The Bombay Technologist

ARTICLE

# An Interview with Prof. Man Mohan Sharma

Shashwat Kulkarni[a], Devavrat Sathe,[a] Ameya Chaudhari,[a] Durva Naik,[a,*]

[a]Institute of Chemical Technology, Nathalal Parekh Road, Matunga, Mumbai-400019, India.

**Corresponding author**: Durva Naik (durvanaikict@gmail.com)

**About Prof. M. M. Sharma:**

**Man Mohan Sharma,** FREng (born May 1, 1937 in Jodhpur, Rajasthan) is an Indian chemical engineer. He was educated at Jodhpur, Mumbai and Cambridge. He obtained the Bachelor of Chemical Engineering (1958) from UDCT (ICT) and subsequently M.Sc. (Tech.) in 1960. He completed his Ph.D. (Chemical Engineering) (1964) at the University of Cambridge with P.V. Danckwerts. In 1964, he returned to India, aged 27, as Professor at the University of Bombay, and later became the Director of the University Department of Chemical Technology (UDCT), now ICT (Institute of Chemical Technology - A Deemed University) – the first chemical engineering professor from ICT to do so. He remained Director, UICT for 33 years. He has been honored by several universities (including the IITs) by honorary doctorates. In 1990, he became the first Indian engineer to be elected as a Fellow of the Royal Society, UK. He was awarded the Padma Bhushan (1987) and then the Padma Vibhushan (2001) by the President of India. He has also been awarded the Leverhulme Medal of the Royal Society, the S.S. Bhatnagar Prize in the Engineering Sciences (1973), FICCI Award (1981), the Vishwakarma Medal of the Indian National Science Academy (1985), G.M. Modi Award (1991), Meghnad Saha Medal (1994), and an honorary Doctor of Science degree from the Indian Institute of Technology, Delhi (2001).

Professor Sharma is a recipient of a number of prestigious academic honours and awards. He is a Fellow of the Indian Academy of Sciences, Bangalore, Honorary Fellow of the National Academy of Sciences (India), Allahabad, Fellow of the Royal Society, London. He was elected Honorary Fellow by the Royal Academy of Engineering and is also a Foreign Associate of the US National Academy of Engineering.

---

### 1. Prof. Sharma, your first paper was published in the Bombay Technologist. Please share your experiences during your time in BT.

Yes. This must be in 1956-57. I still remember the title – '*Concept of partition function waves: A study related to thermodynamics*.' It was an exciting experience to write articles as a young student. As a matter of fact, I encourage all my research students to write a state-of-the-art research article and get their papers published in some local journal to give them a feeling of achievement in the art of writing and to help them financially. Writing articles inculcates in you the art of writing and when you become a research student and you write some state-of-the-art report on an upcoming area, it throws new challenges at you. As an undergraduate student, it is more like training you for the seminars and research projects you will be facing in the final year.

### 2. How did you proceed with your paper in BT? Who or what inspired you?

It's a funny story. Since you asked me, there was a teacher who taught physical chemistry whom I had shown the manuscript that I had written. He insisted on putting his name as a co-author on the manuscript, which made me ineligible for an award even though his contribution was zero.

### 3. From physical chemistry to chemical engineering, how did you cope with this transition? What were the different phases of your academic life?

We used to have extraordinary job offers. It was a big bragging point since we would have jobs in our hands before graduating. People would not believe this as it was difficult to

## ARTICLE

get such high profile jobs during those times. I was bent upon doing research and so did not appear for a single interview as it might have contaminated my mind. Naturally, it meant that my classmates would end up prospering while I was the poor fellow drawing a scholarship of only 150 rupees a month. It also meant that I had to borrow from my classmates and repay all of them once I got my scholarship for pursuing my dream of further studies.

