

THE BEST IS YET TO COME

-Dr Raghunath Mashelkar



The students of Prerana Magazine of IBS Pune had the privilege of interviewing Dr. Raghunath Mashelkar, Doyen of Indian Scientific Research yet a very humble personality, on the 18th of December 2018. Here is a gist of the interview that took place with him.

Q. Sir, you have achieved so much till date. To quote, recipient of the FRS, Padma Vibhushan, Padma Bhushan, and Padma Shri. Can you please walk us through the formative years of your illustrious journey?

I practically lived a hand-to-mouth existence during my childhood. My father passed away when I was six. My mother had to leave our village and we moved to Bombay. She raised me by doing odd jobs that were available for an uneducated woman. I studied under street lights. I got 11th rank (among 135000 students) in Maharashtra State Secondary School Certificate exam. I was going to take up a job leaving my education, but I was fortunate that I got the Sir Dorabji Tata Trust Scholarship – an impressive sixty rupees per month for six years (in terms of purchasing power, it could be close to INR 15,000 per month as of today). After acquiring a Bachelor's degree in Chemical Engineering, I did my doctoral studies with the legendary Prof. M.M. Sharma in Institute of Chemical Technology (then University Department of Chemical Technology). Incidentally, it is interesting that today I am the Chancellor of my alma matter.

I became a lecturer in Salford University in England. That was also the time when India was reeling under the brain drain phenomenon. The then Prime Minister Mrs. Indira Gandhi was concerned that we could not give jobs to scientists like Hargobind Khorana to stay in India – as you are aware, Khorana, went abroad and subsequently won the Nobel Prize. Dr Y Nayudamma, the then Director General of Council of Scientific and Industrial Research (CSIR) came to England to talk to young bright students and attract them back to India. I was on his list. He asked me to meet him at the Savoy hotel in London. He shared his vision of new India. He said that vision can be a reality if young people like me came back. He offered me a position on the spot and I too accepted it on the spot. I never regretted making the decision to return to India – undoubtedly, it was possible because of the unstinted support of my wife, Vaishali. Later I learnt that Dr Nayudamma had sent a cryptic “He is fantastic. Grab him” remark to the Director of National Chemical Laboratory (NCL), Pune. I started as the Assistant Director- National Scientific Researcher of NCL at 32. Later, I became the

Director of National Chemical Laboratory and the Director General of the prestigious, Council of Scientific & Industrial Research (CSIR) - an organization of 40 top class national research laboratories. I retired in 2006, occupying the CSIR Bhatnagar Fellow position. Subsequently, I become National Research Professor, one of the highest honour that an Indian Scientist can get.

Q. What are those key success factors that you acquired during your formative years which have stayed with you all these years?

The following ten lessons from my journey of life have come as a part of my continued learning.

1. Your aspirations are your possibilities - keep them always high.
2. Like instant coffee, there is no instant success. Work hard - success will follow.
3. Work hard in silence. Let success make the noise.
4. Persistence pays. It is always too soon to quit.
5. Don't wait for opportunities to knock on your door. Create opportunities. Build your own doors.
6. You can do anything but not everything. So choose Focus.
7. Be curious forever. Creativity follows curiosity. New creation follows creativity.
8. When someone tells you it can't be done, take it more as a reflection of his limitation, not yours.
9. 'I' in every individual must stand for innovation, not for inhibition or imitation. It is better to fail in originality, then succeed in imitation.
10. There is a no limit to human imagination and achievement, excepting the limits you yourself put on your mind. So go limitless. Outperform yourself.

The last -10th lesson was given to me by my Guru Bharat Ratna Prof. C.N.R. Rao.

Let me explain this. I kept on receiving many accolades and awards - Fellow of Royal Society, Fellow of American Academy of Arts and Science, Fellow of US National Academy of Science, US National Academy of Inventors. Yet, surprisingly the only response from my Guru, Prof. C N R Rao, on every award was "Not bad". Finally, I asked him what I could do to impress him. His reply left me speechless. His reply was this -

"You are climbing the limitless ladder of excellence. There are no limits to this ladder, excepting the limits that you put on yourself. Remember, your best is yet to come".

Q. You have considerable achievements to your credit. How do you feel about these achievements?

I have always interpreted every award as a message telling me "Well done. Keep it up". An award is not the end but just the beginning of a journey. It actually raises the expectations of others from you. You realize that with the honour, come responsibilities. You cannot afford to remain satisfied with the laurels that you receive, you have to keep on raising the bar. I remind myself "the ladder of excellence is limitless" and "your best is yet to come".

Q. Do you celebrate your achievements? If so, how do you do so?

I do celebrate. With family and friends. And enjoy the applause and accolades in private. Yet I resolve to contribute even more. I also draw my inspiration from Prof. C N R Rao who, at the age of 85, works not 24 but 25 hours a day. And also from Prof. Sharma, my great Guru under whom I did my Ph.D. He was a selfless teacher with greatest integrity and ethics that I have met in my life.

Q The way you countered the 'Haldi' and 'Basmati' patent applied for by the United States has been very inspiring. What was the driving factor behind such a courageous act?

