$$\gamma = t_\rho \, o_{\gamma'} : Z(g) \rightarrow U(h) = C[h^*]$$

$$W(A) = N_k(A)/C_k(A) \qquad \gamma : Z(g) \rightarrow C[h^*]^{W}$$

Harish Chandra

(1923 – 1983)

$$\varphi_\alpha(g) = {}_k\int \alpha'(gk)^{-1} \, dk$$

Harish Chandra was an outstanding mathematician of his generation. He was a mathematician who transformed the peripheral topic of *'representation theory'* into a major field which became central to contemporary mathematics.

Harish was born on 11 October 1923 in Kanpur. His grandfather was a senior railroad clerk in Ajmer. He was deeply committed to give his son Chandrakishore a good education. To finance his education he resigned his post and collected the lump sum given as severance pay. Later he rejoined the railroad thereby loosing his seniority in the service hierarchy. Chandrakishore - Harish's father was admitted to the premier Thomason Engineering College in Roorkee. It was India's first Engineering College founded to train civil engineers for the department of public works. Chandrakishore eventually rose quite high and retired as the Executive Engineer of the Uttar Pradesh Irrigation Works. Harish often accompanied his father on long tours to canal sites.

Harish's mother Satyagati Seth belonged to a zamindari family. The family once gave refuge to the ill-fated Rani of Jhansi - the central figure during the Mutiny of 1957. As a token of gratitude she left behind her sword. This souvenir was highly prized as a family heirloom! Harish
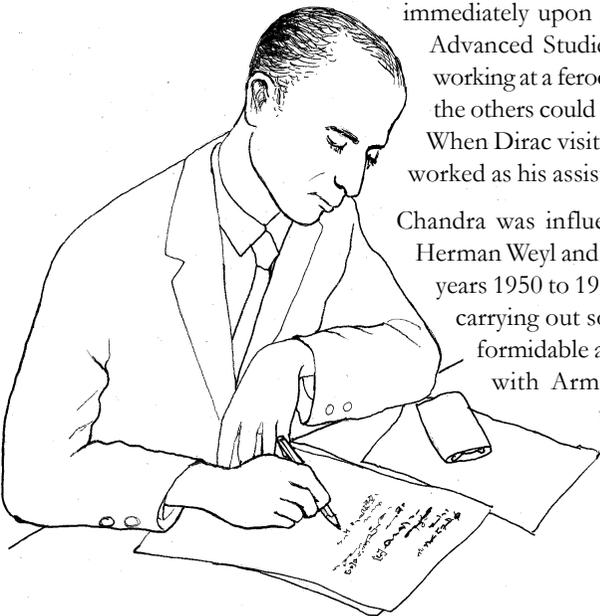
139
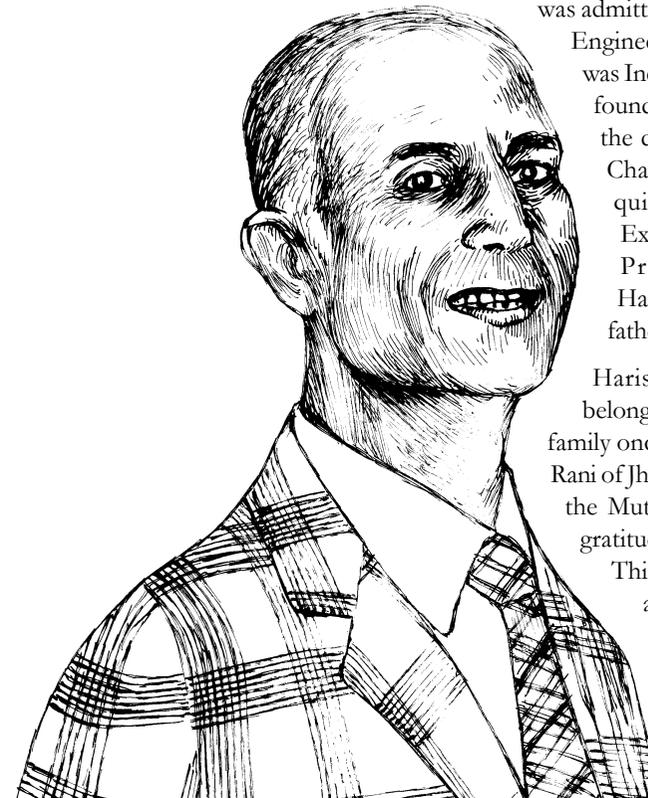
spent most of his childhood in his maternal grandfather's house. He was precocious in studies but often ill. Being timid he was endlessly teased by his classmates. Harish imbibed a life long love for classical music in his grandfather's house. Harish's elder brother Satish joined the elite Indian Civil Service and rose to become the top bureaucrat in independent India.

