Prabhu Lal Bhatnagar was born on August 8, 1912 in Kota, Rajasthan, the second of five sons. His parents belonged to a well-connected family, which had been advisers to the rulers of the princely state of Kota.

The young Bhatnagar showed an affinity for mathematics at a very young age and his first lessons in arithmetic included solving mental sums given by his grandfather. His schooling started at Kota, then he moved to the government school at Rampura. After getting the first rank in the Intermediate examination, Bhatnagar was encouraged by the Principal and Director of Education, Lala Daya Kishan Gupta, to go to Jaipur for further studies. It was during this time that his father passed away and the young Bhatnagar supported himself and his family with the scholarship that he received from matriculation onwards. This was typical of Bhatnagar. He was a man of simple ways and one who never shirked his responsibilities.

In 1934, Bhatnagar completed his BSc degree at Maharajah’s College, Jaipur. At this examination, he obtained the first rank securing the highest marks in mathematics and chemistry in Agra University, to which the college was affiliated. He continued for his master’s degree at the same college and completed it with another outstanding result. The young Bhatnagar must have come to the crossroads at this stage. All brilliant young men of that day appeared for the prestigious Indian Civil Services (ICS) examination. It was a lucrative, powerful profession for the chosen few. However, Bhatnagar was no ordinary young man. On the advice of his teacher, Prof. K L Varma, he moved to Allahabad University to take up research in mathematics as a career.

Allahabad University was at that time a much-coveted place for research. Prof. A C Banerji, a Wrangler from Cambridge, was the Head of the Department of Mathematics. Bhatnagar first worked with Prof. B N Prasad on the summability of Fourier and allied series. Together with Prof. A C Banerji he worked on the solution of second order linear differential equations. Two of their results are included in the famous book of Kamke, *Differential gleichungen – Vol. I*.

Bhatnagar’s research interests slowly shifted to the area of astrophysics, due mainly to his coming into contact with Prof. M N Saha. Bhatnagar began to work on the spiral nebula and the tidal theory of planetary formation. He obtained the DPhil degree in mathematics in 1939 for his thesis entitled ‘On the origin of the solar system’ under the supervision of Prof. A C Banerji.

Prof. S N Mukherjee, the then Principal of St. Stephen’s College, Delhi, invited Bhatnagar to join the college. He joined as a lecturer and for the next sixteen years remained on the faculty.
of the college. He was Head of the Department and concurrently a Reader of Mathematics in Delhi University. These years were the most fruitful time for his research. He indulged in his interest in astrophysics, working both independently and in collaboration with Prof. D S Kothari. The result was a spate of publications from 1939 to 1946, the highlight of which was the theory of anharmonic pulsations of Cepheids and white dwarf stars. This work brought Bhatnagar international recognition and caught the attention of the scientific community. In 1947 he was awarded the DSc degree of Allahabad university for his work on Astrophysics. His interest in stellar structures and interiors led him to the study of rarefied gases and ionized media. This was a prelude to the monumental work that he was to do a few years later.

In 1951, Bhatnagar went to Harvard University, Cambridge, Massachusetts as a Fulbright Scholar for two years. Here he lectured on the mathematical theory of non-uniform gases. Together with D H Menzel and H K Sen, he wrote a book *Stellar Interiors*, which was published in the *International Astrophysics Series*. The Boltzmann equation had captured Bhatnagar’s attention at that time. The complicated integrals which gave the collision effects were far too difficult to handle. His passion for simplification led to the emergence of the BGK (Bhatnagar, Gross, Krook) model. This model has been used as an alternative to the Boltzmann equation in solving problems in rarefield gas dynamics, plasma physics and kinetic theory. The classic paper of Bhatnagar, Gross and Krook in the 94th volume of *Physical Review* of 1954 is the most widely referred paper in plasma physics and, in spite of it being over 50 years old, is still very extensively referred to.

