

## Prafulla Chandra Rây

It was the best of times – the second half of the nineteenth century. The decade of 1860-69 alone saw the birth of Rabindranath Tagore, Motilal Nehru, Swami Vivekananda, Madan Mohan Malaviya, Asutosh Mookherjee. Lala Lajpat Rai, Srinivasa Sastri and Mohandas Karamchand Gandhi. And of Prafulla Chandra Rây. A season of light and hope was descending on a languishing India.

A lover of literature, history and biography, one who read half-a-dozen languages, Prafulla Chandra claimed that he '*became a chemist almost by mistake*'. In practice he became the initiator of chemical research in India and the all-inspiring *guru* of the first research school of chemistry in the country. He became a celebrated historian of antiquarian chemistry, a champion of chemical industry and much more. Yet he remained a symbol of plain living. In Gandhiji's words, '*it is difficult to believe that the man in simple Indian dress wearing simpler manners could possibly be the great scientist and professor*'. The scientist and professor was, in the same breath, a patriot and a social worker given to ceaseless service, an ascetic and a philanthropist who gave away his all in charity. A bachelor, a small man in feeble health, a confirmed dyspeptic, his was a case of the mind far overtaking the body.

Prafulla Chandra was born on August 2, 1861 in Raruli-Katipara, a village now in the Khulna district of Bangladesh. Educated in Calcutta, he inherited his love for literature from his parents especially Harish Chandra, his erudite father and friend. He was much influenced by reformers and nationalists like Keshab Chandra Sen and Surendranath Banerji who taught him in school and college. At that time chemistry was a compulsory subject in the first arts course (FA). Prafulla Chandra studied it in Presidency College since his own college, Metropolitan Institution (now Vidyasagar College), did not have the facilities. The chemistry lectures of Alexander Pedler fascinated him – '*I began almost unconsciously to be attracted to this branch of science*'.

After his FA in 1881, he won the Gilchrist Scholarship in 1882 and proceeded to study science at Edinburgh University. Alexander Crum Brown – a distinguished chemist, a linguist and a man of vast erudition – became his favourite teacher and guide. After completing BSc in 1885, he became a DSc in inorganic chemistry in 1887 working on double sulfates. In-between he found time to write critical patriotic articles like 'India Before and After Mutiny' and 'Essay on India'. He won the Hope Prize, became the Vice President of the University Chemical Society and continued his research work for one more year before returning home in August 1888. The Edinburgh experience made him '*passionately fond of chemistry*'.

Prafulla Chandra spent the next twenty seven years (1889-1916) pursuing his passion at Presidency College as junior and then as senior professor. An instant success as a teacher, his lectures were enlivened by neat demonstrations and historical anecdotes. In lecturing, he wrote: '*I was as much in my elements as a fish in water*'. Having adjusted to teaching, soon there was time. The available facilities were most inadequate, but he was a man possessed and went ahead with research activities culminating in the discovery of mercurous nitrite in 1895. This in turn led him to illumine the little known general chemistry of nitrites and hyponitrites. This endeavour was spread over all his years in Presidency College and



attracted many bright young students – the likes of J C Ghosh, N R Dhar, J N Mukherjee and B B Dey. The first Indian *school of chemistry* was thus born and in time it spread far and wide. Prafulla Chandra was an inorganic chemist but his mental horizon was expansive. A regular follower of organic chemistry literature as well, he encouraged students to go by their own inclinations to inorganic, organic or the then newly emerging field of physical chemistry. His affection for students was mystical, '*bonds existing between them and me were as subtle as those of chemical affinity*'.

In those days, physical methods of study were few and little was known about the nature of chemical bonds. What was possible to do was to synthesize new and interesting families of compounds and to study their composition and certain physical properties. And in this, Prafulla Chandra's endeavours stood tall. True, his work did not have the dimension of the discovery of noble gases by Ramsay or of the coordination theory by Werner – events which took place at about the time Prafulla Chandra began his nitrite studies. But the nature of his mission was most difficult: to grow the first few blades where none was grown before. As Jagadish Chandra Bose will say, Prafulla Chandra was '*a pathfinder and originator ...*'.

Jagadish Chandra was three years senior to him and a colleague in the Physics Department. The two men were close friends and Jagadish Chandra was making history with electromagnetic waves. At the threshold of a new century the two friends were hoisting high the first Indian flag of research in the laboratories of Presidency College. Later Prafulla Chandra would say, '*I trust that the fire which it has been our lot dimly to kindle will be kept burning on...gaining in brilliance and volume and intensity*'.

The synergy of science and industry in the west and its potential for job creation had greatly impressed Prafulla Chandra during Edinburgh days. Why not in India, he asked. And he found time and money to do experiments on the making of pharmaceuticals, mineral acids, etc. initially in his own residence. The final outcome, Bengal Chemical and Pharmaceutical Works (BCPW), became big enough to be converted into a limited liability company in 1902. In the same year, he published the first volume of his celebrated *History of Hindu Chemistry* – a result of years of laboured research. The second volume was published in 1909. The version, '*History of Chemistry in Ancient and Medieval India*' edited in 1956 by his former pupil P Rây is still available from the Indian Chemical Society.

Prafulla Chandra was a living example of what one determined man of ideas can do by measured use of talent, time and energy. At the call of Asutosh Mookherjee he became the first Palit Professor of Chemistry in the newly founded College of Science of Calcutta University after retiring from Presidency College in 1916. His school and its research activities flourished with important contributions to several areas, the chemistry of organic sulfur compounds and their metal complexes, in particular. He was knighted in 1919, and in 1934 he became an Honorary Fellow of the London Chemical Society whose journals have for long been studded with his research papers. Honorary degrees and other tokens of honours kept on pouring. The Indian Chemical Society was born in 1924 with him as the elected Founder-President.



In 1917, the twenty-nine year old Chandrasekhar Venkata Raman joined as the first Palit Professor of Physics. Prafulla Chandra adored the young Raman about whom he said, long before the Nobel Award, 'if this temple of science produced only one Raman and nothing else, it will have amply justified the high expectation formed by its Founder'. In Presidency College it was Bose and Rây and in the College of Science it became Raman and Rây. Bose-Rây-Raman, or symbolically BRR, defines the original trio of modern science in India.

Prafulla Chandra was a legend of charity and social work. All his life, he gave away much of his salary, savings and pension to the needy – individuals and institutions alike. The benefit of his shares in BCPW went to poor widows and orphans. In famine and in flood at least one man would be organising massive relief, Prafulla Chandra Rây.

He passed away on June 16, 1944 – two more months would have made him eighty three. Of success and happiness, he had said, 'I have no sense of success on any very large scale in things achieved ... but have the sense of having worked and of having found happiness in doing so'. In paying homage, *Nature* magazine of July 15 wrote, "Sir Prafulla was more than anyone else, responsible for the great development of scientific research in India during the past fifty years...".

#### Sources:

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The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them.

*Sir William Lawrence Bragg*  
(1890-1971)