kashmir. The age for attaining puberty has also decreased as a result yaks are now producing one calf/year instead of the earlier record of 1 calf/3 years. The rural communities in Yak inhabited states are getting benefited tremendously from this research effort as they get more produce and services by rearing the yak. Further, the Centre has produced the first ever female yak calf "MISMO" in the world through embryo

transfer technology.Dr Ramasami further said that like most other breeds of sheep in India, *Deccani* sheep have a comparatively low reproductive rate, producing one lamb every 10 to 12 months. More than 80% of the income of shepherds rearing *Deccani* sheep comes from sale of lambs. NARI in collaboration with NCL has successfully introduced *FecB* gene in *Deccani* sheep to enhance lamb production. A new strain of *Deccani* sheep with higher productivity called 'NARI Suwarna' has thus been developed. The FecB gene carrier ewes produces twin lambs at every alternate lambing, giving an average litter size of 1.5 compared to 1.0 in the *Deccani*. This increase is high enough to bring about a substantial increase in the shepherd's income and would thus transform gradually the rural economy.

This award to NRC-Yak and NARI alongwith NCL will inspire all those in the profession and business of innovation for rural development in the country not only to accelerate their efforts of innovating more and more but also to implement them successfully at ground level. Such a huge effort would help transform lives of our rural brethren on one hand and bring in vibrancy in rural economy gradually on the other, said Dr T. Ramasami.

CSIR DIAMOND JUBILEE INVENTION AWARDS FOR SCHOOL CHILDREN FOR 2007

The CSIR Diamond Jubilee Invention Awards for School Students were instituted on the World Intellectual Property Day (26 April, 2002), with a view to encouraging the school students to innovate, and generating greater IPR awareness among them. The competition is open to bonafide school students, below eighteen years of age. Sixty prizes can be given; the first prize carries Rs 50,000. CSIR not only gives these awards but also helps in filing patents for the inventions that are patent worthy.

This year only two prizes, one third prize and one fifth prize have been given:

Third Prize (Rs. 15,000/-)
Miss Neha Lalit Sharma
Class: 10, Fr Agnel Multipurpose School, Sector 9A, Vashi
Navi Mumbai
Title: Herbal formulation to control R*hipicephalus* spp. (Brown Dog Tick)

Fifth Prize (Rs. 5,000/-)
Shikhar Bhandari
Class: 11, B.V.B. Mehta Vidyalaya
K.G. Marg, New Delhi
Title: Multiple Use of a Two Wheeler Scooter

Dr Pijush Pal Roy wins National Mineral Award

Dr Pijush Pal Roy, Scientist 'F', Central Institute of Mining and Fuel Research (CIMFR), Dhanbad, has made noteworthy contributions towards widening the horizons of geosciences and their applications. A recipient of the National Mineral Award-2005 of Ministry of Mines, Government of India (presented in 2007). Dr Roy is head of the Blasting Department and also the coordinating scientist of the Respiratory Protection Laboratory, Mine Stowing, Slope Stability, Hydrology and Ventilation Departments of the institute. During his nearly 22 years of stay at CIMFR, he has worked in more than 150 mines and quarries and 15 prestigious hydroelectric projects of the country.

Dr Roy's early research work was on the mechanics of thinly layered laminated materials and their dynamic characteristics under initial, couple and thermal stresses. He has made original contributions to the analysis of prestressed materials, in particular to those of finely layered media, using an interesting transformation. The study was jointly carried out by Dr Roy and Prof. L. Devnath of the Central Florida University, USA. This particular study helped geo-scientists in determining the propagation characteristics of laminated medium when subjected

to dynamic loading. It also helped in the study of physical mine modelling.

Since 1986, Dr Roy's focus has been on rock blasting research including blasting mechanism, physical characteristics and innovative blast design models, cost optimization, safety and productivity. He has developed vibration predictor equations; burden-spacing equations; fragmentation analyzing scale; damage characteristics of surface structures and their evaluation; vibration, air-overpressure and human response standards, methodologies for best use of non-electric initiation systems; theory and principle of air-deck blasting; mathematical equations related to energy balance in rock blasting; use of additives (sawdust & rice-husk) in ANFO for cost-effective optimum blasting in limestone mines and techno-economic evaluation of drilling and blasting operations.

Dr Roy's research on the propagation, prediction and control of ground vibrations due to surface and underground blasting is well recognized. He has scientifically established the physical aspects of the problem and extensively experimented in different categories of mines under varying geo-mining conditions. Such studies are supported by huge experimental data and mostly cited in scientific forum and institutional research work. He has also scientifically analyzed drilling and blasting operations in opencast mines and developed a number of predictive models which are being used by the mine management.

Dr P. Pal Roy of CIMFR receiving the National Mineral Award from Shri Sis Ram Ola, Minister of Mines, Government of India. Dr T. Subbarami Reddy, Minister of State for Mines, Government of India is also seen

Burden and Spacing formulae developed by Dr Roy are also useful tools for researchers and practicing engineers for optimization of blast pattern. On many occasions, CIMFR scientists use them for blast design purposes in various industry-sponsored projects of the institute. He was instrumental in implementation of non-electric initiating devices (Shock-Tube Systems) in Surface and U/G mines for eco-friendly blasting operations. The device is now widely used in almost 80% mines in India.

The fragmentation analyzing scale developed by Dr Roy is being used in designing face orientation for newly developed mines and quarries. As an example, UCIL has used this technique for their proposed Banduhurang Opencast Mines.

Dr Roy and his group have recently released a handy **BG-Folder** and **'INCAB'** software (in Java-Swing) language for field use after extensive field investigations in Blasting Gallery (BG) panels, pertaining to an S&T project of the Ministry of Coal and Mines.

Dr Roy is the author of 2 books (published both in India and abroad), 2 guidelines and nearly 89 scientific papers published in international/ national journals and seminar/ symposia proceedings. In addition to the National Mineral Award, he has also received Young Scientist Award of CSIR-1989, First CMRI-Whittaker Award-1993 and Hindustan Zinc Limited Medal of the Institution of Engineers (India)-1997.

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