In 1950 and in 1955, Bhatnagar was elected Fellow of the Indian science academies and was a much sought after professor. In January 1956, the Indian Institute of Science, Bangalore, invited him to join as the first Professor of the newly created Department of Applied Mathematics, which Bhatnagar accepted. The department was started at IISc as a service department to cater to the requirements of the engineering and science departments, which were established earlier. However, merely giving lectures on various topics of mathematics was not what Bhatnagar had in mind, when he moved to Bangalore. He was bubbling with enthusiasm for scientific research and slowly he began to build a research group by gathering together students from all over India. The topics he chose for research were also varied. Besides kinetic theory of gases and plasma physics, he initiated research in fluid dynamics, including boundary layer theory, magnetohydrodynamics and the theory of non-Newtonian fluids. The choice of these subjects was inspired by the fact that the engineering departments at the Institute could verify experimentally the theoretical results obtained by the group. He was in contact with well-known German fluid dynamicists – Prof. Görtler and Prof. Gieseckus – and sent his students to do post-doctoral work and experiments in their laboratories. His work on secondary flows in various visco-elastic liquids with differing rheological properties led him to conclude that in simple shear flows, they
all behaved similarly. This led to an equivalence of various constants appearing in the equations underlying each of these fluids. He was also aware that it would be nonlinear effects and discontinuous solutions that would be the work of the future and so he initiated work in shock propagation and nonlinear waves. He was also convinced that computers would dominate research in the future and so encouraged students to use computer-oriented numerical techniques and take up the study of mathematical logic.

In the period 1960–65, Bhatnagar spent many months at the Harvard College Observatory. During this period, he developed a severe problem in the spinal region of the lower back. He was unable to walk long distances or stand for a long time. He got used to delivering lectures seated in a chair, curbing his desire to walk up and down impatiently during a lecture. It was a familiar sight to see him seated on a bench with a knot of students around him, while walking from his home to the department. Surgery in the United States corrected his spinal problem and he was once more able to walk briskly.

By April 1969, the Department of Applied Mathematics at the Indian Institute of Science had grown in stature. About 25 of his students had either completed or were in the process of completing their PhD degrees. Bhatnagar decided to move on and took up the Vice Chancellorship of Rajasthan University. Within two years, at the invitation of the newly formed Himachal Pradesh University at Shimla, he joined there as Senior Professor and Head of the Department of Mathematics. While he was at Meerut on a lecture assignment in January 1973, he got the news of the passing away of his wife at Kota. After this tragic incident, Bhatnagar was very much alone. His appointment as member of the Union Public Service Commission came as a welcome change and he moved to Delhi in October 1973. Within two years when the Mehta Research Institute (now Harish-Chandra Research Institute) took shape in Allahabad, Bhatnagar accepted the offer to be its first Director in July 1975.

For a brief spell, Bhatnagar was his old self. With dreams of the future, he worked ceaselessly to build a true centre of research in mathematics. In May 1976, he conducted a one-month course on ‘Hyperbolic systems of partial differential equations and nonlinear waves’. His lecture notes at this course formed the subject of his book *An introductory Course on Nonlinear Waves*, which appeared later as an Oxford Mathematical Monograph.

In spite of recurring spells of pain and giddiness, Bhatnagar went abroad in 1976. He had been the leader of the Indian delegation to the XIV International Congress of Theoretical and Applied Mechanics at Moscow in 1972 and was now attending the XV Congress at the Hague, Netherlands. A month after his return to India, Bhatnagar passed away very quietly on October 5, 1976. He had complained of chest pain and had gone to see the doctor that morning. The
doctors assured him that there was nothing wrong. A few minutes after leaving the hospital, alone in the back seat of his car, he had a massive heart attack and passed away.

A man of Bhatnagar’s calibre needs no epitaph. Here was a simple man, large in his stature and in his love for mathematics in all its forms. To his students, he was a true guru. His was a life of simple honesty, high ideals and high thinking. May my country see more people like him.


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