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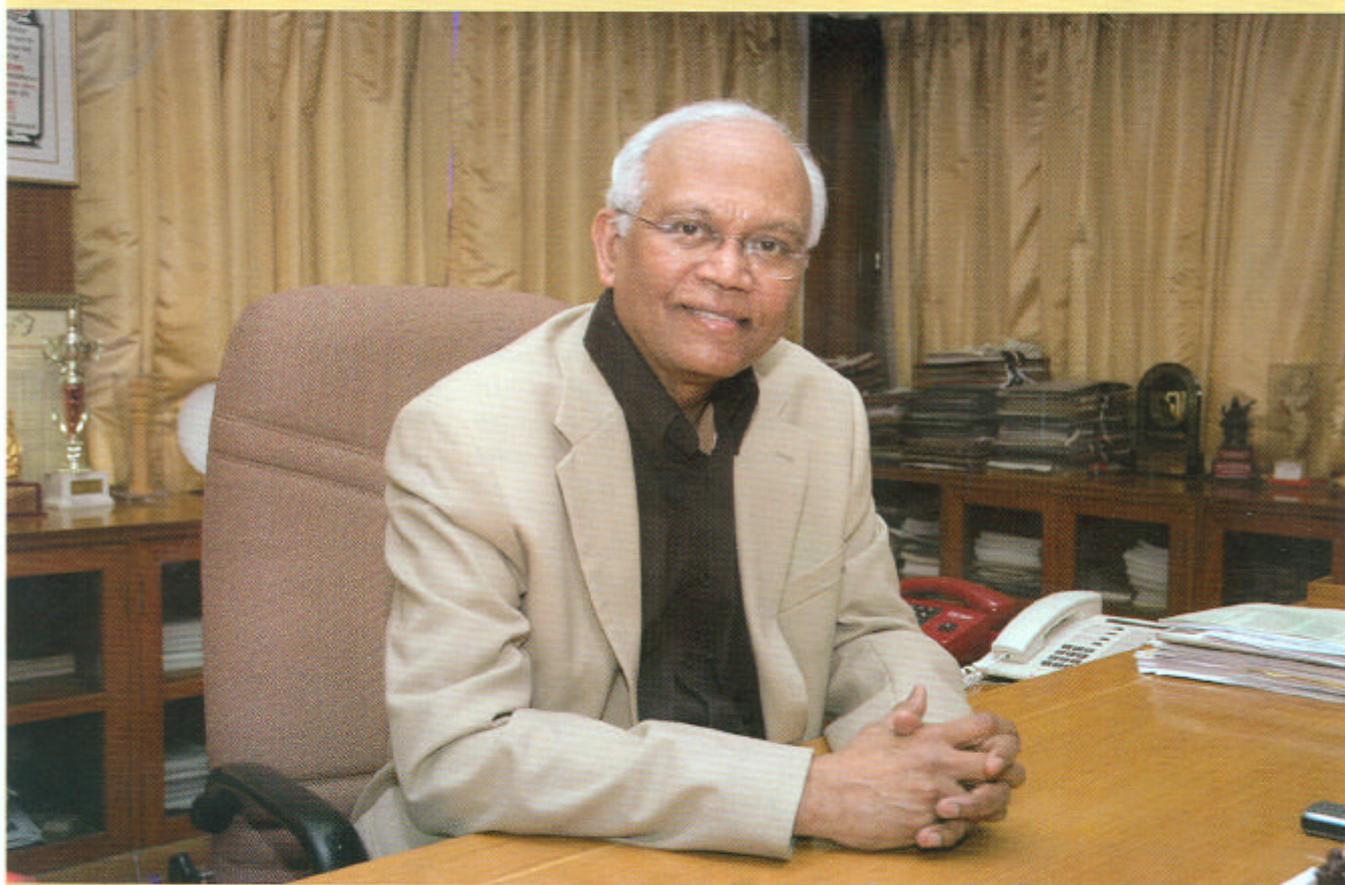
CSIR NEWS



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Team CSIR

Dr R. A. Mashelkar to lay down office



Padmabhushan Dr R.A. Mashelkar, FRS, Director General, CSIR, who orchestrated the transformation of CSIR into a vibrant global R&D platform, will lay down his office after a distinguished tenure of over eleven years, on 31 December 2006.

In this issue we bring to you an exclusive interview with the charismatic scientist, administrator and leader on the eve of relinquishing his office.



Dr R.A. Mashelkar's Interview



Padmabhushan Dr Raghunath Anant Mashelkar, FRS, during his distinguished tenure of over eleven years as the Director General of Council of Scientific & Industrial Research (CSIR), transformed the organization into a user-focused and performance-driven R&D platform that laid great stress on innovation-centred development. The CSIR's changeover has been receiving accolades from all quarters— be it business houses, management experts, eminent scientists or political leadership.

Dr Mashelkar will lay down his office on 31 December 2006, giving reins of CSIR to its new Captain, Padmashri Dr V. Prakash, who, prior to his new assignment, was Director of Central Food Technological Research Institute (CFTRI), Mysore.

On the eve of relinquishing his office, in his interview given to Dr B.C. Kashyap, Editor of CSIR News, Dr Mashelkar talks about his impressions of the fantastic tenure that he had as the CEO of CSIR Inc.

BCK: CSIR News congratulates you, on behalf of the whole CSIR family, on a fantastic tenure as Director General — the Chief Executive Officer of CSIR. The transformed CSIR is today receiving accolades from all quarters— be it business houses, management experts, eminent scientists or political leadership.

The cover story of one of the issues of Business India has observed: "CSIR labs have been transformed by the power of enterprise and proactive management..." Then, in 'A Case Book of Companies in Transformation' CSIR has earned the laurel of being "World Class in India" for the transformation it has managed in post-liberalized India. (together with Infosys, Wipro, Hindustan Lever, Reliance, Ranbaxy and others).

Prof Jayant Narlikar in his book 'Scientific Edge' termed the CSIR transformation as one of the top ten Indian achievements of the past century.

The World Bank has recommended 'CSIR as a model on how countries can harness their top quality scientific research institutions to the task of industrial technology development, innovation, and global competitiveness'.

