

Professor Ram Ballabh: A personal recollection

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I am deeply touched to learn that the Bharat Ganita Parishad and the Department of Mathematics and Astronomy, Lucknow University, still remember Professor Ram Ballabh, who studied, taught and developed a school of researchers in the field of fluid dynamics here. The presence of his students and colleagues shows the respect we have for him even today, 42 years after his demise.

I am not in a position to comment on his contributions in research and development of mathematics in India or his personality as an intellectual and educationist, so I will largely restrict myself to biographical details and personal recollections as his son and student.

Professor Ram Ballabh was born on July 11, 1918 and studied in Moradabad. He came to Lucknow to study at the university in 1934 as a B.Sc. student and completed M.Sc. in Mathematics in 1938. He broke all previous records by obtaining 88 percent marks in the B.Sc. examination and standing first in the faculty. He was the first Ph.D. in Mathematics from Lucknow University. Professor J. A. Strang was his supervisor and Sir E. T. Whittaker was one of the examiners. The title of the thesis was Superposable Fluid Motions. Professor Whittaker praised the quality of work and the mathematical ability shown by the candidate.

Dr. Ram Ballabh was appointed lecturer in 1941, promoted to reader in 1950, and appointed professor and head of the department in 1954 at an early age of 36. The voice of dissent in the Executive Council was silenced by the strong recommendation letter from Professor M. J. Lighthill.

Having grown up with seven sisters and an older brother, he was a family person. My mother Pushpa Vati got married at an early age of 14, when my father was doing B.Sc. In those early days, she stayed with her in-laws in Moradabad and he could visit her only during vacations. My sister, Manorama, was born in 1940, I was born in 1943, the year he was awarded his doctoral degree, and my younger brother Anil was born in 1948. He had a lot of financial commitments as he had about 50 nephews and nieces. Quite a few of them came to stay with us for university education. My mother was a strong woman and my father depended heavily on my mother, leaving her to manage most social obligations and big and small household tasks, which included buying cartload of wood logs for the kitchen chulha from Sitapur Road and shoes for him.

As a father, he gave us quality time. He always found time to be with us for playing card games or carrom. He taught me arithmetic and languages at home while preparing to go to office in Delhi. In 1950, he returned to Lucknow and got me admitted to Colvin Taluqdars College. I learnt a lot from him unknowingly, which has guided me from time to time. Here I would like to recall some of the incidents.

While solving trigonometry problems, I once spent the whole day on one problem. In the evening when I asked him how to get the answer, he asked me if I was satisfied with my calculation. When I said, Yes, he said, Do not worry. There could be a mistake by the author or in printing. Later, as a graduate student I faced a similar problem in a home assignment from a famous book in Statistics, only to realize that there was a mistake in printing. Over the years I have also benefited from this advice to trust my calculations while doing research.

He taught me Coordinate Geometry in B.Sc. part II in 1961 and Mathematical Analysis in M.Sc first year in 1963. I recall that in a class test he had given us, I thought I had correctly answered the question. To my surprise, I got only 50% marks. He told me that I wrote more than was required and had not read the question carefully. I had to be precise!

Another important advice he gave me was when I showed him my first independent research paper in 1972 and said that I wanted to generalize the result. He said if I thought that the work was interesting, I should send it for publication and not wait to publish the most general result.

Similarly, one of my uncles was a student in his M.Sc. class. My uncle was disappointed that he stood second in the class because of very strict marking. This honesty with his profession and inbuilt commitment should stand as example for us.

I remember an amusing story about Leibnitz that he once told us. After his work on Calculus, the Church in Germany asked Leibnitz to prove existence of God by his new philosophy. Leibnitz was by then already famous and respected for his contributions. Leibnitz stood before the big audience, went to the board, drew a haphazard irregular curve (described by Prof Ballabh as Vardhamootan!) and asked Does this not prove the existence of God!. Nobody in the audience had courage to question Leibnitz. Professor Ram Ballabh warned us that sometimes persons of authority used this Method of Intimidation for proving things.

Prof Ram Ballabh studied at Coronation Hindu High School and passed the high school examination in first class with distinction in Mathematics. Urdu and History were his other subjects. The Principal of the Government Intermediate College of Moradabad wrote: Ram Ballabh did not confine himself to scholastic distinction only but took keen interest in extracurricular activities of the college. He was the premier of the college Parliament and it was due to his efforts only that a few successful sittings were held. He took an important part in the college dramatic performances. He was active and energetic member of the college Swimming and Rowing Club.

He continued his interest in dramatics, Science Associations, debating societies and athletic activities of the university. He passed the Certificate B examination of the U.P. Battalion University Officers Training Corps with the distinction in 1945 and became a flying officer in Lucknow University.

During his academic career he won several prizes and gold medals and received merit scholarships and University Fellowships. Testimonials given by well-known educationists and teachers like Professor A.N.Singh, Acharya Narendra Dev, Professor Birbal Sahni speak about him as a man of great potential.