I remember when a little bird was wounded in front of our house my mother applied Haldi on the wound. When I asked her how she knew that Haldi would work for the bird, her reply was very profound. She said, "For me, all living beings are same".

I moved to Delhi as Director General of Council of Scientific & Industrial Research (CSIR) in 1995. The memories of that evening in Pune came back to me in 1997, when I was reading a newspaper report in Times of India written by N. Suresh. The news was that US Patent Office had granted a patent (US patent no. 5,401,5041) on the wound healing properties of turmeric. I was surprised. A patent is granted only when the conditions of novelty, non-obviousness and usefulness are fulfilled. Whatever is available in public domain as prior art cannot fulfill the first two criteria. I decided to challenge the patent on the grounds that its use was well known in India.

In the evening of the same day I was delivering the Hussain Zahir Memorial lecture in National Physical Laboratory, chaired by late P.N. Haksar. At the end of the lecture, I publicly declared that CSIR was going to challenge this patent. I must say that as Secretary to Government of India, protocol demanded that I should have taken the prior permission from the Government, before making such a public announcement. But my problem is that I think from the heart and not from the head. Reading that morning this particular claim of a US patent on wound healing properties, which was known to my mother, and indeed whole generations of Indians, had stirred something within me. I had no time to take permissions. I made this statement instinctively. But the Government stood behind me. After following the normal inter-departmental consultations, it was formally decided that CSIR will challenge the patent claim.

CSIR submitted to USPTO all the evidence, including from the ancient Sanskrit literature. CSIR showed that the wound healing properties of turmeric were known to Indians all along. There was nothing new there. After 14 months, USPTO accepted this evidence. USPTO revoked the patent. This created a history. This was the first time that the third world had fought for its legitimate rights on its traditional knowledge and had actually won.

We at CSIR decided to deep dive into the issue further. Was turmeric case an isolated case? Were there other wrong patents also? The expert group at CSIR estimated that about 2000 patents were

being granted every year internationally, which were linked in one way or the other to traditional knowledge systems. And many of these patents, just like in the turmeric case, were simply wrong. Fighting each of these cases was too expensive and too time consuming. How could one get at the root cause of the problem, and prevent the grant of such patents in the first place? That was the big challenge. But every challenge is also accompanied by an opportunity. And that opportunity came very soon.

In 1998, I got an international platform to champion the cause of Indian traditional knowledge. I was invited to chair the Standing Committee on Information Technology (SCIT) in World Intellectual Property Organisation in Geneva. I used this opportunity to sensitize 170 plus member countries about the issues on misappropriation of traditional knowledge. Citing the turmeric example, I stirred a debate there. One thing led to the other and I made a special trip to USPTO in Washington. We looked at some wrong patents that were given by USPTO, which were linked to India's traditional knowledge systems. Then we looked up some related Sanskrit verses, where the subject matter of those patents was already covered. We then did the English translation of these Sanskrit verses. I carried all this material to USPTO.

I showed to the USPTO officials that what they thought was novel was not novel. It was something that was already available in our old texts. The USPTO officials showed to me the way they used electronic data bases for searching the prior art. Obviously the knowledge that was in our old texts was not in their databases. So, to them, everything looked new! The challenge for us in India, therefore, was to see that our knowledge from the ancient texts should somehow appear on their screens, and that too in the codified language that their patent examiners understood.

Q. Your contest against these patents - was it more of nationalism or was it more of your sense of injustice that someone else wanted to take the credit for it instead of the originators of the idea?

I have always fought against injustice as a matter of principle. In the case of Haldi, maybe nothing earth shattering would have happened if I had not contested against it. On the other hand, the Basmati patent had economic overtones as thousands of crores of our Basmati exports would have been hurt deeply if the Texas company's patent on 'Texmati' would have been up held.

Q. In the 21st century, everyone is well acquainted with the word "INNOVATION". But it just may have been discovered long ago by Gandhiji when he said, "I would prize every invention of science made for the benefit of all". And we are guessing this would have been the driving force behind the "Gandhian Engineering" concept that you introduced. Would you like to throw some light on it?

I was the first Indian to get elected as Foreign Fellow, Australian Academy of Technological Sciences and Engineering (ATSE), I was asked to deliver a lecture in Canberra. I spoke about

Gandhian Engineering and defined it as doing “More from less for more”. The title itself inspired many ideas. Gandhiji had always felt that the benefits of science should reach the poorest of the poor. Further our depleting resources should be used judiciously so that we can preserve it for the coming generations. This meant getting more output by using less resources, so that we preserve for more people – the current as also future. In July-August 2010, I along with Late C.K Prahalad published a paper “Holy Grain - More from less for more” is now considered to be one among the top ten papers relating to innovation. The idea stems from a paradoxical concept - how you create access equality of access despite inequality in income. My recent book - “Leapfrogging to Pole-vaulting: creating the magic of radical yet sustainable transformation” has taken this concept forward. In fact, “Anjani Mashelkar Inclusive Innovation Award” (named after my mother) is instituted to be given not to the best practice but to the next practice in terms of inclusive innovation, which helps all, not some privileged few.