And Prime Minister Dr Manmohan Singh in a CSIR Society meeting expressed his happiness at seeing "CSIR flying higher and farther" and congratulated CSIR " for the remarkable transformation into a performance-driven and user-focused organization".

Sir, you, who orchestrated the CSIR

turnover, will relinquish your office as DG, CSIR at the end of December. How do you feel?

RAM: It is a wonderful feeling to hand over the charge to Dr Prakash, a dynamic leader from within the CSIR system. I have no doubt that with his unbound energy, enthusiasm and commitment to CSIR, he will take it to great heights. I am also delighted to see that Dr Ramasami is the Secretary of Department of Science & Technology. We thus have two of the excellent leaders from within CSIR, Prakash and Ramasami, at the helm of affairs of Indian Science. With Harsh Gupta, again from CSIR, only recently relinquishing charge as Secretary of Department of Ocean Development, we are beginning to see science leaders from CSIR emerging at a national level. That is a great feeling.



Three memorable moments of 1 July 1995



Clockwise from top left:

- Taking over from Dr S. K. Joshi as DG, CSIR
- Listening to the advice of Dr A. P. J. Abdul Kalam
- Planning the next decade with Shri S.C. Kalra, Personal Secretary

BCK: You have been leading CSIR for over eleven years now. How was it in 1995 and how is it in 2006?

RAM: Well, 2005-06 has been great for CSIR! It is an year in which we had the highest number of scientific research papers with the highest quality ever. In terms of our earnings, we touched the highest figure – with the private sector earnings also touching the highest ever. So we have had the best year in both science and business!

BCK: Best in science and best in business is what you have achieved all along! Let me remind you that in 1998, you yourself got the highest

accolades in both science and business by getting elected to Royal Society and also winning the JRD Tata Corporate Leadership Award in the same year.

RAM: Yes, 1998 was a lucky year. I was elected as FRS. Also that year, I was given the JRD Tata Corporate Leadership Award. Aditya Birla and Narayanamurthy were the earlier winners. Premji of WIPRO followed me. I often used to joke that I was sandwiched between the great Narayanamurthy and the great Premji. This was the case of Saraswati getting sandwiched with Lakshmi on either side!

BCK: Coming back to the question, how do you compare CSIR of the past, with the CSIR at present?

RAM: CSIR of 1995 and that of 2006 are two different entities. This shows up in all its performance indicators, both tangible and intangible.

BCK: What are these tangible indicators?

RAM: An organization engaged in scientific and industrial research is conventionally judged on the basis of some standard parameters. Let us look at them. As regards basic scientific research from 1995 to



Mashelkar: Outgoing CEO of CSIR

2005, we moved from 1576 to 3018 SCI publications. Our average impact factor per paper rose from 0.89 to over 2. The foreign patents portfolio held by CSIR moved from 72 to 1251. We are thus building our stock of intellectual capital that makes CSIR a valuable organization. The earnings based on our contract research increased with the accumulated surpluses (equivalent to the profit of an industry) crossing Rs. 400 crores, an eight-fold increase! Today, we supplement Government funding through our own earnings, the only R&D organization to do so!

BCK: What were the other tangible changes?

RAM: Our spending on capital equipment moved from Rs. 25 crores to over Rs. 300 crores, which includes our own contribution based

on own earnings. Our ambition also underwent a sharp change. We hardly had any projects, which were over Rs. 20 crores. Now, we have over 50 projects, some of them reaching even Rs. 200 crores! In fact, when I went to the Cabinet Committee on Economic Affairs (CCEA) with the 135 crores SARAS aircraft project, that was the first time in the history that CSIR had ever gone to CCEA –our first project over 100 crores! Now, of course, we have made it a habit to go to CCEA!

BCK: To an outsider, what are the changes visible in CSIR?

RAM: All these numbers are fine – but I feel that there is a great 'smell' to CSIR of today. When I took over as DG, CSIR, I found that our 40 laboratories had behaved as 40 independent laboratories. Today, we

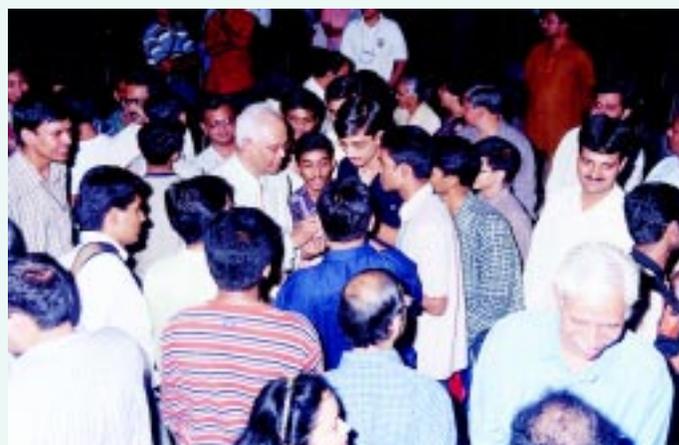
are a TEAM CSIR. There are more than 55 networked projects, where anywhere from 3 to 19 laboratories are working together. CSIR talent networks drawn across the nation are a powerful force to reckon with today.

BCK: How did you manage to create the spirit of this TEAM CSIR?

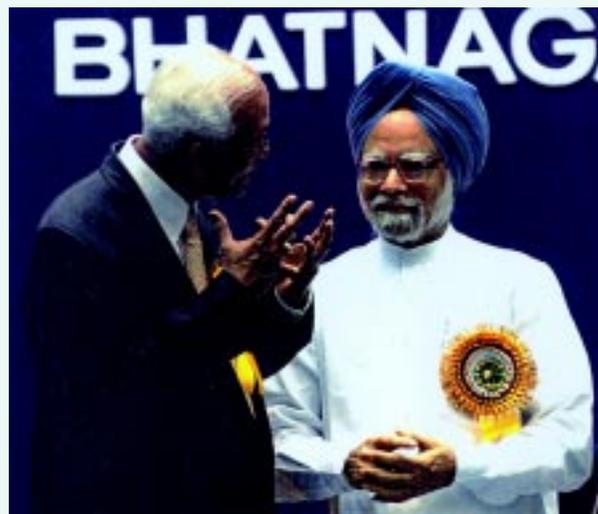
RAM: I believe it was important to carry this message across the laboratories, not just across Directors. I think I created a record by visiting all the 40 laboratories across the country within my very first year as a DG! And there I just did not sit in the Boardrooms. I moved in the labs, where the real action was. I addressed all the members of the laboratory together conveying this message of TEAM CSIR.



