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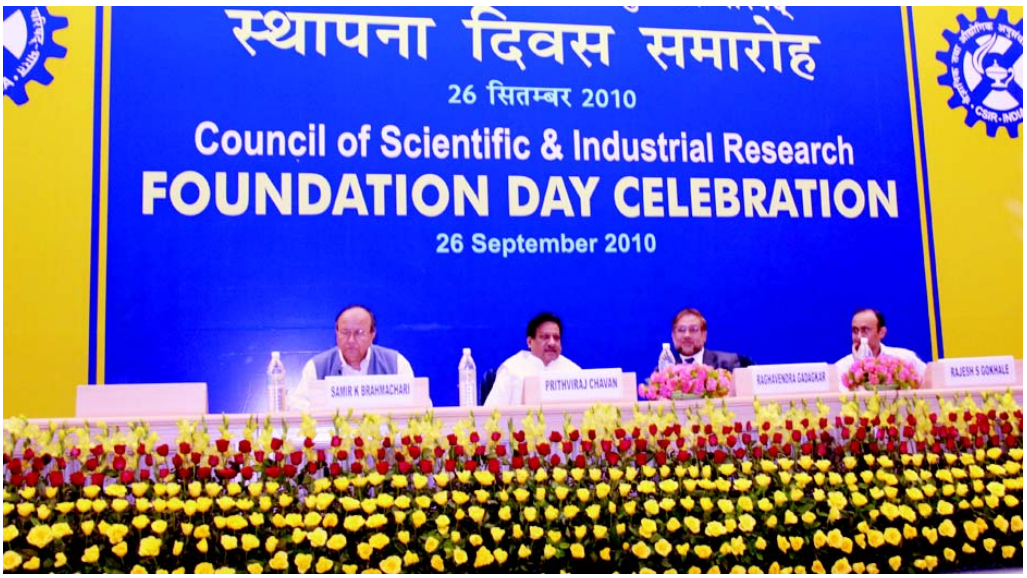
68th CSIR Foundation Day Celebrations, 26 September 2010



Seen on the dais during the CSIR Foundation Day Function at Vigyan Bhawan, New Delhi (*from left*) are: Prof. Samir. K. Brahmachari , Director General, CSIR; Shri Prithviraj Chavan, Minister of State for Science & Technology and Earth Sciences and Vice President, CSIR; Prof. Raghavendra Gadagkar and Dr. Rajesh S. Gokhale

Founded in 1942, the Council of Scientific & Industrial Research (CSIR) completed 68 years of its dedicated service to the nation on 26 September 2010. 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 has 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 various awards.

The main function of the CSIR Foundation Day this year was held at Vigyan Bhawan, New Delhi. The function, attended by the distinguished gathering of scientists and technologists was presided over by Shri Prithviraj Chavan, Minister of State (Independent Charge), Science & Technology and Earth Sciences and Vice President, CSIR, who gave away the various awards.

DG CSIR, Prof. Samir. K. Brahmachari, welcoming Prof. Raghavendra Gadagkar (*left)* and presenting him a memento (*right*)
The Hon'ble Minister Shri Prithviraj Chavan is also seen in the pictures

Welcome Address by Director General, CSIR, Prof. Samir K. Brahmachari

Hon'ble Minister of Science and Technology and Vice President, CSIR, Shri Prithviraj Chavan; Chief Guest for 68th Foundation Day celebrations, Prof. Raghavendra Gadagkar, guests from Academia, Industry and other Science Departments, Awardees and their families, CSIR staff, members of electronic and print media, ladies and gentlemen. I extend you all a very warm welcome to CSIR's Foundation Day celebration and thank you for joining us on this happy occasion.

To our Hon'ble Minister Shri Prithviraj Chavan, I convey my personal as well as entire CSIR family's greetings. Sir, although you have been very familiar, as a parliamentarian, with the working of central science departments including CSIR for the past 20 years or so, your charge as Minister and also the Vice-President, CSIR has come at a very defining moment.

The world has just stepped into the second decade of the present century. This is a decade of innovation not only for us but also for all the nations. This is the decade, which will reward those who are creative, innovative and entrepreneurial. Sir, CSIR, under your guidance knows this well, and has accordingly prepared itself for such a challenge. Today is the day when we honour such achievers of ours, who take up challenges and deliver.

Our esteemed speaker today is Prof. Raghavendra Gadagkar, a behavioural geneticist and a social biologist, who has very few peers, globally. As founder Chair of the Centre for Contemporary Studies at Indian Institute of Science, Prof. Gadagkar works across a very exotic research domain extending from "*Evolution of Social Life in Insects*" to '*Insect Biodiversity*' and is a very captivating speaker. At a relatively young age, he has been able to scale those professional heights, which most take several life times. Thank you Prof. Gadagkar for accepting our invitation. We look forward to listening to you.

DG CSIR, Prof. Samir. K. Brahmachari delivering the Welcome Address

A view of the audience

CSIR 'Foundation Day' is an occasion which many young, and not so young, scientists across India, keenly wait for. They look forward to receiving the most coveted Young Scientist Awards, Technology Awards and Diamond Jubilee Invention Awards. I welcome all of them and congratulate them on their achievements.

Ladies and Gentlemen, this day is an occasion which gives us a wonderful opportunity to reminiscence our past year's achievements and think deeply of the future. What does it have in store for us? How it will unfold? Are we prepared for it? Do we have systems in place? And so on. The more I think of it, the more I feel convinced of our prowess. We have a young and thinking team of scientists, technologists and engineers who could bring numerous accolades to us. We have now a large number of brand new young leaders for our labs. Not only could we successfully get approval for the Academy of Scientific and Innovative Research, but also could envision for CSIR, a futuristic policy framework "CSIR Vision and Strategies for 2022".

CSIR's mission has been and continues to be: ***"To provide scientific and industrial R&D that maximizes the economic, environmental and societal benefits for the people of India."***

The people and country-centric thrust to science, technology and societal pursuits remain the cornerstone of CSIR's mission. However, today the dreams and aspirations of the nation about the future have soared. Expectations from CSIR and the other public-funded institutions to fulfil these are much higher now. Not only is the pace of scientific and technological growth, and the yardsticks of living standards, much higher today, age old myths of economy and growth have been broken; that is the shift from manufacturing to services; capital resources to knowledge resources; population as a burden to human resource as an asset; national needs to opportunities.

The changed scenario has inspired CSIR to dream big towards Science & Engineering leadership; Innovative technology solutions; End-to-end technologies in niche areas; Open innovation for inclusive growth; Nurturing talent in trans-disciplinary areas and Enabling scientific entrepreneurship. CSIR's slogan for the next two decades will be "*Leadership in Science & Technology for the Masses and Happiness for a Billion People*". We have learned from the past, live in the present and have a clear vision for the future.

We are reorganizing our network programmes into six domain-specific clusters; unleashing "Empower' – programme of preferential funding for creative young researchers and are setting up CSIR-Tech: a vehicle to unleash the entrepreneurial spirit of many of our scientists. We are also connecting with our stakeholders through CSIR-NGO meet and CSIR-800; participating in national Solar Energy Mission; and are planning long-term human resource management and development strategies by induction of 'outstanding' and 'distinguished' scientists into CSIR mainstream. Some of our recent achievements are *Risorine* the TB drug, *Prostalyn* for prostrate tumours, clot-buster *streptokinase* and carbon fibre technology, which have all given us a deep sense of happiness and pride.

Our being India's '*numero uno*' in terms of 'peer reviewed papers published', 'patents filed' and 'commercial earning through licensing', continued this year as well. I congratulate all in CSIR for this feat and also thank our industrial stakeholders for their belief in us. I believe that for CSIR's 4500 scientists and other staff, the *mantra* for success is, Gurudev Ravindra Nath Tagore's quote: ***"I slept and dreamt that life was joy. I awoke and saw that life was service. I acted and behold, service was joy".*** For CSIR, pursuing the S&T agenda of the nation is the service, and the joy. Sir, that is the Foundation Day resolution for us and we will live it. Welcome again and thank you all.

