D. K. Rai (1943–2012)

It was one of the saddest moments in my life when the news of the death of Devendra Kumar Rai on 12 July 2012 was conveyed to me. He was one of my best teachers, a noble colleague and trusted friend in Banaras Hindu University (BHU), Varanasi for the past four decades. In 1958, when I joined the Central Hindu College in Varanasi, as a first-year intermediate science student, the teachers of physics, chemistry and mathematics came from their respective departments in the main campus of BHU. The standards of teaching and laboratory work were one of the best in the country and our teachers used to motivate and inspire us by citing examples of their brilliant students of the past. J. V. Narlikar was presented as one of the most brilliant alumni. In 1960, when I joined B Sc in BHU, we came to know some very bright M Sc physics students. In 1961, D. K. Rai, who was among this group scored the highest marks, obtained the Chancellor medal and later rose to the post of professor of spectroscopy, greatly diversifying the researches in the famous laboratory started by R. K. Asundi way back in 1939. T. R. Prasad from this famous group joined IAS and served the country with distinction as cabinet secretary, T. V. Ramakrishnan, FRS, is famous for his work on condensed matter while O. N. Srivastava and G. Singh were renowned professors of BHU.

Rai was born in 1943 and had his elementary education in his village Reotipur, Ghazipur District, Uttar Pradesh. He completed his high school from Sanatan Dharm School and intermediate science from Queen's College in Varanasi before joining B Sc in 1957 at BHU. He had lost vision in one of his eyes due to a serious infection at a very tender age. To many of us, who had the privilege to observe him closely, this physical disability never impeded his outstanding abilities as a teacher, brilliant researcher and a kind and noble friend. He was appointed lecturer in spectroscopy just after his M Sc in 1961 and the quality of teaching was many fold enhanced by him. He would come to the department around 8 a.m. and leave after 6 p.m. even on Sundays. He participated in all the academic activities, was always available in his office after teaching duties and was seen discussing problems with research scholars or reading scientific journals. Research students greatly benefited from his unique expertise in the interpretations and clear explanations of complex problems that required knowledge of quantum mechanics.

Rai undertook postdoctoral work for a year in the quantum chemistry group of Prof. Lowdin at Uppsala, Sweden in 1965 and perfected the techniques of molecular orbital approach to calculate molecular properties in ground as well as excited electronic states. He worked on the problem of hydrogen bonding in DNA double helix, leading to important

advancements in the understanding of biological properties of molecules in terms of their molecular orbitals. I remember G. N. Ramachandran (IISc, Bangalore) visiting BHU in 1970 to give lectures on the famous Ramachandran plot. When he visited the spectroscopy laboratory, there was an intense discussion with Rai for more than an hour and a couple of years later Rai went to the Molecular Biophysics Unit, IISc, as a visiting scientist for a short period. This new area of research in biophysics has led to its addition as a postgraduate specialization in the Physics Department since 2009.

Rai had great expertise in the analysis of vibrational and rotational spectra of molecules, interpretations of predissociation features and determination of molecular geometry in the excited electronic states. He also made significant contributions in theoretical understanding of electron–atom and electron–molecule collisions leading to important insight into the working of gas lasers. He visited several laboratories in Germany in late 1970s and early 1990s as a senior Humboldt fellow. After the establishment of Centre of Advanced Studies in Physics at BHU, there was a shift towards spectroscopic studies of solid and nanomaterials. The experimental studies on doped glassy materials were vigorously carried out after 2000 and Rai continued to make valuable contributions in explanations of phenomena of frequency upconversion and quantum cutting in glasses doped with rare earth compounds. He published about 300 research papers in scientific journals and 27 research scholars obtained Ph D under his supervision.

Rai was a true follower of Pandit Madan Mohan Malaviya (founder of BHU), and was a great proponent of imparting science education in Hindi. In addition to many scientific articles, he wrote books in Hindi on C. V. Raman and laser applications. He was also the chief editor of the University magazine *PRAJNA* for many years and was instrumental in publications of memorable issues on the life and work of Nicolaus Copernicus and Raman. He was a fellow of the Laser and Spectroscopy Society of India and President of the Physics Section of the Indian Science Congress at Madurai in 1990. Rai was on the editorial boards of *Indian Journal of Physics and Journal of Scientific Research of CSIR*. He was member of DST, New Delhi for two terms and served on many committees of UGC, New Delhi. He held the administrative positions of Head of the Physics Department and Dean, Faculty of Science at BHU and served the community of students and staff with great distinction. He was the seniormost professor of BHU, a member of its Executive Council, Academic Council and its Court. Above all, he was a great teacher and his interactions with undergraduate, postgraduate and research students both inside and outside the lecture halls and laboratory left them highly satisfied in the process of acquiring knowledge. He shunned publicity, was a rare example of humility and scholarship and is revered by thousands of his students all around the world.

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