Keen observer during laboratory visits.
 Dr V. Prakash, DG (designate) and then Director, CFTRI, is in the background



Always enthusing and guiding young scientists



Engaging with Prime Minister Shri Atal Bihari Vajpayee (2000) and Prime Minister Dr Manmohan Singh (2005)

BCK: Did 'CSIR Vision 2001', that you articulated play any role?

RAM: Yes, I believe this was an important milestone. We brought this out after a wide consultation with our stakeholders, both internal as well as external. I remember, Dr A.P.J. Abdul Kalam, our President, was a member of the Advisory Board. He is a great friend and guide for CSIR. When I spoke about Vision 2001, he said, "Why don't you have Vision 2020?" I still remember my response. I said, "I retire in 2002. I will like to be judged before I retire." Of course, as it turns out, I am retiring only in 2006. That is another matter!

BCK: But how did the Vision document help create an alignment?

RAM: I will put it simply. CSIR laboratories were like magnetic needles all pointing in diverse directions. 'CSIR Vision 2001' was like a magnet, which reoriented all the needles in the same direction.

We put quantitative targets for CSIR as a whole by 2001. This was in terms of our earnings, patents, technologies, etc. The laboratories started thinking as to what each one of them could do to contribute to achieving this collective target of CSIR. In fact, I was very happy to see that many laboratories came out with their own Vision 2001 documents to align with CSIR Vision 2001

BCK: When did you really feel that TEAM CSIR had arrived?

RAM: The most touching moment was on the 11 May 1998, when we had CSIR Directors' Conference in Bangalore. The theme of that Conference was TEAM CSIR. I was deeply touched when in a charged closing ceremony, all the Directors spontaneously signed on a single declaration saying, "India matters to us. It is our endeavour that we shall matter to India, more". This was a perfect alignment of all the leaders for a common goal.

BCK: When you took over as DG-CSIR, there existed a big cultural divide between the R&D institutions and the industry owing to the missing science-business link from the Indian scene. Has it changed at all?

RAM: Yes, indeed. There was a big divide. For example, the products coming out of CSIR were packages containing knowledge and information, whereas for industry, they are saleable goods and services. CSIR used to strive by scientific novelty, whereas the driver for industry is market attractiveness alone. CSIR's focus was on perceived needs, whereas industry only focuses on market needs. And from this cultural divide, to have a prestigious magazine like Business India go out of the way to do a cover story on CSIR was remarkable. The editorial applauded CSIR by saying "CSIR labs have been transformed by the power of enterprise and proactive management." You can't get a better certificate!



Mashelkar: *Outgoing* CEO of CSIR

Best in Science



Being inducted as FRS (1998) by the Nobel Laureate Aaron Klug, President of the Royal Society. Only the third Indian Engineer in the 20th century to have been so honoured



Receiving the Star of Asia (2005) award at the hands of George Bush, Sr, former President of USA; the first Asian Scientist to receive it



Receiving the TWAS Medal (2005) for Science from President Mubarak of Egypt, in Alexandria



Being inducted as Foreign Associate of US National Academy of Science (2005) by President Prof. Cicerzone. Only the 8th Indian in over 140 years to be so honoured.



Equally at ease with Science & Business.
Meeting Sir Harry Kroto, the Nobel Laureate,
Along with President, ASSOCHAM



Best in Business



During the award ceremony of Lal Bahadur Shastri National Award for Excellence in Public Administration And Management Sciences (2002), seen with Dr A. P. J. Abdul Kalam, Smt. Sonia Gandhi and Shri L. K. Advani



Receiving the JRD Tata Corporate Leadership Award (1998) at the hands of Shri Krishan Kant, Vice President of India – first scientist to receive this award.



Receiving Dadabhai Naoroji Memorial Award (2002) for contributions to Advancing S&T in India at the hands of President Dr A.P.J. Abdul Kalam



Receiving the Lifetime Achievement Award of Indian Science Congress Association (2004) at the hands of Dr Manmohan Singh



During Lifetime Achievement Award (2006) ceremony with Shri Kapil Sibal



Mashelkar: Outgoing CEO of CSIR

Meeting three US Presidents



George Bush Sr.,



George Bush Jr.



Bill Clinton

BCK: But apart from CSIR itself partnering with business, I think you played even a greater role by getting this movement across the country through path-breaking initiatives such as NMITLI.

RAM: Yes, indeed. New Millennium Indian Technology Leadership Initiative (NMITLI) was a new adventure. There was a huge paradigm shift. Indian industry had invariably looked at those areas where markets were certain (because there were imported products in the market place) and technologies were certain (because all that one had to do was to copy these products by reverse engineering). However, NMITLI positioned itself in a quadrant, where technologies were uncertain and markets were uncertain. This meant risk taking. I dare say that NMITLI was the first programme, which encouraged not only risk-taking but tolerance towards failures. It brought in a paradigm shift in the way we do things and the kind of cutting edge products we can create.

BCK: Can you give some examples?

RAM: Yes, indeed. After 1963, there was no new drug on TB. It was NMITLI, which brought in 'Sudoterb', a completely new chemical entity, which clears TB in two months and not six to eight months. A real breakthrough that the world was looking for! We created world-class products in bioinformatics such as Bio-suite by linking an IT leader such as TCS with nineteen top institutions. Everyone is looking for a computer for hundred dollars. NMITLI created Mobilis, an innovative mobile PC with a potential to meet that price line. There are several such breakthroughs in the pipeline. NMITLI has been CSIR's gift to the nation — creating a new spirit of adventure, which Indian industry and Indian institutions had never seen.

BCK: You had always believed that CSIR must go beyond the call of duty and make a difference to the nation. Have we done it during your tenure?