CSIR Foundation Day Lecture

War and Peace: Conflict and Cooperation in an Insect Society

Prof. Raghavendra Gadagkar

Unknown to many of us, a large number of insects' species organize themselves into very sophisticated societies. Their societies parallel and sometimes surpass human societies in their social organization, in their social integration, in communication, in division of labour and most importantly in the way in which they tread a very fine balance between conflict and cooperation. In a honey bee colony for example, you may find fifty to sixty thousand individuals of which there is only one large fertile queen, a small number of males or drones, and the rest of the colony consists of small, sterile females who are referred to as workers. Together they function as a colony.

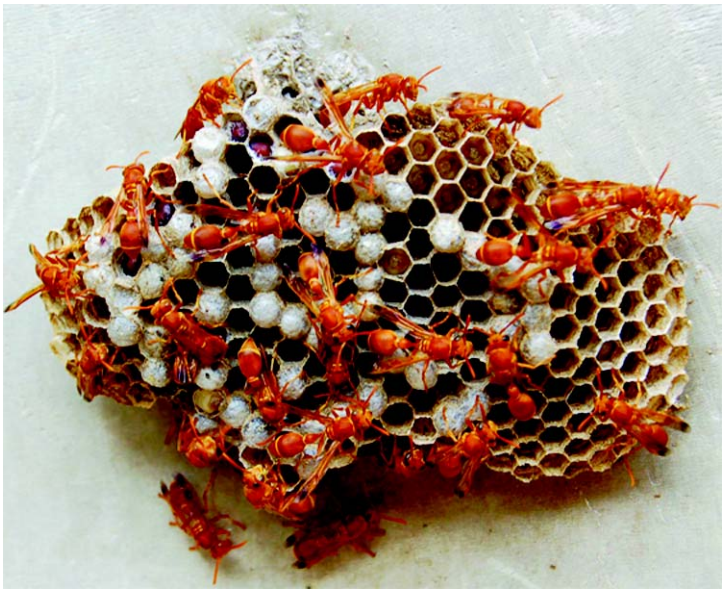
The queen is typically surrounded by a small group of workers. It is the duty of these workers to take care of the queen. They lick, clean and feed the queen, who is so busy laying eggs and secreting pheromones that she has no time to take care of herself. This job of taking care by the workers is done in shifts. A few minutes later these workers who are in-charge of the queen will go off elsewhere in the colony to perform other tasks, and other workers who are now performing other tasks will come to take care of the queen. This gives an opportunity for a very large fraction of the worker force to come in a close contact with the queen and be aware of the state of their queen. All the tasks that are required to run the society are actually done by the workers. The male – I am embarrassed to say — are incredibly lazy and they actually do not do any work for the honey bee society. It's the females who do all the work. In the first half of their lives workers work inside the colony — building the nest, cleaning it, feeding the larvae, processing food, guarding the nest, removing dead bees and so on. In the second half of their lives, they go outside the colony in search of food – nectar and pollen — for the colony.

Some of us may not be aware that honey bees have a fairly sophisticated symbolic language which is called the dance language. When a honey bee finds a large amount of food, she returns to the hive and is able to communicate with bees at home and provide information about the food she has found, how much, how far away from home, and exactly how to get there. And after she has performed this dance you can take the dancer away and those bees who have watched the dance will be able to go and find that particular source of food, which may well be five kilometers away from the hive. This is an accomplishment that no other animal species appears to have made other than human beings.

Prof. Raghavendra Gadagkar delivering the CSIR Foundation Day lecture

Wonderful as they are, I do not use honey bees in my research. The reason is that honey bees attained their sophisticated social organization many millions of years ago so that the details of their transition from solitary to social life has now become obscured. Instead, I use the primitively eusocial Indian tropical wasp *Ropalidia marginata*. This is a remarkable wasp which appears to be at the brink of sociality. It can organize itself into reasonably sophisticated societies and yet it has not forgotten to lead a solitary life.

Moreover, its societies (colonies) are small and often contain no more than 20-30 individuals. This allows us to mark every individual wasps with unique spots of coloured paint and study their behaviour. I and my students have spent many years attempting to understand how and why these wasps organize themselves into social colonies. Our research has involved asking simple questions and designing experiments to answer these questions. Almost always a successful answer to a question opens up at least one new question which requires its own new experiment, provides a new answer, leads to yet another question and so. Here I will give a small sample of such cycles of question, experiment, answer and new question.



A typical nest of the primitively eusocial wasp, *Ropalida marginata*
(Photo courtesy: Thrwaiamma Varghese)

In an early study we asked how the individual members of a colony divide tasks among themselves? To answer this question we recorded the behaviour of all individually identified individuals and subjected the resulting data to multi-variate statistical analysis. The result was that we could identify three distinct groups of wasps which we labeled sitters, fighters and foragers. This result led to the question about the position of the queen in the colony in such a system of behavioural caste differentiation.

Queens of other such wasp species are known to be aggressive and use their physical aggression both to suppress worker reproduction and to regulate non-reproductive activities of the workers such as foraging and brood care. We therefore expected our queens to fall in the fighter caste. To our great surprise this was not the case. In colony after colony, we found that *Ropalidia marginata* queens belong to the sitter caste.

This result raises the question of how such meek and docile sitters are accepted as queens. To answer the above question we designed an experiment which involved studying normal, queen-right colonies, experimental removal of the queens to study queenless colonies and reintroduction of the queen to study the reconstituted colony. Such experiments yielded the remarkable result that the normally peaceful society of *Ropalidia marginata* became extremely aggressive upon removal of the queen. Even more remarkably, all the new aggression was thrown by a single worker. Equally remarkably we found that this hyper aggressive individual dropped her aggression and went back to work immediately upon return of the queen. We also found that if the queen was not returned, the hyper aggressive individual gradually lost her aggression in about a week's time and became the next meek and docile queen of the colony. Thus meek and docile queens of *R. marginata* became queens because they begin their career as extremely aggressive individuals. Thus we labeled the hyper aggressive worker as the Potential Queen (PQ).

But this raises the question of how they suppress worker reproduction and maintain reproductive monopoly throughout their tenure (which may last several months) after losing their aggression within a week. To answer the above question we designed a different experiment. Here we cut a nest into two parts and separated them by a wire mesh partition and released the queen and half the workers on one side and the remaining workers on

Biography

Raghavendra Gadagkar is INSA S. N. Bose Research Professor and J .C. Bose National Fellow at the Centre for Ecological Sciences, Indian Institute of Science, IISc; Honorary Professor, Jawaharlal Nehru Centre for Advanced Scientific Research; Non-Resident Permanent Fellow of the Wissenschaftskolleg (Institute of Advanced Study) in Berlin; and Honorary Professor, Indian Institute of Science Education and Research, Kolkata.

During the past 25 years he has established an active school of research in the area of Animal Behaviour, Ecology and Evolution. He has published over 250 research papers and articles and two books. His book entitled Survival Strategies (Harvard University Press, USA, 1997 and University Press, Hyderabad, 1998, since translated into Chinese and Korean), explains recent advances in behavioural ecology and sociobiology to a general audience. His more technical book entitled, *The Social Biology of Ropalidia* (Harvard Univeristy Press, USA, 2001) summarizes over 20 years of his research aimed at understanding the evolution of eusociality. His research work has been recognized by a number of awards including the *Shanti Swarup Bhatanagar Prize, B.M. Biral Science Prize, Homi Bhabha Fellowship, B. P. Pal National Environmnent Fellowship on Biodiversity, The Third World Academy of Sciences Award in Biology* and *H.K Firodia Award*. He is an elected fellow of the Indian Academy of Sciences, the Indian National Science Academy, the National Academy of Sciences, India, the Academy of Sciences of the Developing World (TWAS) and Foreign Associate of the National Academy of Sciences, USA.

