

Tuhin K. Roy (1923–2019)

Dr Tuhin Kumar Roy was born in Mung-hyr, Bihar, India, on 1 August 1923. His father, Rakhai Raj Roy was a lawyer who practised in Burdwan. Roy received an informal education at home until the age of seven. He was taught by his mother and a tutor who would come home to teach him. He lost his mother while he was 7 years old. At this point, he was admitted to the Burdwan Town School for boys, one of the three main schools in Burdwan at the time, straight into grade III. He always topped in the class of 30 students and was given a scholarship on merit, with free tuition fees from class V onwards to Matriculation.

After completing secondary school, Roy took up physics, chemistry and mathematics along with Bengali and English for his I Sc course at Junior college at Burdwan Raj College. He topped in the entire Burdwan district in his I Sc final and received the much coveted 'Burdwan Silver Medal' from the Maharaja of Burdwan for his achievements. He was also awarded a full government scholarship to attend St Xaviers College, Kolkata (one of the top colleges in India even today), for his under-graduate level studies in his three chosen subjects, physics, chemistry and mathematics.

For his post-graduate, Roy went to the University College of Science, Kolkata for a Master's degree in Applied Chemistry. This college is famous for the illustrious scientists who were teaching there, one of them being Satyen Bose, famous for the Bose–Einstein theory. Another of his teachers was Meghnad Saha, another famous physicist. At the end of his studies here he was presented with the University Gold Medal for topping the class.

Having completed his Master's degree, Roy worked at the Indian Lac Research Institute in Ranchi for a year and a half. India gained independence in 1947 and the new Government, led by Pandit Jawaharlal Nehru decided to send five top students of the country to MIT (Massachusetts Institute of Technology) for a course of their choice on a complete scholarship over three years. This included the fare and a stipend for food, books, clothes and other living expenses. Roy was interviewed extensively in Kolkata by a former MIT graduate for admission to the Master's in Chemical

Engineering. During his first year at MIT Graduate school, he had to take some additional undergraduate courses to strengthen his foundation. He completed his Master's in two years in the class of '49 from MIT, staying at the Graduate house. His professor and counsellor was Ashdown, who was very fond of him. The top nine students from his class of '49 were allowed to apply and take the comprehensive exam for further studies



(Doctor of Science degree) at MIT. Of these, only three were admitted into the Sc D course, of which he was one. Roy, in fact, began his research for his Sc D topic during the final year of his Master's as he knew he was on a scholarship for only 3 years and time was running out.

Roy did his doctorate thesis at MIT in 'Fluid bed reactions and fluid bed cracking' which is popular nowadays in oil refineries. He worked under two splendid professors, Warren K. Lewis and E. R. Gilliland. Once his three years in the US were complete, his scholarship funded by the Indian Government had lapsed, with him needing another year to complete his Doctorate. Fortunately, the Head of the Chemical Engineering Department, Whitman wrote to the Indian Government asking for an extension as 'Roy was one of their leading students'. The Indian Government extended the scholarship for another year to complete his Sc D. In spite of working hard in the two years he had after his Master's, Roy still needed an extra month to fully complete his research. This time, Lewis came to

his rescue and arranged a fellowship for him from the Standard Oil Company.

Roy met Silva Mardiste at the International Centre, Harvard Square, Boston. Silva had just completed her graduation in Political Science from Bennington College, New England, Vermont, which in those days was an all girls' college. She was working at the famous Lahey Clinic in Boston. Roy finally married her on 1 January 1951.

After completion of Sc D degree in June 1951, Roy got a fantastic job offer with the American Cyanamid Company for \$ 450 a month, which was considered high those days. He was assigned to work at the Chemical Construction Company, a subsidiary of the American Cyanamid Co., and moved to Lynden, New Jersey for his first assignment to make phosphoric acid from phosphate rock. The first week, his main job was to personally unload 50 kg of phosphate rock at the highest platform at the pilot plant in Lynden. Indians had a reputation of not working hard with their hands as they had abundant help back home, and Roy realized he was being put to test! He knew they could not pay him such a high salary for merely unloading phosphate rock at the Company, so he worked at it without a murmur, although he did mention to his boss that the weight of the phosphate logs to be unloaded was exactly as much as his own body weight! However, once his 'initiation' was over, he was promoted every week, first from 'unloader' to supervisor, and then very soon to being the leading engineer of the entire pilot plant, much to the envy of his initial supervisors! In 1953, Roy was ready to return to India as the rule in the US was that Indians needed to return after eighteen months of working in their country. His boss, Ed Roberts, the Vice President of the Company asked him to stay on and promised to double his salary if he agreed. Roberts wrote to the US Government seeking special permission for his very talented employee to stay on, on the grounds that he had specialized knowledge and was an asset to the US whom no one could replace. The US Government agreed.