RAM: Yes, I believe so. CSIR's fighting the wrong patent on wound healing property of turmeric granted by the US patent office was a classic example. Here, CSIR made its business something that was not its business. This was the first time that a developing country formally protested against the piracy of its traditional knowledge. Winning the turmeric patent battle gave the nation a confidence. It brought clarity at international level.

BCK: But was it not very simple to win this turmeric case?

RAM: Yes, it was not difficult. We had all the evidence. To me, turmeric fight was a 'symbolic' fight. I think this symbolism was beautifully captured by Shri Gopalakrishna Gandhi, Governor of West Bengal, while inaugurating the national symposium on IPR on 12 August 2005. He had said, "The course of events in India and the position of India with reference to the rest of the world, it can truly be said, has been altered by two substances. The first is salt. And all



of us know of the impact of the 1930 Salt Satyagraha. There was one person associated with that Satyagraha and I do not have to tell this audience who it was. The second substance is turmeric. The recognition by the US patent authorities of India's claims on the subject of turmeric, has not only been our victory but has been the victory of a major principle in the Patent Laws of the world and the one name associated with that victory is that of Dr R.A. Mashelkar." I was deeply touched by his remarks.

BCK: But apart from the symbolic value, did this not serve a bigger purpose of global awareness of traditional knowledge?

RAM: Yes, it did. I was the Chairman of SCIT of WIPO with over 170 member nations. I asked as to in what way the traditional knowledge is different from the knowledge generated in formal laboratories. After all, it has been generated by our ancestors who have worked in 'laboratories of life' for centuries. It was then that the idea of Traditional Knowledge Digital Library (TKDL) was born. TKDL has made a paradigm shift in preserving the rich heritage of India's traditional knowledge and protecting it from piracy. Just last month, 21 nations met in Delhi and desired to create TKDLs by seeking India's advice and assistance. This is a big



Contributing to the meeting of Commission of Intellectual Property Rights, Innovation & Public Health as its Vice-chair. In the middle is the Chair, Madame Ruth Dreifuss, the former President of Switzerland

achievement.

BCK: But what will TKDL finally achieve?

RAM: Well, the creation of TKDL involves codification of traditional knowledge database, classification and also its linkage to the international patent classification system. In other words, a Sanskrit Shloka gets connected with the PC of a patent examiner in Washington, and that too in a system that he understands. Not only will the wrong patents not be given on our traditional knowledge now but also you will have this rich value-added database, which will help us in undertaking research on creating new products. So, TKDL achieves preservation, protection as well as promotion of new innovations.

BCK: You spoke about the lack of patent literacy among scientists. In 1996, CSIR was the first organization to declare a formal IP Policy. On the flip side there has been some recent criticism about "unnecessary

patenting." How has CSIR addressed that?

RAM: Yes. I am proud to say that CSIR propagated the culture of patent literacy in the country. CSIR's foreign patent portfolio was 72 in 1995. It stands at 1251 today. The criticism about 'unnecessary patenting' is somewhat misplaced. Worldwide experience shows that

only 5% of the patents get commercialized and CSIR's record is certainly much better than that. A Committee of eminent experts set up by our Minister as a result of the Cabinet decision has reviewed the performance of CSIR vis-à-vis its IPR management. The Committee has internationally benchmarked CSIR. It is full of praise of CSIR's performance.

BCK: But as you yourself had once said, these are 'wars in the knowledge market'. Do we have the acumen to win these wars?

RAM: Let us again get to fundamentals. You know, it is an intellectual war that one is fighting and it requires an intelligent strategy. For example, one patent by MOBIL on ZSM5 catalyst was surrounded by 150 patents! CSIR needs to learn this strategy and so does the nation. Also don't forget that we are relatively new in the game. Licensing will follow. Big winners will emerge in time to come. They are beginning to emerge already.



Mashelkar: *Outgoing* CEO of CSIR



To R.D. Mashelkar
With best wishes,

Meeting President Bush (2006)



Sharing a lighter moment with the legendary industrialist Dhirubhai Ambani

BCK: Can you give us an example of such big wins?

RAM: Oh! Yes. Just recently, IMT's breakthrough on clot specific streptokinase was licensed to a company. While signing, the CMD of the company said that they would not have looked at the innovation, if it was not covered with US and European patents! Tell me, who will sign in millions of dollars in an innovation, which can be poached easily? The down payment for this deal is 5 million dollars and the royalty, which IMT will get is 5% of the sales turnover. Of course, we will have to keep our fingers crossed that the molecule will hit the marketplace. There can be many a slip between the cup and the lip. However, if it does hit the market, it could be a billion dollar drug. This means returns to IMT of around 50 million dollar per year. And this will come to a laboratory, whose annual budget is not even 3 million dollars per year today! Let me use a cricketing terminology. CSIR has to

keep on collecting singles, but it will have to hit some big sixes like IMT has done as we go along

BCK: But this is all about wealth creation. That is about managing the 'economic' bottom line. But what about the other bottom lines, the social and the environmental?

RAM: I am a strong believer in the triple bottom line. In fact, we had created a Mission Statement in 1996 for CSIR, the first time ever. Let me repeat it for you. "To provide scientific industrial R&D that maximizes the economic, environment & societal benefits for the people of the nation."

CII has set up awards for companies that excel in making these triple bottom lines now. That is wonderful. But CSIR did it 10 years ago.

BCK: Are you happy with CSIR's efforts to create such triple bottom line so far?

RAM: Yes, indeed I am. For example, we are creating jobs for the poor. We are creating technologies for affordable drinking water. We are creating affordable drugs for the poor. For example, CIMAP's breakthrough on menthol mint has not only meant displacing China to the second position as an exporting nation but also having 70% of menthol production in India with more than 5 million man-days of jobs created, essentially for the poor. CSIR breakthrough on the E-MAL, which is an anti-malaria drug for cerebral malaria, has meant supply of these drugs not only to the Indians, but to 48 nations in the world, many of them from sub-Saharan Africa. CSIR's breakthrough, which provides bacteria and virus-free drinking water at 4-paise per litre, has penetrated many schools in villages. CLRI was the saviour of Indian leather industry. CLRI brought back tanneries that were closed due to pollution by developing green technology. This saved several



thousands of jobs for the underprivileged poor. And I can give you dozens of other examples. CSIR must continue to make high technology work for the poor.