Q. Mrs. Indira Gandhi was concerned about the situation of “Brain Drain”. What are your views about it?

I remember addressing this issue at the Pune Convocation. The topic was “Brain drain to brain gain to brain circulation”. The main reason for brain drain is that India has been a land of ideas but not one of opportunities. However, with rapid expansion of opportunities in India, the scenario has finally changed. People who once used to go abroad in search of opportunities, are returning to their homeland as the level of research funding, quality has gone up. I, however, want to emphasize that the most significant change is the changing mindset of the young people. And how true this is! In recent times, we in India celebrated the appointment of Sundar Pichai as the CEO of Google. Earlier we celebrated the appointment of Satya Nandella as the CEO of Microsoft. India believes in Satyam, Shivam, Sundaram. So we already have Satya and Sundar – may be now it is time to have Shiva as CEO of another global giant, may be Apple, may be IBM, may be Intel who knows?

A young about-to-graduate student was candid enough to point out that I really did not know what the current generation really was. He said, “Sir, in your generation graduates just wanted to go to the States. The next generation wanted to go to the States and get jobs in good companies like Google and Microsoft. The subsequent generation wanted to go to the US, get a job in a good company and rise to the top as well. However, our generation wants to create our own Google and Microsoft right here in India.”

I would like to say that not only the mindset of this generation but also the scenarios that prevailed have changed. This has opened up opportunities both for Indians as well as foreigners.

Q. Sir, we are seeing that a large number of Indians are coming back to India. However, they are coming more for commercial operations. Are they returning for research purposes, also?

The opening of six new Indian Institutes of Science Education and Research, thirty new central universities, new IITs, NITs, IITs has created a platform for a lot of candidates to establish strong research careers right here in India. I, myself have been the chairman of IISER- in Mohali and the other in Kolkata. We are getting people from Stanford, Caltech, Harvard, MIT etc. The way the government finances these research projects, the manner and the magnitude of the risk that are taken can be definitely improved for the development of research in the country. I have written extensively on this topic in my paper “What will it take for Indian Science and technology to be globally competitive” in Current Science (Vol. 109, No. 6, 25 September 2015)

Q. Over the years India has made a lot of advancement in the field of space, technology and defense. It definitely is a great achievement for India. How do you feel about this progress?

The way we have achieved so much with limited resources is remarkable. We were the only ones who made it to Mars with Mangalyan in the first attempt. Even technologically advanced countries couldn't do so. With budget constraints, we could achieve such an incredible mission with just 74 million dollars whereas the USA spent almost 671 million dollars. This is a classic case of what I call the “Affordable Excellence”- where the work done was impeccable. Going to Mars is not an easy feat. Yet it was done in a budget which was ten times cheaper.

I definitely would link this scenario to us Indians trying to have the genetic makeup of getting “more from less for more”- because when scarcity and aspiration join hands, they become a very deadly combination. I remember my dear friend, also my Guru, Prof C K Prahalad talking about the two main aspects of resource and aspiration - where the relation between the two is absolutely inverse. As resources keep going up, aspirations begin to come down. The basic challenge is to know how to keep one's aspirations above their level of resources.

Q. India is witnessing an entire new era of start-ups. How would you describe this trend in India? Have you witnessed any sort of growth in this aspect?

Oh, here I would like to say that **we should not be content with only copying but we need to start creating.** I undoubtedly admire the success of many of companies like Ola, Flipkart, etc. but I have an inner urge to see something that would start first in India and then spread across the world. With budding intellects, I think it is time for us to create. For example, I initiated the New Millennium Indian Technology Leadership initiative, one of the biggest public partnerships ever, where we make sure that the target, we have set is ahead of the others. The problem of all this actually lies in the lack of our innovation ecosystem. The risk-taking ability is missing. We tend to focus more on the 'Venture Capital' rather than the 'Adventure Capital'. We are still in the phase of building regulatory systems and other ancillaries which would help innovators and entrepreneurs.

Q. With the rise in technology, what would be your message to us, MBA students?

The term “MBA” has the word “Business” in it, and business itself is changing. The world's largest taxi service provider - Uber, owns no taxis of its own; the world's largest hotel chain - Airbnb, owns no hotels; the largest cinema provider - Netflix, owns no cinema halls. There has been a dramatic shift in the way the business landscape is depicted due to the exponential rise in the state of technology. Soon, almost 60% of the children in senior classes in school will be employed in jobs that do not exist today. It has become a challenge for the education system to prepare these students for jobs which they themselves don't know about. Many a times, I hear from young students that what they learn in classes is not what they implement in their real life. That is where I share my advice with young MBA students. To survive in the corporate world, you need to be able to have the following qualities:

1. Ability to deal with complexity and ambiguity
2. Creativity
3. Critical thinking
4. Cognitive flexibility
5. High Emotional intelligence
6. Ability to co-create- not just between man & man, but between man & machine also

Armed with the above skills, a management student will be able to chart his/her way through this VUCA world, namely volatile, uncertain, complex and ambiguous.



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