Dr Gadagkar has been on the editorial boards of several national and international science journals, including the board of reviewing editors of Science. He has delivered over 500 invited lectures in Universities, Institutes, schools and colleges in India and abroad. He was invited to USA as the Michener Lecturer and by the Royal Society to deliver a public Lecture in London, on the occasion of India Day and has delivered Plenary Lectures at a number of national and international conferences. He is a member of several professional scientific bodies and government and non- government advisory committees including the Scientific Advisory Committee to the Cabinet, Government of India.

other side. Our expectation was that the queen may be using a pheromone to signal her presence to the workers.

Our prediction was that if the pheromone is volatile, it will be perceived across the wire mesh so that workers on both sides of the mesh will behave as if they have a queen. On the other hand, if the pheromone is non-volatile, workers in the queenless side will behave as if they do not have a queen; in other words one of the workers on this side should become hyper aggressive and behave like a PQ. We have repeated this experiment several times and in every case the queenless side produced a PQ indicating that the queen pheromone is non-volatile.

The non-volatile queen pheromone may be adequate to suppress worker reproduction but how does the meek and docile queen makes its workers work for the colony? This question needed yet another experiment. In this case we found by removing the queen and observing the workers that the queen does not regulate the work of the workers. The workers themselves regulate each other's work in an

decentralized, self-organised manner, irrespective of whether the queen is present or not.

But how is the PQ chosen among all the workers. We have performed many different kinds of experiments in our attempts to answer this question but so far we have failed. The PQ is an unspecialized individual, not different from other workers in her morphology, body size, behaviour, dominance rank or her ovarian development. Although we cannot predict the identity of the PQ in the presence of the queen, we asked if there was nevertheless a designated heir known and acceptable to the rest of the colony. Performing other more complicated experiments, we have found clear evidence that there is indeed a cryptic heir designate known and acceptable to the wasps although unknown to us.

A striking feature of the wasps evident in all these experiments is that they managed their affairs including the contentious task of designating a PQ without over conflict. Conflict however was very conspicuous in the manner in which the wasps behaved towards members of other colonies. Using another set of experiments we showed that the wasps have a well developed mechanism of nestmate discrimination. This ensures that alien wasps are kept away from nests when we experimentally introduced foreign wasps into the cages of other colonies, the resident wasp displayed a very nuanced reaction to the introduced foreigners. The young members of the foreign colony were allowed to join the resident colony. The older workers of the foreign colony were allowed to live in the periphery of the cage but not allowed to join the colony. The queen of the foreign colony was located wherever she was and killed. In subsequent experiments, we have shown that the young foreign wasps allowed to join the colony, became fully integrated into their foster colonies and lose their foreign identity. Indeed they can go on to become foragers and even future queens of their foster colonies.

In summary, we find that the wasps have well developed mechanisms to maintain peace within the colony and equally well developed mechanisms to make war with foreigners. It is this dual ability to have peace with insiders and make war with foreigners that is perhaps the reason why the insect societies have been so ecologically successful as to have received the label "super organism". One might say, we humans are not very different. I certainly do not think that we should blindly imitate insect societies. But I do think that insect societies hold a mirror to us and make us think and reflect on the way we humans conduct our own affairs.

Suggested Readings:

Gadagkar, R. (1997). *Survival Strategies – Cooperation and Conflict in Animal Societies.* Harvard University Press, Cambridge, Massachusetts, USA and Universities Press, Hyderabad, India.

Gadagkar, R. (2001). *The Social Biology of Ropalidia marginata: Toward Understanding the Evolution of Eusociality.* Harvard University Press, Cambridge, Massachusetts, USA.

Gadagkar, R. (2009). *Interrogating an Insect Society.* Proceedings of the National Academy of Sciences, USA, 106, 10407-10414.

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Address by Shri Prithviraj Chavan, the Hon'ble Minister of State for S&T (IC) and Earth Sciences, and Vice President, CSIR

Prof. Raghavendra Gadagkar, Prof. Samir Brahmachari, Dr. Rajesh Gokhale, Awardees, invitees from Industry, Academia, Government and members of CSIR family. My warm felicitations and congratulations to CSIR for completing 68 glorious years of existence. Ever since its establishment in 1942, CSIR has been the harbinger of major scientific and technological achievements in the country, and I hope and believe that it shall continue to provide scientific leadership to the country in years to come as well. To all the Awardees and their family members, I offer my warmest greetings and congratulations. We are proud of their work, which has brought not only personal glory to them but also to the institutions where they work. Let this recognition be a catalyst in their future scientific endeavours.

September 26 happens to be the birthday of Dr. Manmohan Singh, our beloved Prime Minister and President, CSIR Society. I extend on my personal behalf and on behalf of CSIR family members, our greetings and best wishes to him. We are indeed very fortunate to receive his full support for all our scientific endeavours and pursuits.

Prof. Gadagkar, I really enjoyed listening to your Foundation Day lecture. For me, an engineer, your talk presented a whole new realm of knowledge and the science governing animal social behaviour. We appreciate that you not only have established a new school to study *Animal Behaviour, Ecology and Evolution* but are also very widely consulted and quoted for your work on ants, bees and wasps. For our young researchers working in the broad domain of behavioural ecology and sociobiology, you are indeed a role model. I must compliment DG, CSIR for inviting a very distinguished working scientist to deliver this year's Foundation Day lecture.

Ladies and Gentlemen, last year in the course of my Presidential remarks, I had desired CSIR to put in an increased focus on 'energy', 'water' and 'food sector' research. I am very happy to note that CSIR has indeed put in measures to initiate very intensive work in these areas. I commend DGCSIR for his very definitive and prompt initiative.

CSIR's strength is primarily in the areas of Chemistry and Biology, but I always felt that CSIR must have strong presence in the engineering research as well. It is in this context that I note with appreciation CSIR's most innovative programme *Post-graduate Research Programme in Engineering (PGRPE)* launched last year.

This programme prepares our young engineers not only to undertake challenges of engineering research but also brings back the focus on an area which our country needs the most for augmenting its manufacturing capabilities and designing new products. That this programme is going strong and has attracted thousands of students passing out from engineering colleges brings us a solution to our perennial shortage of engineers in research.

Shri Prithviraj Chavan, the Hon'ble Minister of State for S&T and Vice President, CSIR addressing the audience

This year is again a year of numerous achievements for CSIR. I am very happy to mention the Cabinet's approval for *CSIR Academy for Scientific & Innovative Research (AcSIR)* – an initiative which shall have a very strong and positive contribution to the CSIR's research base. I notice that the setting-up of *AcSIR* has attracted very appreciative feedback from academia and researchers alike. I compliment Dr. Brahmachari on his very passionate involvement in this endeavour. Not only I admire his passion to think forward and excel in the same, but also for creating for all Indian science

departments, a road map to consider and follow. Yet other achievements of far-reaching importance are setting up of CSIR-Tech and wide-ranging global recognition for TKDL, i.e. the Traditional Knowledge Digital Library. I believe these measures will propel CSIR into a league of those great performing organizations, which create a very judicious mix of research and entrepreneurship.

Prof. Brahmachari, I again compliment you for creating a very distinct and a new way of research project funding. In the 10th Plan, we initiated R&D work in Network mode, which brought scientists from diverse disciplines and dispersed locations together, thus creating a synergy. These network programmes brought in a huge dividend wherein CSIR laboratories could function synergistically and it got reflected in our output as well. CSIR's recent organization of networks into "network clusters" by creating distinct, yet synergistically linked sub-clusters, has brought oneness in the system. I firmly believe that this is the beginning of a great period of cooperation and achievements for CSIR.

This period has also seen other initiatives, such as mechanisms to reach the masses through CSIR-NGOs linkages; CSIR-800 programmes; participating in national solar, energy and water missions to provide cutting-edge scientific inputs and transfer of some path-breaking high value technologies like sulphur of potash, carbon fibre composite, the anti-TB drug risorine, semi-continuous bio-diesel plant, co-relating Ayurveda and Genomics thereby giving rise to a new scientific area of study - the Ayurgenomics, etc. I appreciate these developments.