BCK: Your stint in Delhi is not only known for your tenure as DG, CSIR but also for several Mashelkar Committees that were constituted by the Government. Many of them dealt with controversial national issues. How did you manage all this?

RAM: I have been used to having Mashelkar Committees right from mid 80's, when I was in NCL! When the Bhopal disaster took place, where over 2000 people died due to MIC leakage, I was appointed the technical assessor for the one-man Inquiry Commission by the Government. When I was at NCL, I chaired the Committee to investigate into the accident in Maharashtra Gas Cracker Complex, Nagothane, set up by the Government of India, where 34 people had died. I am gratified that consecutive Governments thought of referring issues of national importance to several Mashelkar Committees over the last decade.

BCK: Could you tell us about a few of the Mashelkar committees that you can particularly look back with satisfaction?

RAM: I chaired a Committee to look at reforms and restructuring of Regional Engineering Colleges (REC), which have a status next to IITs. We made a recommendation that RECs should be converted into National

Institutes of Technology by changing their governance structure as well as by switching the funding to the Central Government. This has been done. I am particularly proud of this.

BCK: This is all about higher education. But what about industry?

RAM: The Committee on R&D in Drugs and Pharmaceuticals that I headed had eminent members such as the current Deputy Governor of Reserve Bank of India, Dr Rakesh Mohan and great pioneers such as the late Dr Parvinder Singh of Ranbaxy. We were able to bring out a report, which had far reaching consequences. A fund of Rs. 150 crores per annum has been created with Department of Science & Technology for drug development promotion, which was a recommendation of the Committee. The Committee on Recombinant Pharma that I chaired recently created a real 'hassle free' path for Indian biopharma industry. They are all so happy.

BCK: These were relatively non-controversial committees, but did you chair some controversial committees also?

RAM: Yes, indeed. National Auto Fuel Policy Committee, which I chaired was a big challenge. We brought out a pragmatic and balanced report, which gave a sound and solid road map, which has been appreciated nationwide. Our recommendations were totally evidence based. Three of our laboratories (IIP, NEERI and

CRR) contributed so handsomely. Other Mashelkar committees on Spurious Drugs, Patentability, etc. dealt with difficult issues too.

BCK: In all, there have been twelve high-powered Mashelkar Committees, which seems to be some kind of a record. While you were doing all this report from your other national and international commitments, it appeared that there were ten Mashelkars at work! One of them was scientist Mashelkar of course! We have seen that your research publication record since 1995 till today has remained intact. How did you manage this?

RAM: Basically, I am a scientist at heart. Doing science is not work for me; it is relaxation. Therefore, I had two addresses; one as DG, CSIR in Delhi and the other one as the Research Scientist in my group at National Chemical Laboratory. I spent all my weekends and holidays in my laboratory. Managing time is the issue. I remember my students used to come to Pune airport with the research results in the last week and we would use those 45 minutes discussing these results till we reached the lab!

BCK: We are proud that you are the only third Indian engineer to have been elected as Fellow of Royal Society (FRS), London in the twentieth century. You are the only 8th Indian to have been elected as Foreign Associate of National Academy of Science (USA) since 1863. These two are considered as some of the highest recognitions in science. How did you achieve this?



Mashelkar: Outgoing CEO of CSIR

RAM: I suppose I was very lucky. In fact, when I became FRS I received many congratulatory messages. One of them was from another FRS from UK. He said in his congratulatory message, "only two great things can now happen to you now, one is death and the other is Nobel Prize". The first one is certain and the second is uncertain. So enjoy your moment of glory! Well, there may be a bit of an exaggeration here, but it still makes the point.

BCK: This is good. But what worries us is that in over 60 years, for the research exclusively done in CSIR, there have been only two scientists, who become FRS, one is yourself and the other is Dr A.P. Mitra. And in over 60 years, you are the only Foreign Associate of US National Academy of Science. Does it not worry you?

RAM: Well, not really. You will see big winners emerging soon. The average quality of research in CSIR has gone up enormously in the last decade. What we need are more breakthroughs from CSIR and more science that can make such a difference that science will take a little right or left turn. The fact that in 2005, we had such peaks that we had nine coverages on the cover pages of top scientific research journals indicates that we are arriving there.

BCK: How do you look at the future CSIR?

RAM: CSIR today is on a very strong footing. Its budgets, team spirit, its performance level and its image are

at a new high. But we must raise our ambition. How do we do that? From Light Canard Research Aircraft (LCRA), we moved to a two-seater all-composite aircraft HANSA and now to a 14-seater SARAS. In the Eleventh Five Year Plan, we are planning the first phase of a 70-seater regional aircraft. We are thus raising our ambition every year and trying to fly higher and further. This is just an example. We must continue to do this in everything we do. The biggest challenge for CSIR of tomorrow will be to continue to remain relevant in the dynamically changing environment and also to be able to attract the best talent, since the competition for talent in India is going to be increasingly severe.

BCK: Finally, how would you like to be remembered?

RAM: Out of the 37 years of my professional life, I have spent 30 years in CSIR. This is half of my life. CSIR's age and my age, by the way, are almost the same. I feel extraordinarily privileged that I was given an opportunity to lead in almost one sixth of CSIR's journey. I would like to be remembered as an individual, who created a Team CSIR spirit. One who raised its ambition and led this unique transformation process, which has been applauded worldwide. An eminent scientist such as Jayant Narlikar in his book 'Scientific Edge' named CSIR's transformation in the nineties as one of the top ten achievements of Indian Science & Technology in the 20th Century. What can be more satisfying?

BCK: What will happen after 1st January, 2007?

RAM: I will get back into my research laboratory at NCL to work as CSIR Bhatnagar Fellow. From 'weekend research' now, this will mean 'full time research'. I feel so happy.

BCK: So it will be research and nothing else?