At that time, there were only two faculties in chemical engineering – both had come from the United States and had agreed to guide me – but their sudden decision to go back left me in a lurch. There was a very great personality in PPV who was quite a terror. A fellow student told me not to approach him due to his reputation but I was determined. He was one of the first graduates of chemical engineering from UDCT. When I entered, he asked what I wanted, and I was ready with what I wanted to work on – an area which he didn't like. Despite all that, we had a great conversation for over an hour or so. I got very friendly with my PPV friends and as they all were B.Sc. graduates and mathematics wasn't covered in their course, I also ended up helping them learn the intricacies of kinetics of reaction and modeling as well as thermochemical calculations. The relationship that we shared at that time allowed us to become friends for lifetime.

To further enhance my knowledge, I took formal lessons in macromolecular chemistry and analytical chemistry. I made a point to imbibe thorough knowledge on polymers at an early stage when polymer industry was just about to come up in India. Now that I didn't have a PhD guide, I finished my work for my Master's thesis within a year. As there was no one to guide me, I finally decided to try my luck abroad. I had applied to several places including the United States from where I had got an offer from an Amercian Professor. Around the same time, I got a handsome offer from Cambridge. So the first thing I did was, I took permission from the American professor who had earlier consented to offer me a Ph.D. position in his research group as it would be immoral to take it up without his consent. Not only did he give me consent but also congratulated me for securing a research position in Cambridge.

Although, I finished my PhD within 3 years, I could have submitted it after two years as the rules permitted such a possibility based on performance. However, I wanted to spend the extra one year to pursue some projects on my own. I did that and then I did something unusual and unknown in Cambridge in those days. I had an idea which I thought would make an impact on the industry. My supervisor had extraordinary contacts, so he got hold of a director in Shell. Some fellow came to meet me and he asked me to patent the idea, so I got it patented for which they paid me handsomely. Then, I was asked to make a presentation to the board of technical personnel in the Netherlands about the value of my idea as it was on my name. I was straightforward and asked them whether they were interested in my idea because I believed in its value and it was definitely better than what people had commercialized at that time.

At the end of the presentation, they offered me a unique opportunity to work at NOCIL that was coming up at that time. The offer was to take up an assignment in Holland or England, and within 15 years, move back to India as a big shot in NOCIL. Naturally, I rejected this offer given my interest in academics. At the same time, academicians in US and Canada were offering me postdoctoral positions, but I was firm on coming back to UDCT. I knew there was no money in UDCT, I said we will do whatever we can and develop something unique. Today, no IIT can compete with UDCT chemical engineering. UDCT had only five faculty members then, compared to the IITs which had much more money, foreign exchange and we had nothing, but with sheer dint of collective leadership we made a name for ICT and the flag is still flying high uninterrupted. I can say that even now, 20 years after I quit.

### 4. We, at the Bombay Technologist, have incorporated the idea of bringing research to undergraduate students who have just started college or are in their second year. How would you suggest we go about giving them directions?

Let me draw a scenario. During my time in UDCT, the brightest girl student, Janaki Ram, was in a dilemma whether to pursue her studies further or not. I talked to her and persuaded her to stay and that's what she did eventually. She did extraordinarily good work in an industrial assignment and could have easily got a scholarship in MIT for pursuing doctoral studies, but she wanted to stay in India. As fate would have it, she married a person who was stationed in America and she worked in a very renowned company after completing her postdoctoral research while she was there.

The next person who came to UDCT and wanted admission to our chemical engineering course was Mahalaxmi Iyer as she didn't want to study medicine. She had equal marks in PCB and PCM, and her parents asked me what the scope of chemical engineering was. I offered to fix a meeting between Mahalaxmi and Janaki so that she could talk to her. She was completely motivated and stayed on to do her Ph.D.

So, you inspire people by example. You must give teaching a higher priority. If the teacher is bunking the class, what sincerity will he/she convey? You should practice what you preach. If you take up a research project and the research supervisor (faculty) is there for name's sake and isn't really committed, then it is utterly unproductive. So, how do you inspire a person to take up research? After all, research is predominantly perspiration! It is a process that involves acts of failures and overcoming failures. That is the main advantage of doing research. However, undergraduate research has a different meaning where I had introduced an incentive for fellows to do a research project for 6 weeks with a decent honorarium involved. It was first introduced in the name of a very accomplished member, Prof. R.A. Rajyadhakshya.