India is on a growth trajectory, its GDP is envy to many developing nations. Our research funding is almost one percent of our GDP and poised to go up. This growth is all possible because we have a dynamic set-up, young research pool and visionary leadership. I am sure, CSIR will continue to empower its scientists through innovative schemes like *Empower*, which is preferential funding available to young researchers to help them fulfill their scientific dreams.

Ladies and Gentlemen, for any organization or establishment, its mission and vision are very important, so is the case with CSIR. But the vision should always be dynamic, sensitive to the prevailing environment and yet aim at reaching distinct horizons. I am very happy to know that CSIR is creating for itself, a *Vision Document – CSIR 2022*, which is going to broadly focus on its strengths and needs, and charts an Action Plan. Dr. Brahmachari, I would very keenly watch the outcome of such an ambition.

During the period, CSIR has inducted young and new Directors, who along with the experienced ones are engaged in creating a new CSIR. This consultative mechanism always pays dividend. I would like to offer you my wholehearted cooperation in such an endeavour. I also compliment CSIR for its continuing leadership position in research publications, patents and commercial earnings. This amply indicates that CSIR is a performing organization and is charting its own innovation driven path.

Ladies and Gentlemen, let me take this occasion to share a concern of mine. As per the latest World Competitive Index released by IMD, Lausanne (Switzerland) India's competitiveness ranking for this year is at 31 out of 58 countries covered, while it was 27, 29 and 30 for the years 2007, 2008 and 2009 respectively. Achievements in science and technology and innovativeness also play a role while deciding competitiveness of a country. There is a decline for us, although, not very alarming. But then it calls for bringing proactive and enabling measures, which should propel India among the first 20 if not in the first 10. Creating a wider science base, modernizing science laboratories, creating challenging research projects and ambience, making scientists more accountable could be a few such initial steps.

While concluding, I am tempted to say that in the history of every organization, there comes a 'tipping point', a defining moment, and a threshold, which decides the future for that organization. For CSIR that defining moment is on the anvil. It must transit from XI Plan to XII Plan with never before ambition, agenda and goals – truly global and never set before. My Ministry and I personally would always be there to support you. Wishing all of you the very best and congratulations again to all the Awardees and their family members. Thank you, all.

Shanti Swarup Bhatnagar Prize 2010

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 500,000, 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.

For the year 2010, nine scientists have been selected for the prestigious Shanti Swarup Bhatnagar Prize.

Biological Sciences

Dr Sanjeev Galande
National Centre for Cell Science, Pune (Presently at Indian Institute of Science Education and Research, Pune)

Dr Shubha Tole
Tata Institute of Fundamental Research, Mumbai

Chemical Sciences

Dr Swapan K Pati
Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

Dr Sandeep Verma
Indian Institute of Technology, Kanpur

Engineering Sciences

Dr G K Ananthasuresh
Indian Institute of Science, Bangalore

Dr Sanghamitra Bandyopadhyay
Indian Statistical Institute, Kolkata

Medical Sciences

Dr Mitali Mukherji
Institute of Genomics & Integrative Biology (CSIR), Delhi

Physical Sciences

Dr Umesh Vasudeo Waghmare
Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

Dr Kalobaran Maiti
Tata Institute of Fundamental Research, Mumbai

No Award was given in the area of **Earth, Atmosphere, Ocean & Planetary Sciences and Mathematical Sciences.**

CSIR Young Scientist Awards 2010

Instituted in 1987, CSIR Young Scientist Awards seek to promote in-house excellence in various fields of science and technology. 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: Biological Sciences; Chemical Sciences; Engineering Sciences; Earth, Atmosphere, Ocean and Planetary Sciences and Physical Sciences (including Instrumentation).

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. CSIR Young Scientist Awardees are also entitled to a research grant of Rs 5.0 lakhs (Rupees five lakhs only) per annum for a period of five years and an honorarium of Rs 7500/- (Rupees seven thousand five hundred only) per month till the age of 45 years.

Till 2009, 133 scientists (including 17 women scientists) have received the CSIR Young Scientist Award and out of these 14 scientists have been conferred with the prestigious Shanti Swarup Bhatnagar Prize. For the year 2010, Advisory Committee consisting of eminent scientists recommended the following seven scientists for the 2010 Young Scientist Awards. This year, none was found suitable in Physical Sciences (including instrumentation)

Biological Sciences

Dr. M. Mohammed Idris, Centre for Cellular and Molecular Biology, Hyderabad. Dr. Idris has been awarded for his excellent work on discovery of genes involved in pancreatitis and Huntington's diseases, establishment of genetic diagnostic procedures and recent insight into neurodegeneration in zebrafish model.

Dr. Sudesh Kumar Yadav, Institute of Himalayan Bioresource Technology Palampur. Dr. Yadav has been awarded for his outstanding contribution in the area of metabolic engineering & abiotic stress tolerance in plants.

Chemical Sciences

Dr. Kamalesh Parasad, Central Salt & Marine Chemicals Research Institute, Bhavnagar. Dr Parasad has

CSIR Young Scientist Awardees with Shri Prithviraj Chavan, Prof. Samir K. Brahmachari, Prof. Raghavendra Gadagkar and Dr. Rajesh S. Gokhale

been awarded for his significant contributions in the field of Polysaccharides leading to new functional materials that have great societal applications, besides being of fundamental interest.

Engineering Sciences

Dr Sanjay Pandurang Kamble, National Chemical Laboratory, Pune. Dr. Kamble has been awarded for his outstanding contributions to the development of chemical processes and technologies with a view to protect environment and minimize the energy requirement.

Dr Saptarshi Sasmal, Structural Engineering Research Centre, Chennai. Dr Sasmal has been awarded for his significant contribution to condition assessment & strengthening of structures.

Earth, Atmosphere, Ocean & Planetary Sciences

Dr. Ravi Prakash Srivastava, National Geophysical Research Institute, Hyderabad. Dr. Srivastava has been awarded for development of a new technique to model natural complex systems particularly hydrocarbon reservoirs.

Dr. Samir Ravikant Damare, National Institute of Oceanography Goa. Dr. Damare has been awarded for his outstanding research that has proven the presence of fungi in the deep-sea sediments in the Central Indian Basin and for understanding their physiology & enzyme profile using culturing techniques.

CSIR Technology Awards 2010

Instituted in 1990 and given annually, '*CSIR Technology Awards'* seek to foster and encourage multi-disciplinary in-house team efforts and external interaction for technology development, transfer and commercialization. These Awards include one each for: (i) Life Sciences; (ii) Physical Sciences including Engineering; (iii) Innovation; (iv) Business Development and Technology Marketing; and (v) Most Significant CSIR Technology of the Five-Year Plan Period (awarded once in five years, coinciding with the plan period, to such technology which has proven in the market place at least for five years).

Each Technology Award comprises of a cash prize of Rs 2 lakh except the award for the *"Most Significant CSIR Technology of the Five-Year Plan Period"* which has a cash prize of Rs 5 lakh. Besides, a plaque and a citation is also given to the awardees.

The Hon'ble Minister of State (IC) Science & Technology and Earth Sciences, Shri Prithviraj Chavan, on the occasion of CSIR Foundation Day, gave away CSIR Technology Awards for the year 2010. These awards were in the category of: Physical Sciences including Engineering (to Centre Glass and Ceramic Research Institute, Kolkata); Innovation (to North East Institute of Science and Technology, Jorhat); and Business Development & Technology Marketing (to National Metallurgical Laboratory, Jamshedpur).

Technology Award for Physical Sciences including Engineering

Centre Glass and Ceramic Research Institute, Kolkata won the CSIR Technology Award for developing manufacturing technology of bioceramic implants for medical applications. The technologies for production of ocular implants and hip prostheses and bio-active coatings are licensed to M/s IFGL Bioceramics Ltd., Kolkata and are in commercial production. The Sancheti Hospital, Pune; Disha Eye Hospitals and Research Centre Pvt. Ltd., Barrackpore; and West Bengal University of Animal and Fishery Sciences, Kolkata have contributed for conducting necessary trials related to the development.