RAM: No, No. That is not the case. My 2007 diary is already getting full! Recently, the world famous economist Jeffrey Sachs sent me an e-mail congratulating me on becoming the 'DG of Global CSIR'. Let me explain what has happened. Just as we have CSIR in India we have CSIR - like institutions in Asia Pacific, Europe, USA and South Africa. The leading ones have got together to form Global Research Alliance (GRA). This alliance will represent a mighty strength of around 60,000 scientists and engineers with over 6 billion dollar budgets. I have been elected as its first President. My role will be that of a Chief Mentor to help GRA in creating a global good through 'global funding by using our combined and unique global talent'. To me, this is a huge challenge.

BCK: What else will you be doing?

RAM: Well, I have been elected as the President of Institution of Chemical Engineers, UK. As a chemical engineer, I feel greatly honoured. In fifty years, I am the first non-English President, that too in its Golden Jubilee year! I see



that India is on the move, whether its people or its products.

BCK: What do you mean by that?

RAM: Fifty years ago, an Englishman Dr McBain was the Director of National Chemical Laboratory. Today, an Indian from India is going to preside over a prestigious UK institution. Similarly, 50 year ago, it was a British Morris Oxford that was sold as an Indian Ambassador on Indian roads. Today, it is an Indian Indica that is being sold as Cityrover on London roads. This is the emergence of a New India. In fifty years, the wheel has turned the full circle.

BCK: Well, in the post-liberalized India, if there was one individual, who had the courage of conviction that India could turn the wheel the full circle, it was you, Dr Mashelkar. As a member of the CSIR family, I feel proud that you were our DG too.

RAM: Thank you. You are so gracious.

BCK: Finally, I will like to quote from what our Prime Minister said about you on 26 September 2006 during the S.S. Bhatnagar Prize ceremony. He said, "We all are proud of your achievements but I conclude by expressing the hope and prayer that perhaps we have not

seen the best of you still – the best is yet to come. May your life and work continue to inspire generations of scientists and technologists in our country". So according to him, your best is yet to come!

RAM: Well, it was our gracious, large-hearted Prime Minister, who had these characteristically kind words. About his expectation of very 'best yet to come', I will simply say that in whatever I have done, I have tried to give my 'very best'. I will try to do that till the very last day of my life. I only hope that 'my best' will be considered to be 'good enough' by this great nation, which has given me so much in such abundance.

Major Contributions by Dr R. A. Mashelkar

LEADERSHIP IN SCIENCE & TECHNOLOGY

In post liberalized India (since 1991), Mashelkar has been a key figure in redefining the new direction of Indian Science & Technology, driving commercialization of scientific research, institutional transformation, launching IPR movement, protecting India's traditional knowledge and linking it to formal S&T to create globally competitive products, masterminding the most successful public-private partnership, (NMITLI), conceptualizing and

championing the process of India's emergence as a global R&D platform, etc.

NATIONAL AND INTERNATIONAL RECOGNITION

- Elected Foreign Associate of US National Academy of Science (2005) – after 1863, only 7 Indians have been so honoured. Considered as one of the highest honours after Nobel Prize.

- Elected Foreign Associate of US National Academy of Engineering (2003) – honour coming to an Indian in India after 14 years.
- Elected Fellow of Royal Society (London) in 1998. The third Indian Engineer to be elected in the twentieth century.
- Elected (effective 1.1.2007) First President of Global Research Alliance formed by 9 CSIR-like institutions from Asia-Pacific, Europe and USA



Mashelkar: Outgoing CEO of CSIR

with over 50,000 scientists and total budget running into billions.

- Elected President, Institution of Chemical Engineers (UK) in its Golden Jubilee year. The first ever non-English President to be elected.
- President of Indian National Science Academy (2005-2007).
- The First Asian to be honoured by World Federation of Engineering Organization's (WFEO) Medal of Engineering Excellence (2003).
- The First Scientist to be awarded the prestigious Stars of Asia Award of Business Week (USA). Received at the hands of George Bush Sr., Former President, USA.
- The first Indian to deliver the prestigious Zuckerman Lecture (2003), London; General Section President, British Association of Advancement of Science (2003).
- Received D.Sc. (honoris causa) from 26 universities including Universities of Wisconsin (USA), London (UK), and Pretoria (South Africa);
- Won 40 national awards for S&T, leadership, quality, HRD, etc. These include : Dadabhai Naoroji Award and JRD Tata Corporate Leadership Award (first scientist to win it after its inception), Lal Bahadur Shastri National Award (given to Indians on a global basis), etc.



Embracing his legendary Guru, Prof M. M. Sharma

S&T CONTRIBUTION

New Millennium Indian Technology Leadership Initiative (NMITLI)

Masterminded the NMITLI programme; the biggest Public-Private partnership in independent India. Within a short span of 5 years, NMITLI has networked over 65 private industries and over 200 institutions. This represents a paradigm shift in Indian science (which had hardly partnered the private sector) the private sector (which had hardly worked on risky projects with leadership potential), Government funding (private sector is being funded for risky projects with high failure possibility), as well as philosophy (Indian leadership rather than incremental follow on

products). This model is being promoted by other funding agencies. National Innovation Foundation (NIF)

Founding NIF and chairing the Governing Body of NIF; has been responsible for giving recognition and creating reward systems for the innovations of thousands of grass root innovators, which include illiterate farmers, artisans, fishermen, school dropouts, housewives, etc. During 2004, over 50,000 entries were received. The growth is exponential.

ORIGINAL CONTRIBUTIONS TO SCIENTIFIC AND INDUSTRIAL RESEARCH

Mashelkar's basic research (over 230 publications) has seen some



As Chairman of National Innovation Foundation, rewarding grassroot innovations



Being honoured with D.Sc (Hon. Causa) by Pretoria University, South Africa (2000). One of his 26 D.Sc (Hon. Causa)

breakthroughs. Synthetic hydrogels have been considered as potential candidates for mimicking life. Sensitivity, selectivity, mobility, memory, self-organization, self-healing and enzyme-like activity are some of the attributes of living materials. Among these, the last three attributes have been demonstrated by Mashelkar for the first time. It was Mashelkar, who demonstrated biomimetic switching hydrogels (gelzymes), the discovery of molecular recognition induced macroscopic reversible morphological transitions and the discovery of self-healing phenomena in gels. His unified transient network models for analyzing the wall-slip problem have opened up new vistas. His pioneering work on role of convective constraint release is the first ever-direct molecular level interpretation of the wall-slip

phenomenon. His path breaking work on the role of energetic interactions in transient polymeric

networks resolved anomalies, which had remained unexplained for the last thirty years.