Finally, in 1954, Roy returned to India. He had applied for and got the post as the S. K. Acharya Chair and Head of the Chemical Engineering

Department of Jadavpur University, Kolkata at the age of 31. He worked there until his bond to the Indian Government was completed in 1958 and soon afterwards, went again to US on a two year full time consultancy with the Freeport Sulphur Company. Their head office was in New York, but he worked at the New Orleans office. After almost two years there, the supplies of the raw material which the plant was based on (nickeliferous laterite which came from Cuba) were cut off due to the Cuban revolution. Hence, having completed his consultancy period, he returned to India and re-joined Jadavpur University as the Head of the Chemical Engineering Department in early 1960. He left Jadavpur university end 1960 and then moved with his family to Delhi.

In 1963, Roy made yet another trip back to the US with a generous job offer from the Scientific Design Co., living for three years in Greenwich, Connecticut.

Over the years, Roy got a number of patents, both in the US and in India for his outstanding work in chemical engineering. He also wrote several research papers which were published in American and Indian chemical journals, like the *Industrial and Engineering Chemistry Journal* and *Scientific American Chemical Society*, among others. Over the years, he presented several papers in his field all over the world, and even when his advanced age and illness had made it difficult to attend the seminars himself; his colleagues would present his papers, the last one being in Quebec City, Canada, on the use of hydrogen in pressure hydrometallurgy.

Some of his patents for the separation of metals from their ores are still being widely used all over the world. He held 6 Patents in USA & 3 Patents in India

Roy was selected as Man of the Year in UK in 1998. He received Dr B P Godrej Life Time Achievement Award from Adi Godrej in 2004 towards recognition for his illustrious academic and professional career as well as for his invaluable contribution in nurturing Indian Institute of Chemical Engineers (IChE) from its very early days. In 2007, he was conferred with the IChE Diamond Award. He was also elected to the Indian National

Academy of Engineering, Indian Academy of Sciences and Indian Institute of Chemical Engineers. He served as INAE (Indian National Academy of Engineering) distinguished visiting faculty, and the Department of Chemical Engineering, University of Calcutta got the privilege of having him as INAE visiting faculty during 2003–04. He was the honorary member of the Board of AIChE (American Institute of Chemical Engineers).

After moving to Delhi in 1960, Roy was approached by S. N. Mazumdar, an ex-ICS officer to start a Company to enable jobs for aspiring Chemical Engineering graduates in India. Thus, the company, Industrial Consulting Bureau, was begun and several Indian chemical engineers who had returned from the US, UK and Germany were employed. In 1965, the company changed its name to Chemical Metallurgical Design Company (CMDC) and Roy after returning from the US joined as its Managing Director.

Che Guevara, the Minister of Industries in Cuba, had written to Jadavpur University to get in touch with ‘the’ Dr Roy ‘who had the patent to separate nickel and cobalt from the Cuban Laterite ore and had worked with the American Company, Freeport Sulphur, while doing this job in the US’. By this time, all the American workers employed had left the Moabay Nickel Plant in West Cuba and it was working at 10% of its full designed capacity.

Roy agreed to increase the capacity of the plant, but insisted on the same fees and facilities that were being given to other foreign consultants for working there. This was agreed upon, and he and his team brought up the capacity of the plant production by 50% within the promised three months with very little additional expenditure, and then subsequently, with some more financial inputs, to 80% of its full working capacity.

Roy met Fidel Castro several times during his many visits to the country on work. It was around this time that he was questioned in India by some American officials from the CIA about the nature of his work in Cuba. He was told that he would not be allowed a US visa ever if he continued to work for the Cuban gov-

ernment. His answer was a nonchalant, ‘That’s okay, there are a number of other countries to visit in this world.’ Needless to say, he was always granted a visa by the US during his many visits there subsequently!

As a stalwart in his field, Roy did a lot of honorary work for various institutions. He was always invited to give speeches and talks at several universities and conferences. He set the entrance examination papers for the IITs over many years and was the main external examiner for IIT, Kharagpur. He was actively involved with various organizations as well, such as Indian Academy of Sciences, Indian National Academy of Engineering and American Institute of Chemical Engineers. He also served as a Resident Scientist at Indian Space Research Organisation, Research Advisor at Sriram Institute of Industrial Research and Distinguished Visiting Professor at Jadavpur University and Calcutta University in the ‘80’s.

Roy was one of the Founding Members of Indian Institute of Chemical Engineers (IChE) and his close association with the Institute since its birth was never loosened. He remained an integral part of the IChE where course content, syllabus, etc. for various chemical engineering exams and courses were decided. He was the Honorary Editor of *Indian Chemical Engineer*, the quarterly journal of the Institute during 1959–1961. He held the position of Honorary Editor of the quarterly journal of the Institute, *Indian Chemical Engineer* during the period from 1959 to 1961. His deep insights and knowledge indeed enriched the quality of the journal. He was elected President of IChE for 2 years. He suffered a stroke in 2008 and his left side was paralysed. He used to go to IICHE building in a wheel chair. He started writing a book on hydrometallurgical extraction of metal. Unfortunately he passed away on 4 August 2019.

SITAL K. BANERJEE

*Flat B2/6, Parijat Building,
24 Mandeville Gardens,
Kolkata 700 019, India
e-mail: boolan2012@gmail.com*