Technology Award for Innovation

North East Institute of Science and Technology won the CSIR Technology Award for developing process for making high strength proppants. Oil exploring companies use high strength proppants in fracturing operations,

among others. The process developed utilizes native raw material like Bauxite, which is abundantly available in India. The proppants thus produced, conform to American Petroleum Institute (API) specifications. Keshava Deva Malaviya Institute of Petroleum Exploration (KDMIPE), ONGC, Dehradun has contributed in developing the process.

Technology Award for Business Development and Technology Marketing

National Metallurgical Laboratory won the CSIR Technology Award for significantly enhancing the business and markets for its knowledgebase.

Winners of CSIR Technology Award with Shri Prithviraj Chavan, Prof. Samir.K. Brahmachari, Prof. Raghavendra Gadagkar and Dr. Rajesh S. Gokhale

CSIR Diamond Jubilee Invention Award for School Children 2010

In order to enhance creativity amongst school children, CSIR announced, for the first time, Diamond Jubilee Invention Award for School Children on 26 April, 2002 - the day celebrated as *World Intellectual Property Day* throughout the world. The objectives of this competition are: to capture creativity and innovativeness amongst school children and create awareness about IPR.

There are a total number of 60 awards to be given each year. The first prizewinner becomes eligible for WIPO's Young inventor's Award carrying a medal and a certificate besides cash prize of Rs 50,000/-.

For the year 2009, only one invention was selected out of 288 proposals received for the various categories of prizes to be given. No first prize was given.

Miss Neha Lalit Sharma of Class XII, Swami Vivekanand Junior College, Chembur, Mumbai was given the Second Prize (Rs 25,000/-). Her work involved devising a method for dyeing cotton fabric using a natural colorant from tobacco.

Winner of the CSIR Diamond Jubilee Invention Award for School Children with Shri Prithviraj Chavan, and Prof. Samir K. Brahmachari

SOLECKSHAW
CSIR's Solar Solution to Street Steering

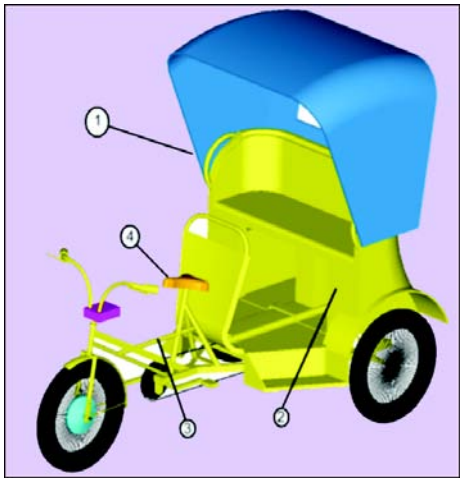
Dr. P. Cheena Chawla

Unquestionably, the plight of poor rickshaw-pullers who pedal all day long, all for a meager income that barely sustains their families, is pathetic. But not any longer, thanks to CSIR's path-breaking work in designing solar powered, non-polluting modern rickshaw that is poised to erase forever the poverty and drudgery so deeply linked to this occupation. Christened as '*Soleckshaw*' — the new *avatar* of the old rickshaw — this unique vehicle is a product of the research efforts of CSIR scientists working at the Central Mechanical Engineering Research Institute (CMERI), Durgapur. The credit goes to the scientific team of this project at CMERI, comprising the Principal Investigator, Mr. A. J. Banerjee, and other key players, namely Mr. Palash Maji, Mr. P. S. Banerjee and Mr. Sankar Karmakar.

Prior to cycle rickshaws of the present day, runner-pulled rickshaws were in vogue that personified helplessness and sheer submission to such unhealthy practice. In fact, the word 'rickshaw' has originated from the Japanese word *jinrikisha* which means 'human-powered vehicle'. *Soleckshaw* has come to the rescue of millions of rickshaw-pullers in the country, for it promises to reduce the human effort in steering the vehicle while being a faster means of transport than the traditional rickshaw and is also environment-friendly.

Launching of "*Soleckshaw*" — the solar operated cycle rickshaw — in Delhi on 2 October 2008 by the then Union Minister of Science & Technology and Earth Sciences, Shri Kapil Sibal and the Chief Minister of Delhi, Smt. Sheila Dikshit

BLDC based, front wheel drive *soleckshaw,* prototype manufactured by CMERI, Durgapur



The 3D model of *soleckshaw* shows flexible hood [1] that is attached to the body [2] through hinge arrangement. The entire body is mounted on main chassis [3] that has the transmission system. The driver's seat [4], with adjustable height, is mounted on the main chassis

Soleckshaw is one of the classic examples that testifies CSIR's commitment to translate its meaningful technologies into relevant products and services for the common man through the *CSIR 800* initiative — a pragmatic approach of reaching out to 800 million economically weak, less privileged people of the country. *Soleckshaw* is a promising product of CSIR that has born out of this vision.

Experimental Model with overhead solar panel

PMDC based, rear wheel drive *soleckshaw,* manufactured by *M/s Dean Systems* (one of the licensee), Kolkata

Solekshaw has been so designed that mere manual 'pedal pushing' of rickshaw would get transformed to 'driving' a rickshaw as the latter is equipped with a solar-powered electric motor that assists the pedal drive. Having a battery panel and a specially designed 240-350 W, 36-volt solar battery-powered electric motor, weighing about 5 kg, this new rickshaw effectively harnesses solar energy that actually brings movement to the vehicle's chain drive.

The rear wheels of *soleckshaw* are manually driven while the front wheel is driven by the motor, which is mounted on the wheel. The specifically designed brush less direct-current (BLDC) motor has been developed for the first time in India by the Crompton Greaves based on the specifications provided by CMERI. The motor is having a proper braking system. Currently plying in Durgapur, Delhi (Chandni Chowk), Chandigarh, Jaipur, Ranchi, Kolkata and Ahmedabad, as a technology demonstration project, *soleckshaw* is slowly making its presence felt in different parts of the country.

Reducing the effort made by its driver to minimum, *soleckshaw* can carry a load of as much as 200 kg that is about two or three passengers. It also has a sturdier frame and is equipped with FM radio, while having power-sockets for charging mobile phones during the ride. The solar battery, weighing around 15 kg, is placed under the passenger's seat. Interestingly, this new 'pedicab' has additional features like head-light, a tail lamp and indicators. It also has a low footboard that is user-friendly especially helpful for children, senior citizens and the disabled. With a top speed of 15 Km per hour**,** a fully charged solar battery of *soleckshaw* can ferry passengers for up to 50-70 Kms that is quite impressive.

However, this new design of rickshaw does not have a solar charging mechanism integrated into it, which is why replenishing/charging stations, which house the solar panels, are needed for the purpose of recharging the batteries. A battery takes about 5-6 hours for charging. According to Dr Gautam Biswas, Director, CMERI, setting up of solar charging stations is quite costly. So far there are three solar charging stations for test run of *soleckshaw,* in Durgapur, Delhi and Chandigarh. The Central Electronics Limited, (CEL), a Govt. of India undertaking is authorized to set up such stations in India. The Kolkata-based INSILICA is also ready for setting up solar charging stations, where a used battery could be replaced with a charged one. On the other hand, solar panels can be added while manufacturing the *soleckshaws,* but understandably, this would raise the cost of each rickshaw. Usually a 1 m x 1.5 m panel is capable of producing 300 W that is needed to power a *soleckshaw.*

As the current price of *soleckshaw* at Rs 30,000-35,000 is quite high, in contrast with the price of a normal rickshaw being about Rs 8,000, efforts are being made to reduce its manufacturing cost for the demand to pick up. Apart from the chassis, the sub-assemblies that need to be manufactured include the differential drive, the special hub motor and the light weight solar panel. CSIR has so far transferred the license for manufacture of *soleckshaws* to the following companies — *Modular Machines*, Faridabad, *Dean Systems*, Kolkata; *HBL Power Systems Ltd*,

Hyderabad and *Stilam Automobiles Pvt Ltd*., Gurgaon.