NATIONAL CONTRIBUTIONS THROUGH MASHELKAR COMMITTEES

Mashelkar has chaired several important high-powered committees at National level during the last 10 years in diverse fields dealing with higher education, institutional restructuring, energy, research and development, telecom, national auto fuel policy, spurious drugs, recombinant pharma, etc. These

Mashelkar Committees have made a major difference.

The Mashelkar Committee on 'National Auto Fuel Policy' has given India a policy that uses an integrated approach by taking a holistic view, which balances diverse aspects of emission, auto technologies and auto fuel quality on



the one hand and the social cost and security of fuel supply on the other. This exhaustive scientific evidence-based analysis in a unique landmark in policy setting in India.

The Mashelkar Committee report on 'Review of Regional Engineering Colleges' was fully accepted and implemented by the government. Seventeen Regional Engineering Colleges have been converted to National Institutes of Technology, while changing the entire pattern of funding as well as governance.

Mashelkar Committee on 'R&D in Drugs and Pharmaceuticals' has led to several changes, including giving a new vision to this vital sector including setting up a Drug Development Promotion Foundation with the formation of Rs 150 crore annual fund.

Mashelkar Committee on 'A Comprehensive Examination of Drug Regulatory Issues, including the Problem of Spurious Drugs' has led to a new legislation as well as proposed fundamental changes in the Indian drug regulatory system, so that it becomes world class.

Mashelkar Committee on 'Recombinant Pharma' has eliminated the multiple regulatory controls and it has been heralded by Indian biotechnology industry.

Mashelkar Committee in 'ICAR reorganisation' has suggested sweeping changes in the working of ICAR to make it a vibrant organization.

CONTRIBUTIONS TO INTELLECTUAL PROPERTY MOVEMENT

Based on a world wide opinion poll (2003-2005), International Journal 'Managing Intellectual Property' has listed Mashelkar as being one of the 50 most influential people in intellectual property from 19 countries around the world. Mashelkar was responsible for creating practically a 'national movement' on IPR through his visionary campaign with Indian academics, researchers and corporates.

Under his leadership, CSIR occupied the first position in WIPO's top fifty PCT filers among all the developing nations in 2002. CSIR has maintained unprecedented 30%- 40% share of the US patents granted to Indians in India during the last three years.

He spearheaded the challenge of the success revocation of the US patent on wound-healing properties of turmeric (USP 5,401,5041) and chaired the Technical committee, which successfully challenge the revocation of the US patents on Basmati Rice (USP 5,663,484) by RiceTec Company, Texas (2001). This has opened up new paradigms in the protection of traditional knowledge, not only for India but also for the entire developing world.

As the first Chairman of SCIT of World Intellectual Property

Organisation (Geneva), Mashelkar strongly advocated that traditional knowledge be treated at par with industrial property systems, which led to the creation of Traditional Knowledge Digital Library (TKDL).

Fought successfully in changing the International Patent Classification System to include the Indian traditional knowledge, which is a breakthrough for the entire developing world.

In June 2006, the Cabinet took the decision to entrust the responsibility of providing access to TKDL for international patent offices to CSIR.

As a member of the prestigious International IPR Commission set up by UK Government (2001) played a crucial role in making recommendations, which balance the rights of the poor. This has made a major impact on international thinking on IPR and development. As a One Man Review Committee of World Wide Academy (WWA) of WIPO, gave a new developing-world orientation to WWA.

As a Vice-President of the Prestigious WHO Commission on IPR, Innovation & Public Health (2004-06) played a critical role in giving a road map for affordable drugs for the poor.

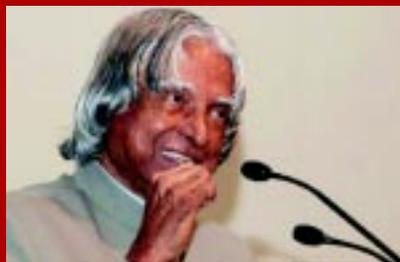
Currently chairing the Committee on Technical Expert Group of Patent Laws set up by the Government of India to decide about the patentability criteria.



India pays tribute:

A small compilation of the glowing accolades from across all strata of society

Political Leadership



"In his many years as a most distinguished scientist, Dr Mashelkar has made valuable contributions in the areas of public policy, R&D Management and Innovation."

— Dr APJ Abdul Kalam,
President of India



Best is yet to come
"To Dr Mashelkar, I have to say you have served our country and the cause of science and technology with the greatest distinction. On behalf of our people and our Government, I wish to convey to you our grateful regards. We all are proud of your achievements but I conclude by expressing the hope and prayer that perhaps we have not seen the best of you still - the best is yet to come. May your life and work continue to inspire generations of scientists and technologists in our country."

—Prime Minister Dr Manmohan Singh, Speech at the CSIR Foundation Day function in Vigyan Bhawan, New Delhi (26 September 2006)

"I would like to congratulate CSIR for the remarkable transformation into a performance-driven and user-focussed organization. The entire CSIR family deserves to be complimented for achieving this feat. I am happy to see that CSIR is flying higher and further."

—Prime Minister Dr Manmohan Singh,
CSIR Society meeting, 26 July 2004

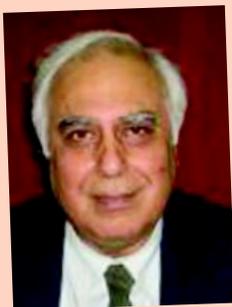


"I would especially like to compliment Dr Mashelkar, who is in our midst. He is not only one of India's foremost scientists, but he has also proved to be an able science administrator. Under his leadership, CSIR has regained its dynamism, and prestige, besides showing itself to be capable of standing up to the challenges of liberalization and globalization."