A young person doing research has a bright mind. Students were carefully selected given their zeal to perform and learn

## ARTICLE

from the experience that could be provided through such an opportunity. No fear, so you are daring and willing to try any unconventional idea and, as good luck would have it, the ideal flowers.
You inspire, basically, by example.

### 5. What is the role of a mentor in a student's life? What are your views on the academia in India?

A teacher plays a crucial role in a student's life. If the teacher himself or herself is not hardworking and not committed to students, then it doesn't convey sincerity. One of the reasons why India has suffered is because academics have lost the kind of prestige they used to enjoy earlier – firstly, due to the lack of guts as they don't speak up what they genuinely feel, and secondly, because teaching in India is not respected by Indians. In the US or England, Ph.D.s teach not only in private schools but also in publicly supported schools. This is not the case in India anymore, as private schools tend to pay more than public schools, but quality cannot come with money.

The trait in UDCT has been a combo: First and foremost, teaching and the impact of research on teaching, and then the studies carried out for industries. There is hardly any institution in India, which can command that kind of connection. If you take, for example, paints – most of the big names in the paints industry are alumni of UDCT. Ashwin Dani and the Choksi family all were a part of UDCT.

### 6. ICT has a closely-knit network of alumni. According to you, what are the reasons?

Bodies in ICT such as the Bombay Technologist, the UDCT Alumni Association (UAA) and the Technological Association maintain the relation between the institute and the alumni. These organizations are solid financially due to good contributors. What matters is a sense of belonging which the alumni have towards ICT. We, in the beginning of 60s and 70s, were economically weak, but the philanthropists helped the students. People who were benefitted from this, as soon as they prospered, came back and gave money to create opportunities for those who were short of finance. They remain grateful to the institute. They want to reciprocate the kindness shown to them by the institute. This is the culture we have imbibed over the years in UDCT.

### 7. What is the future of Indian youth in the chemical industry considering the current scenario?

Very bright. For a simple reason: it is an essential industry and you cannot do without it. Plastics, polyesters, fertilizers, agrochemicals – you cannot live without them. At every walk of life, you can observe the contribution of chemicals. So many things are critically dependent on the chemical industry – from your toothbrush to what you eat – everything is dependent on chemicals. The chemical industry is not a negotiable industry and we cannot exist without it.

### 8. After all these years, what gaps do you think the Indian chemical industry still has which should be filled by the next generation of chemical engineers?

They are many, actually. Firstly, there are many important monomers such as acrylic acid (without which we won't have acrylic paints) which are not manufactured in India. We make polystyrene but we don't have styrene. We use polycarbonate but we don't make polycarbonate. Today, there are many big gaps, so the opportunities in this industry are unlimited.

### 9. What did the Bombay Technologist mean to you as a student?

The Bombay Technologist was a revolutionary idea that no one else but ICT could conceive. It is a prestigious journal and has enjoyed a rich tradition in the past. It used to publish once a year and it was also very handy for looking at the list of past graduates. We used to look at the notices regarding the invitation for articles and there used to be awards for best articles. This prompted me to write an article for BT along with the will to cultivate the art of writing.

### 10. You pursued research when you had several jobs lined up for you. In today's world, where everyone is determined to earn money even if it would mean to sacrifice one's passion, how do we believe that research will live on?

The value system of society has changed. Two things have killed engineering: IIMs and IT – more money and less responsibility. Now, the lifestyle of people and family values have changed, but India will always have people like me who will pursue what they wish to. There are still people who go and study mathematics even though the opportunities to earn money are minimal. See, there is something that triggers the excitement in you. Money is important. Although I started with a low income, I never regretted. The excitement of dealing with young people and developing them can't be weighed in terms of money. At the same time, you can't be suffering from abject poverty. You must maintain a balance. In research, during our times, we would compensate with consultancy. I started with Rs. 1000 per month and now, professionals charge more than a lakh.