While high cost of s*oleckshaw* may pose as a hindrance to its widespread use, *e*fforts are in full swing to develop innovative business models with NGOs, banks, corporates and manufacturing organizations to make *solecksha*ws available to drivers at the cost of an ordinary rickshaw or alternatively work out reasonable rentals/installments for owning a *soleckshaw*. Another challenge is to have solar battery charging stations functional across the country, for which plans are underway. Besides, the cost of charging a battery that is about Rs 45 at present needs a further cut.

The main body structure of the scientifically-designed *soleckshaw* has been customized in different models that suit different terrains and purposes. Unlike the existing rickshaws, *soleckshaw* can be driven easily both on the plains as well as uphill, without any risk of imbalance. Moreover, different materials have been tested for optimizing the most suitable design, thanks to the team of CMERI scientists working on this project tirelessly.

The Mark I version of *soleckshaw*, designed and developed by CMERI was the one that was launched in Delhi in October 2008 by the Honorable Chief Minister of Delhi, Mrs Sheila Dikshit and Union Human Resource Development Minister, Mr Kapil Sibal, who was the then Minister of Science and Technology and Earth Sciences.

With focus on designing slimmer and lighter versions of *soleckshaw*, CMERI scientists have also developed the Mark II *soleckshaw* with one of its model having a solar panel on top. It is faster than Mark 1 model, as it can reach a speed of up to 30 Km per hour. A still advanced version, Mark III *soleckshaw*, is poised to be more spacious family vehicle having reclined seats and aerodynamic body. Besides reducing the physical stress of present-day rickshaw pullers and providing them a decent employment with higher economic returns, s*oleckshaw* would help mitigate global warming as well, as this public transport vehicle is free from carbon dioxide emission and its large-scale use is poised to reduce our dependence on polluting vehicles like auto-rickshaws that use fossil fuels.

The other players who have joined hands for taking *soleckshaw* to Delhi streets, under the Technology Demonstration Project (TDP) at Chandni Chowk, are scientists at the Advanced Materials & Process Research Institute (AMPRI), CSIR, who have provided the fly ash jute-polymer composite-based instant housing unit for housing the battery bank, while the Delhi Metro Rail Corporation (DMRC) has provided the facility for accommodating the solar charging station at its Delhi Metro Station at Chandni Chowk. Besides, the Centre for Rural Development (CRD), an NGO, is working as a partner for wider deployment of *solecksha*w.

It is indeed a heartening fact that the Honorable Minister of State for Communications & Information Technology, Shri Sachin Pilot, has recently launched *soleckshaw* as an environment-friendly postal delivery vehicle. This signifies Govt's inclination towards modernizing the Indian Post Services and making the postal delivery more efficient. In this light, recently *M/s Kinetic Motors* along with CMERI has re-designed and developed a modified version of *soleckshaw* that could serve, more appropriately, as a light postal delivery vehicle. No doubt, it would add more dignity to the postal delivery service as a whole, while speeding up the delivery time.

There are bright rays of hope that *soleckshaw* would go places very soon as the Honorable Finance Minister, Shri Pranab Mukherjee has proposed to provide a concessional excise duty of four per cent to *soleckshaw*, while exempting the customs duty on its key parts and components. Meanwhile, newer models of *soleckshaw* are in the offing as CMERI scientists are fully committed to providing novel engineering marvels to suit our country's needs.

(Technical inputs and Photo courtesy:
Dr Gautam Biswas, Director, CMERI and Project Team, CMERI, Durgapur).

CSIR Foundation Day Celebrations at Laboratories/Institutes

All the 37 CSIR Laboratories/Institutes celebrated the CSIR Foundation Day on 26 September with great enthusiasm. They took stock of the performance of the past year and planned the future. Special programmes were arranged on the occasion and the staff members who had completed 25 years of regular service and who had retired since last Foundation Day, were honoured by presenting memontoes and shawls. Various competitions were organized as a part of the celebrations and winners were awarded. The occasion was also observed as Open Day by many Institutes/Laboratories and a large number of people, particularly the students, visited and interacted with the scientists. The programmes organized on the occasion at CBRI, CIMAP, IICB, IMMT, NEIST, NGRI and NIO are highlighted here:

Central Building Research Institute (CBRI), Roorkee

The Institute observed 'Open Day' on 26 September 2010 to commemorate the Foundation Day of Council of Scientific and Industrial Research. The Institute was kept open to the public and invitations were sent to schools to send their children to interact freely with the scientists of the Institute.

A view of the dais during CSIR Foundation Day Celebrations at CBRI

Padam Shree Prof. K.L. Chopra, Former Director, IIT Kharagpur graced the occasion as Chief Guest and congratulated scientists and staff members of the Institute for carrying out various R&D programmes concerned with the advancement of Science & Technology. The R&D work of CBRI has benefited the society, particularly the rural people of the country. He emphasized that the research should cater to the needs of the masses and must be environment-friendly. He also showed his concern towards the ethical values diminishing in the area of scientific research. Prof. Prem Krishna, Chairman, Research Council, CBRI, Roorkee graced the occasion as the Guest of Honour and drew attention on the problem of Global Warming. He also emphasized that the scientists in the Institute should choose a few areas and work towards excellence in those.

In his Presidential Address, Prof. S.K. Bhattacharyya, Director, CBRI welcomed the Chief Guest and the Guest of Honour and highlighted the Institute's R&D activities. He informed that a PGRPE course on "*Engineering of Infrastructure (Buildings/Roads) and Disaster Mitigation*" has started from this year in the Institute and eight students have been enrolled. Prof. S.K. Bhattacharyya also said that it is a matter of great satisfaction that our country is now considered as one of the greatest scientific resource of the world market. CBRI is directly concerned with the upliftment of the common people



CSIR Foundation Day celebrations, in progress, at CBRI

man as shelter is considered to be one of the basic needs. CBRI has always played a vital role in finding appropriate solutions for providing houses and buildings to meet the aspirations of the people of this country.

On this occasion, the citations were distributed to the persons who retired during the year and the employees who had completed 25 years of service in CSIR. The meritorious wards of CBRI staff were also rewarded. An essay competition for CBRI wards was organized in different groups and the selected ones were awarded. The prizes were also given to the winners of different events organized for celebrating the Foundation Day. The Programme was anchored by Shri Y. Pandey, Scientist 'F'and the Vote of Thanks was given by the CoA, Shri S. C. Tyagi.

At a later session, Prof. K. L. Chopra delivered the first lecture of the Distinguished Institute Lecture Series on *'Application of Solar-Photovoltaic in Buildings'*. In the evening a cultural programme was also organized in the Institute's auditorium, in which the PGRPE students, scientists, staff and the wards of CBRI family participated.

Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow

Visit of a large number of students and persons from different section of society, scientific lectures by young scientists, CSIR Foundation Day Oration by eminent scientist, release of a new publication, felicitation of the staff and cultural programme marked the day-long celebrations of CSIR Foundation Day at Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow. The Institute was visited by large number of students from various schools. In the forenoon scientific session, young scientists from local CSIR labs delivered talks, which were attended by the scientists and research scholars of the Institute.

Prof. D.N. Rao of the Indian Institute of Science, Bangalore chaired the session. Prof. Ram Rajasekharan, Director, CIMAP welcomed the participants. Dr. Sumit Kumar Bag from NBRI delivered a talk on '*Computational Biology Research in Plant Sciences*'. He said that drought tolerance and superior fibre quality are two of the most desirable traits that need to be introduced in the present day cotton plant. He further said that the task of sequencing of five whole transcriptome

A glimpse of CSIR Foundation Day celebrations at CIMAP

libraries of leaf and root tissues of drought tolerant and drought sensitive varieties of *Gossypium herbaceum* have been carried out on GSFLX 454 sequencer.