Chandra completed his initial education in Kanpur. As a very bright student in his MSc Physics class at Allahabad University, he solved the theory of the vibration of the *mridangam* on the spot, with Prof. C. V. Raman as the examiner and received 100% marks for it. In the Allahabad University, K. S. Krishnan, encouraged Chandra in every possible way and recommended him as a research student to Homi Bhabha at the Indian Institute of Science, Bangalore. Raman's fame was at its peak and it is no wonder that the young Chandra chose to study not mathematics but theoretical physics. Chandra's French teacher at the Allahabad University Mrs. H. Kale had become the librarian at IISc. So he stayed with her in Bangalore. Later Chandra married Lalitha - Mrs. Kale's daughter.

Bhabha recognized the genius in Chandra and sent him off to study with Dirac. In 1945, Chandra as a student of Dirac at the University of Cambridge realised his true inclination and switched over from physics to mathematics. While at Cambridge he attended Wolfgang Pauli's lectures, and during one, pointed out a mistake in Pauli's work. Thereafter the two became life-long friends. He obtained his PhD in 1947 on the *Infinite irreducible representations of the Lorentz's group* and during the same year he moved to the USA. Almost immediately upon his arrival at the Institute for Advanced Studies, Princeton, Chandra began working at a ferocious pace setting standards that the others could only admire but never emulate. When Dirac visited Princeton, Harish-Chandra worked as his assistant.

Chandra was influenced by the mathematicians Herman Weyl and Claude Chevalley. He spent 13 years 1950 to 1963, at the Columbia University carrying out some of his best research using formidable and inductive logic. He worked with Armand Borel and founded the theory of arithmetic groups. From 1968, until his death in 1983, he was IBM von Neumann Professor in the School of Mathematics at the Institute for Advanced Study, Princeton.

He was a man who kept no useless papers, and used the back sides of his manuscripts for scrap work. His lectures which usually comprised of his own course work were very sought after. These lectures gave students a feel of the way a mathematician thinks and his struggles. Chandra always thought of himself as an outsider, perhaps because he came to mathematics late. He was a great admirer of two other great outsiders, the impressionists Cezanne and Van Gogh, seeing himself in them. Chandra had himself been an enthusiastic and talented painter in his youth.

In the last years in India and England, Harish-Chandra was busy with relativistic field theory. His ideas have since found their way into several texts. Harish-Chandra's achievements as a mathematician were great. The theory he created still stands like a Gothic cathedral, heavily buttressed below but, in spite of its great weight, light and soaring in the upper reaches, coming as close to heaven as a mathematician can. He believed mathematics as a medium to mediate between man and what can only be called God. In this his task was not to bring men closer to God, but God closer to men.

Harish-Chandra was a Guggenheim Fellow in 1957-58 and a Sloan Fellow from 1961 to 1963. He was elected a Fellow of the Royal Society in 1973. He was elected Fellow of the Indian Academy of Sciences and the Indian National Science Academy in 1975 and of the National Academy of Sciences of the USA in 1981. He was an Honorary Fellow of the Tata Institute of Fundamental Research, Bombay. He was awarded honorary degrees by the Delhi University in 1973 and the Yale University in 1981. He received the Cole Prize of the American Mathematical Society in 1954 and the Srinivasa Ramanujan Medal of the Indian National Science Academy in 1974. The Indian Government honoured him by naming an institute dedicated to Theoretical Physics and Mathematics, after him, in Allahabad, India. The institute is known as Harish-Chandra Research Institute or HRI.

He died of a heart attack in 1983, during a conference in Princeton in honour of Armand Borel's 60th birthday. A similar conference in his honour, scheduled for the following year, was not to take place. He is survived by his wife, Lalitha, and his daughters Premala (Premi), and Devaki.

141