— Shri Atal Bihari Vajpayee,
Former Prime Minister of
India, Shanti Swarup
Bhatnagar Prize Ceremony
25 May 1998



Mashelkar: Outgoing CEO of CSIR



"I am proud to say that this flagship of ours, CSIR, has at its helm a man who has done us proud. He is a renowned scientist, nationalist to the core and brings laurels for his country whenever

he steps out of India. The foundation of an institution is not a one activity but a continuing process, which enables the institution to face the challenges of the future. To do this, we need a man with vision to mould such institutions. Dr Mashelkar is a man of such vision. I am sure under his leadership CSIR has a glorious future."

—Shri Kapil Sibal, Minister for Science & Technology and Earth Sciences, Address at CSIR Foundation Day Function, 2005

"He is a combination of many things. He has the curiosity of a child, maturity of a statesman and the vision of a man, who looks to the future and sees India in the context of the future. He has the passion of a man, who lives his life fully and he has actually instilled in the CSIR system, all the qualities that he personally possesses. That is why CSIR is today that it would be 11 years from now. So, I think that it is only befitting that before he leaves us at the end of the month, we place on record our appreciation of the fact that he has contributed in a manner that perhaps none other has done in the long history of CSIR since 1942."

—Shri Kapil Sibal, Minister of Science & Technology and Earth Sciences, CSIR Directors' Conference, 10 December 2006



"Scientists are the primary agents through whom the traditional societies are transformed into modern ones. It is for the political leadership to facilitate this transformation. The other day, I read a touching story about how a very poor Indian village boy struggled to

come up in life, taking the benefit of education, which was otherwise beyond his reach, with the help of others. Yet by his persistent endeavour and supported by well-meaning and visionary people, he obtained quality higher education and came up to occupy a crucial position in the scientific establishments of his country. He was among those who had migrated to the West in search of greater challenges and better opportunities for research or to quote him, "in search of walls to paint," but returned to the motherland when shown the right opportunity to excel and contribute to our own nation building. By now you will be knowing whom I am talking about. He is none other than your Director General, Dr Mashelkar."

—Shri Somnath Chatterjee, Speaker, Lok Sabha, at the CSIR Foundation Day celebration Function, 26 September 2005



"A tribute to Dr Mashelkar is a tribute to the spirit of renaissance in Indian science and technology. "

—Dr Montek Singh Ahluwalia, Dy. Chairman, Planning Commission session of 'Mind to Market' Symposium organized by FICCI, 17 November 2006

"Dr Mashelkar is not only a dangerous optimist, but an infectious optimist also."

—Dr Montek Singh, Dy. Chairman, Planning Commission

Mashelkar: Outgoing CEO of CSIR



Corporate Leadership



"Dr Mashelkar's vast knowledge and standing is deceptively hidden by his great humility."

—Ratan Tata
Tata Group of Industries



"I would say Dr Mashelkar has set up very high standards to achieve, but he is well on his way to meeting some of these."

—Late Dr Parvinder Singh of
Ranbaxy



"Dr Mashelkar has brought about a new direction to the management of scientific institutions in India by making their research user-oriented with economic benefits. This is path-breaking. While the team at the helm of CSIR has helped realize the goal, he as an individual has led them as one from within them. This approach makes all the difference."

—Mukesh Ambani
Reliance Industries Ltd



"Everybody calls Dr Mashelkar a dangerous optimist, but he is a catalyst, an explosive catalyst. Where he goes, an explosion of optimism occurs."

—Dr Vijay Bhatkar, Chairman,
ETH Laboratories,
Dishnet DSL Ltd, Pune



"CSIR CEO Ramesh has transformed our national laboratories to institutions of innovations and creativity. His qualities as a manager, administrator and of course, as a scientist are truly outstanding. He is very optimistic. In fact, my wife tells me that whenever you are down, think of Dr Mashelkar, you will feel better, and this is true."

—Shri N. R. Narayanamurthy, Former
Chairman, Infosys Technologies Ltd.



"Under the dynamic leadership of Dr R. A. Mashelkar, FRS, CSIR has been constantly renewing itself to be in tune with the needs and challenges of a resurgent India."

—Dr A. S. Ganguly
Former Chairman, Hindustan Lever Ltd



"He always used to say that we should stand in the forefront of technology and file patents in developed countries. I must admit that he has not only inspired scientists in CSIR to create wealth by harnessing intellectual property, but also all of us in the industry."

—Dr Anji Reddy
Dr Reddy's Laboratories



Mashelkar: Outgoing CEO of CSIR

Eminent Scientists



"Leader-Manager of Science. Extraordinary person of many qualities."

— Prof. M. M. Sharma,
Former Director,
University of Mumbai
Institute of Chemical
Technology, Mumbai



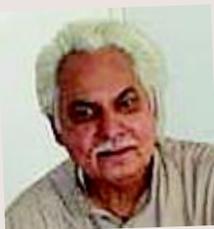
"Dr Mashelkar, the leader of the major S&T agency in the country is a great product of India."

— Prof. C. N. R. Rao,
Linus Pauling Research
Professor and Honorary
President, Jawaharlal Nehru
Centre for Advanced
Scientific Research, Bangalore



"A man with adventurous spirit and full commitment to science, Ramesh will be remembered for his bold support to young scientists and entrepreneurs venturing into new ideas."

—Dr Jayant Narlikar,
Director, IUCAA, Pune



"Wherever he goes he leaves an indelible mark—the Mashelkar mark. He is Mr Optimistic of India."

—Prof. R. Kumar,
Fellow, Jawaharlal Nehru
Centre for Advanced
Scientific Research,
Bangalore



"One of the finest things to have happened to CSIR. ... "Kohinoor of Indian Science."

—Dr Arcot Ramachandran,
Former DG, CSIR



"I have never ceased to marvel at (his) singular ability to combine first-rate science, the innovative development and transfer of technology and excellence in corporate management."

—Prof. M. S. Valiathan,
Former President, INSA.



"Mashelkar's CSIR has the 21st Century written all over it"

—Roddam Narasimha,
Former Director, NAL

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