Dr. B. Surendar Reddy from CDRI delivered a lecture on '*Targeted Cancer Therapies: A Chemical Pharmaceutics Approach*'. He said that targeted cancer therapies block the growth and spread of cancer by interfering with molecular targets. Among many possible targeted therapies, delivery of anti-neoplastic agents to cancer cells using nanomaterials as pharmaceutical delivery systems is an important strategy. "Amongst the different arsenals of nanoparticles, tumor specific small molecule ligand bearing multi-functional nanoparticles, which would selectively find and kill cancer cells, play a very significant role in the development of targeted therapies", added Dr. Reddy.

Dr. Rajnish Kumar Chaturvedi from IITR delivered his lecture on '*Stem Cell's Transplantation in Parkinson's Disease: Prospects for Regenerative edicine'*. He said that transplantation of neural stem cell (NSC) derived dopamine (DA) neurons has emerged as an alternative approach to fetal neural cell transplantation in Parkinson's disease (PD).

An attempt has been made at IITR to increase survival and function of NSC derived DA neurons, by co-grafting with Zuckerkandl's organ; (a paraneural organ that expresses neurotrophic factors as well as cell adhesion molecules), to provide continuous NTF support and developmental cues to transplanted DA neurons in rat model of PD. After 24 weeks of transplantation, a significant number of surviving functional NSC derived DA neurons were observed in co-transplanted group as evident by the increase in number of tyrosine hydroxylase immunoreactive (TH-IR) neurons and TH-IR fiber density at the transplantation site (striatum).

At a special function held on this occasion, Director, CIMAP, Prof. Ram Rajasekharan welcomed the Chief Guest and highlighted the progress of the Institute made in last one year. The Function was presided over by Prof. D. N. Rao of Biochemistry Division, Indian Institute of Science (IISc), Bangalore. Prof. Rao delivered the Foundation Day lecture on, *Genomics of Restriction–Modification System*. He said that restriction endonucleases occur ubiquitously among procaryotic organisms. Up to 1% of the genome of procaryotic organisms is taken up by the genes for these enzymes. Their principal biological function is the protection of the host genome against foreign DNA, in particular bacteriophage DNA.

Restriction-modification (R-M) systems are composed of pairs of opposing enzyme activities: an endonuclease and a DNA methyltransferase (MTase). The endonucleases recognise specific sequences and catalyse cleavage of double-stranded DNA. The modification MTases catalyze the addition of a methyl group to one nucleotide in each strand of the recognition sequence using S-adenosyl-L-methionine (AdoMet) as the methyl group donor. Based on their molecular structure, sequence recognition, cleavage position and cofactor requirements, R-M systems are generally classified into four groups. In general R-M systems restrict unmodified DNA, but there are other systems that specifically recognize and cut modified DNA.

More than 3500 restriction enzymes have been discovered. "With the identification and sequencing of a number of R-M systems from bacterial genomes, an increasing number of these have been found that do not seem to fit into the conventional classification", Prof. Rao added. He further said that it is well documented that restriction enzyme genes always lie close to their cognate methyltransferase genes. Analysis of the bacterial and archaeal genome sequences shows that MTase genes are more common than one would have expected on the basis of previous biochemical screening.

On this occasion, four staff members who had completed 25 years of continuous service in CSIR, and nine staff members who had superannuated during 2010 were felicitated by the Chief Guest. Prof. D.N. Rao also released CIMAP Annual Report 2009-10, Hindi magazine '*Aus-Boond*' and its English version '*Maps Dew'* besides the latest issue of the *Journal of Medicinal and Aromatic Plant Science* (JMAPs). He also released a newly developed variety of Menthofuran mint named '*CIMAP-Patra'*. Director, CIMAP, Prof. Ram Rajasekharan and General Manager of IPCA Laboratory, Ratlam Dr. D.C. Jain also exchanged the consultancy agreement for contractual cultivation of anti-malarial drug from the plant *Artemisia annua*. Later in the evening a cultural programme by CIMAP research students was also organized, which was attended by the staff.

Indian Institute of Chemical Biology (IICB), Kolkata

IICB, Kolkata, observed the 68th Foundation Day of CSIR on 26 September 2010 at its premises. Prof. Siddhartha Roy, Director, IICB presided over the Function in which Dr. Ajay Kumar Ray, Vice-Chancellor, BESU, Shibpur, West Bengal was present as the Guest-in Chief. Prof. Amitabha Chattopadhyay, Scientist H, CCMB, Hyderabad delivered the Foundation Day Lecture.

CSIR Foundation Day celebration at IICB. Seated on dias *(from left)* are: Dr. S.R.Sarkar, Dr. A. Chattopadhyay, Dr. A. K. Ray, Prof. S.Roy and Dr. H.K.Majumder

In his Welcome Address, Prof. Siddhartha Roy mentioned that in 1942 CSIR was born with an aim to transform the future independent India into a scientific power, a technological power and to carry our scientific and technological progress to world class echelon. :CSIR has silently and quietly transformed India from a relatively rural agricultural country into a major force", he added. Prof. Roy was much delighted to inform that about two months back the Academy of CSIR was created as a part of CSIR..

In the introductory lecture, Dr. Hemanta Kumar Majumder, Scientist G, IICB and Chairman, CSIR Foundation Day Organizing Committee presented a brief history of CSIR formation and discussed about the CSIR structure, which is heterogeneous in nature. He expressed his pleasure in stating that different Institutes of CSIR are doing excellent science and IICB is not an exception as the scientists are consistently publishing their work in highly reputed international journals.

Dr. A. K. Ray, the Chief Guest, in his Inaugural Address said that the fire set by Dr. Bhatnagar 68 years back, has spread all over the country and CSIR can really boast of being an organization which has possibly produced the maximum number of patents and publications. He congratulated IICB scientists for contributing to diverse aspects of cellular and molecular biology. He discussed about the contributions of Acharya Jagadish Chandra Bose, Acharya Prafulla Chandra Roy, Indian Association for Cultivation of Science, Presidency College, the University of Calcutta and presented a brief history of the Indian Science in this context.

Dr Ray elaborated that in 1940, after a lot of destruction and devastation during the Second World War, the British Government in India could not decline to the requests of the Indian stalwarts in science like Dr. Bhatnagar to form an organization in India in line with DSIR in England. In 1941, the Board of Scientific and Industrial Research, BSIR was formed and very soon it was transformed into CSIR in 1942 which acquired a large number of scientific institutions in its aegis countrywide.

The employees of IICB who had completed 25 years of service and the employees who had retired from services in IICB during September 2009 and August 2010 were honoured by presenting mementos. The Function was graced by invited guests, distinguished scientists, employees, ex-colleagues and the students. It ended with Vote of Thanks by Dr. S R Sarkar, CoA, IICB and Convener of the Organizing Committee.

After the first session, Foundation Day lecture was delivered by Dr. Amitabha Chattopadhyay, regarding an important work on Membrane Biology and Neurobiology entitled, "*Role of Membrane Cholesterol in the Function of Serotonin-1A Receptors: Implication in Health and Disease*". In his lecture, Dr. Chattopadhyay said that most of our brains are full of membranes and in these membranes there are cholesterols. The main interest of his work was to find out the major cholesterol in brain per gram tissue and to understand its function in neurodegenerative diseases. It was important to understand neurobiology in the context of membrane biology. He said that G-protein coupled to receptors,

which are a class of proteins that connect the cells inside to outside. He described the communication pathways of cells up to the DNA level and informed that these GPCRs are good drug targets. "Serotonin acts as a neurotransmitter in the brain and it exerts its diverse actions by binding to distinct cell surface receptors", he added. He also elaborated his studies with human serotonin-1A receptors and brain cholesterol, cholesterol requirements of serotonin receptors, interaction of the hippocampal serotonin 1A receptor with membrane cholesterol and the diseases associated with defective cholesterol biosynthesis.

The Institute also observed 'Open House' on 24 September 2010 in connection with the Foundation Day celebration to enable students to visit IICB. About 400 students from 15 schools and colleges with their teachers visited various laboratories and interacted with the scientists expressing great interest and enthusiasm.