He was on deputation for a short period of a year and a half in New Delhi as a Mathematical Officer, Central Water Power, Irrigation & Navigation Commission (1948-1950). He did not like the life of Delhi. Once he jokingly said that if you drop a needle from an aeroplane flying over the city, it will fall on an officer. During this period he wrote his first book on Coordinate Geometry, which was published by a Delhi publisher. He had to

withdraw it, and later in early 1960 he rewrote the book, which we all have read.

Applied Mathematicians are often interested in solutions of the basic equations arising in their field of study. It is not always possible to find exact solutions to non-linear partial differential equations. In particular, the system of nonlinear equations of motions for viscous fluid flow present formidable obstacles to classical analysis.

To deal with the nonlinear character of the hydrodynamical equations of motions, he developed a new method for the solution of a certain type of fluid motion. The concept of Superposability and Self-Superposability was introduced as early as in 1940 by him. In his words, Broadly speaking, the idea of Superposability is to inquire whether there exist sets of solutions which are linearly additive; what restrictions are necessary and sufficient to secure the additive property and how to determine the members of the set which are additive to a given solution when such members exist, what are the special properties of such sets; whether all solutions belong to at least one additive set or not the members exist.

This new theory of Superposability of Fluid Dynamics has gained recognition in the field of Applied Mathematics. He and his students (13 Ph.D. and 1 D.Sc.) have published research papers in national journals covering various aspects of Fluid Dynamics. He was very generous with his research students and allowed them to publish their work under single-authorship. During his lifetime his students published more than 75 papers. His students always acknowledged his help most of the time even after they left the department.

Some of the work is discussed in his monograph Hydrodynamic Superposability published by Asia Publishing House in 1963. Later, an excellent survey is presented in his presidential address On certain aspects of fluid dynamics presented in the 58 th Session of Indian Science Congress, Bangalore (January 3-9, 1970). Unfortunately, he could not deliver the lecture due to bad health.

He visited Manchester University, U.K. to work with Professor M. J. LightHill, F.R.S. during 1952-53. He was a research associate of Professor Oddvar Bjorgum in summer of 1957. In 1964, he visited U.S.A as a Fullbright Exchange Visitor and in 1969 he visited different universities in Yugoslavia under the Indo-Yugoslav cultural exchange programme of the Government and lectured on Mathematics at the universities of Belgarde, Lubljana, Skopje, Sarajevo, and Zogreb and participated in discussions on Mathematics.

He was the general editor of the Hindu Astronomical and Mathematical Text series dealing with the development of Mathematics and Astronomy in Ancient India. The published volumes have been widely appreciated. He was also the editor of the Mathematical journal Ganita. He was one of the reviewers for the Mathematical Reviews, U.S.A. He was a member of learned scientific societies and was elected as a Fellow of the National Academy of Sciences, India.

Professor Ram Ballabh was frequently invited to All India Radio, Lucknow to participate in programmes on various aspects of mathematics. He was also a well-known contributor of popular articles of mathematics in English and Hindi to science magazines and also for the Republic Day and Independence Day issues of Swatantra Bharat in Hindi.

He wrote three books for undergraduate students. The book on Coordinate Geometry was used by a generation of students and teachers and is perhaps still in print. The other two books were on Differential Calculus and Integral Calculus. A draft of a book on Differential Equations was prepared but could not be published.

The mathematical community of India could not take full advantage of his creativity and vision due to his bad health. He became diabetic in late 1950s, had both eyes operated for cataract in 1961. Later in early 1970s he developed heart problems, and unfortunately

suffered a paralytic attack of left side in 1974. Despite this, he continued his duties of teaching and research supervision till the fateful early morning of August 15, 1976 when he breathed last.

Professor Ballabh loved to play the card game Bridge with his friends regularly and also played lawn tennis in the university. He enjoyed desi bangla paan and smoked Scissors or Capstan brand of cigarettes. During Deepavali I fondly recall us playing the card game teen patti , as is the tradition.

He was very punctual. I remember that he took my baraat procession and reached the venue unexpectedly at the scheduled time. The guests were still to come and the chairs were being arranged in the shamiana . He had neat habits and was usually dressed formally. He would not have liked the casual look of present day young students!

It was at his suggestion that I took Statistics as one of the subjects in B.Sc., after class XII. I wanted to leave chemistry as it required lot of mugging which I hated. Geology was my choice. He said you will have the same problem. He gave me the book of P.G. Hoel to read and discussed it with me. I enjoyed it.

I am grateful to the organizers and office bearers of the Parishad for celebrating the Birth Centenary Year of Professor Ram Ballabh. I wished to be present and attend the conference and meet some of my teachers and friends. I hope that this enthusiasm of remembering and honouring stalwarts associated with the department continues forever.