Institute of Minerals and Materials Technology (IMMT), Bhubaneswar

Institute of Minerals and Materials Technology (IMMT), Bhubaneswar observed the 68th Foundation day of Council of Scientific and Industrial Research (CSIR), New Delhi on 26 September 2010. Mr. M.K. Sampath, CEO, ESSAR Steel Ltd delivered the Foundation Day Lecture as Chief Guest in a Function attended by retired and existing employees of IMMT and invited guests. Describing his experience in the Indian industries, Mr. Sampath said that as an Indian research organization of repute, IMMT has drawn attention of the global minerals industry for its high standards of process development, especially in the field of iron ore processing.

Mr M.K. Sampath, CEO, ESSAR Steel Ltd. delivered the 68th Foundation Day Lecture

Prof. B.K. Mishra delivering the Welcome Address

Mr. Sampath declared that ESSAR and IMMT will soon join hands to work in overseas projects to extract iron ore. ESSAR has sought IMMT's collaboration to study iron ore pockets in the African continent and implement the strategy to begin large-scale production soon.

Prof. B.K. Mishra, Director IMMT mentioned the significant achievements of CSIR in the recent decade in the scientific, industrial, strategic, societal and academic sectors in the country. He welcomed the ESSAR proposal for the joint overseas collaboration and assured that IMMT will begin its global industrial campaign in association with ESSAR to compete with the global players. The joint venture will be the first of its kind for any Indian R&D organization in the mineral sector.

On the occasion, IMMT released a process technology for manufacturing of cold setting chemical activated fly ash and red mud building brick and block to M/s Vedanta Aluminium Limited, Lanjigarh. Retiring employees of CSIR in IMMT and employees completing 25 years of service were felicitated. The Chief Guest awarded the winners of various competitions held to commemorate CSIR Foundation Day. Studentship awards were also distributed to the meritorious children of IMMT employees.

North East Institute of Science and Technology (NEIST), Jorhat

NEIST organized the 68th CSIR Foundation Day on 26 September 2010 with much gaiety and well sorted out programme. Held at its auditorium in the evening hours, the Function was presided over by Dr R. C. Boruah, Scientist H & Scientist-in-charge, NEIST. Those present included NEIST fraternity, a large gathering comprising of invited guests, retired employees of NEIST and the press. Prof G. P. Dubey, Ex-Dean, Faculty of Ayurveda, Banaras Hindu University, Banaras graced the occasion as the Chief Guest and also delivered the Foundation Day Lecture. In his Welcome Address, Dr J. C. S. Kotoky, Scientist G, extended a warm welcome to all and apprised the gathering about the achievements of CSIR in various fields of research. He extended gratitude to all the former scientists of CSIR for their contribution in bringing the position of CSIR up to this level and for keeping the CSIR flagship high. Delivering the foundation day lecture on, '*Role of Medicinal plant Salacia Species in the Prevention and Management of Metabolic Syndromes*', Prof Dubey said that the North-East of India being a biodiversity hotspot has a vast scope for the exploitation of plant diversity in various medicinal uses. Prof. Dubey explained in detail the promising results of *Salacia* species in having anti-obesity, anti-inflammatory, anti-diabetic and anti-atherogenic properties. He presented, through various slides, the biochemical activity/parameters in different ranges of normal population in the study of metabolic syndrome. He also stressed on the importance of preserving our environment and to contribute towards economic empowerment of the country. On this special occasion, a Golden Jubilee Brochure on CSIR-NEIST was formally released by the Chief Guest. At the Function, 29 retired retired employees of NEIST were felicitated with mementoes and *sanman patra* and staff members who had completed 25 years in CSIR service were also presented mementoes. Awards were given to the winners of various competitions held on the occasion of Foundation Day, SC/ST students for their academic excellence in State Board Exams and wards of NEIST employees for their excellence in sports during 2009-10. The Function concluded with Vote of Thanks offered by Dr B. G. Unni, Scientist G. Earlier the Institute observed as 'Open Day' in the morning hours for the visit of students and public at large who came in large number and interacted with the scientists.

National Geophysical Research Institute (NGRI), Hyderabad

CSIR Foundation Day celebrations started with a Welcome Address to all by Dr Y..J.Bhaskar Rao, Acting Director, NGRI. The Chief Guest was Dr. Shailesh Nayak, Secretary to the Government of India, Ministry of Earth Sciences (MoES). Dr. Nayak delivered a lecture with a very appropriate title befitting the occasion '*Societal Benefits of Earth System Sciences*'. Through his India-centric illustrations, Dr. Nayak explained how Earth science plays a very crucial role in serving the society. He also highlighted the role of MoES in the Indian Earth science scenario, where the numerous scientific programs significantly impact the Indian society and socio-economics. Dr. Nayak highlighted some recent successes acknowledging definite contributions from NGRI, such as exploration for gas hydrates, legal continental shelf mapping, tsunami warning system, monitoring and assessment of earthquake hazards and Antarctic research.

Seen on the dais (*from left*) are: Dr.Y.J. Bhaskara Rao, Director, NGRI & Dr. Shailesh Nayak, Secretary to the Government of India, Ministry of Earth Sciences (MoES).

Prior to the lecture, Dr Kalachand Sain, scientist, NGRI, introduced the speaker to the gathering. The superannuated staff members were felicitated by the Chief Guest. Cash awards were presented to winners of various competitions and meritorious students. The Function ended with a Vote of Thanks by Dr. D. Sarkar, scientist, NEIST.

CSIR Foundation Day Celebrations

To commemorate the CSIR Foundation Day, NGRI was kept open for public especially for students to know about 'Mother Earth' About 3000 students from various schools visited different laboratories depicting the activities of the Institute. The demonstrations invoked a lot of enthusiasm among the students and teachers as a result of the painstaking effort made by the scientists, technical staff and research students. The Best Exhibit Award was won by Seismology group headed by Dr. Srinagesh and the Best Explanation Award went to the Tsunami studies group led by Dr. Kirti Srivastava. Besides, Mr. Anand Kumar, Technical Officer won a Consolation Prize for his low cost pump run by solar power. Prizes were awarded by the Chief Guest, Dr. Shailesh Nayak

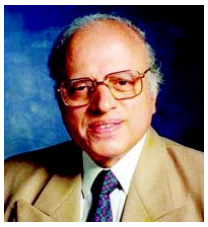

NGRI scientists explaining scientific experiments and interacting with participating students

National Institute of Oceanography (NIO), Goa

"In order to handle the adverse situations due to the effects of climatic change on food security, it is very essential to have an anticipatory research on the agenda" said Prof. M.S. Swaminathan during CSIR Foundation Day lecture at the National Institute of Oceanography (NIO). Prof Swaminathan was sharing his thoughts on "*Safeguarding National Food Security in an Era of Climate Change*" from the floor of NIO to a large gathering of scientists, students, farmers and many others who attended the Foundation Day lecture on 26 September 2010.

Prof. Swaminathan said the Government is trying to bring in legislation in the form of Food Security Act but to fulfill the needs of the people, enough food availability is essential. Whereas just by 1 or 2 degrees C rise in temperature, wheat production would reduce to a large extent. It is therefore essential to develop different varieties of seeds that can handle the situations of such fluctuating climate. "We must move from 'green revolution' to 'ever-green revolution' by increasing productivity in perpetuity without associated ecological harm", he emphasized. While organic farming/ agriculture is one direction in this effort for grain production, the fish production can also be enhanced by low external input sustainable aquaculture methods wherein the herbivore-based feeds are used, indigenous species are considered and water quality and health of the fish is maintained.

Prof. Swaminathan also addressed the issues of meeting the challenge of sea level rise by suggesting the strategy that includes development of mangrove and non-mangrove bio-shields to minimize the impact of coastal storms and sea water inundation, promoting sea water farming through agri-aqua farms, promoting below sea level farming as already being practiced by farmers in the Kuttanad area of Kerala, breeding salinity tolerant crop varieties for cultivation in coastal areas based on genetic engineering techniques besides preparing contingency plans for the resettlement of climate refugees. Food availability, home grown food security and nutrition security by way of use of other farm products was his mantra for food security and fight for hunger.



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