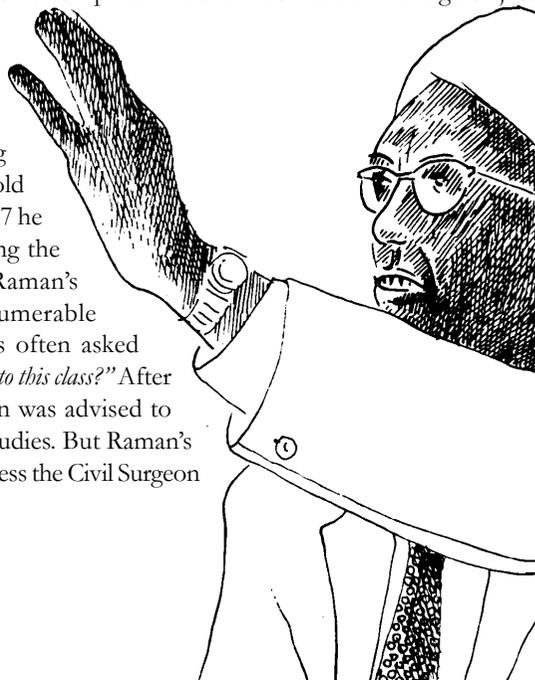


Even as science labs run amuck with funds and sophisticated gadgetry we must not forget that the most expensive and precious piece of equipment is still the human mind! No one symbolized it better than Sir C. V. Raman – the only Indian scientist to have won the Nobel Prize for scientific work done in India. The equipment he used was very rudimentary costing less than Rs 200!

This remarkable scientist was born on 7 November 1888 near Tiruchirapalli, Tamil Nadu. His father was a lecturer of physics and maths. Raman was exposed to books on a variety of subjects' right from childhood. He also imbibed from his father a love for music - on the nature of which he later did considerable research.

Raman had his early schooling in Vishakhapatnam. There being no age restriction in those days he completed matriculation at a tender age of just eleven! Raman entered Presidency College, Madras, in 1902, and in 1904 gained his BA winning the first place and the gold medal in physics. In 1907 he gained his MA obtaining the highest distinctions. Raman's small built posed innumerable problems. His teachers often asked him, "Do you really belong to this class?" After finishing college Raman was advised to go abroad for higher studies. But Raman's puny figure did not impress the Civil Surgeon



in Madras who felt that Raman would not be able to withstand the harsh English climate. Raman was eternally grateful to that surgeon for making him stay on in India!

What did Raman do after an MA in Physics? In those days there were few openings in science and Raman had no choice but to become a civil servant in the Finance Department in Calcutta!



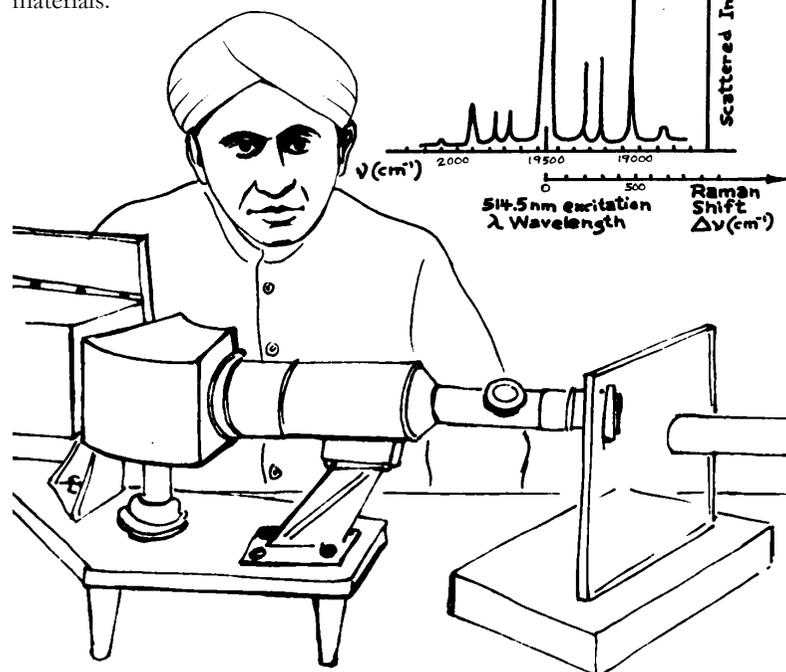
His marriage, like his whole life ahead, was full of drama. While visiting his relatives at their house, he chanced upon young Lokasundari, just 13, and was immediately attracted to her. In a revolutionary move he arranged his own marriage. Lokasundari was singing a Carnatic composition, *Rama Ni Samanam Evaro* (Rama, who is your equal?), when he first saw her!

Though he joined the Finance Department, his interest in Physics did not wane. He conducted experiments in his makeshift home laboratory. As the story goes, one evening while returning from work, he spotted the signboard *Indian Association for the Cultivation of Science IACS* at Bowbazar. Legend has it that he jumped out of a moving tram and rushed to the IACS where he was welcomed by Amritlal Sircar, whose father Mahendralal Sircar had founded this institute in 1876 to promote Indian science. Raman started working in the laboratory after office hours. Soon he started churning out high quality scientific papers which attracted the attention of experts.

In 1917, Sir Asutosh Mookerjee, the Vice-Chancellor of Calcutta University offered Raman the Taraknath Palit Chair of Physics at the University. Raman was delighted. Bidding bye-bye to balance sheets he was at last free to pursue what he loved most.

In 1921 Raman sailed abroad for a conference. This sea voyage had momentous consequences for physics. He was fascinated by the blue waters of the ocean. Why did the sea look blue? Did the ocean reflect the blue sky? Could something else be the cause? Raman felt intuitively that it had something to do with the interaction between water and sunlight. So, while his fellow passengers played cards and bingo, Raman conducted experiments with a pocket spectrometer and churned out a paper on the scattering of light in different mediums.

After returning to India Raman started serious research on this subject. He passed light beams through a variety of liquids and studied their effects. Finally in 1928, he established that when monochromatic (single colour) light was passed through a liquid; the light quanta and the liquid molecules interact and scatter the light. The emergent light is found to be of a different colour from the original beam. It is shifted to both higher and lower levels of energy, relative to the incident light. This is the famous *Raman Effect* which later won him the Nobel Prize. The discovery had a catalytic effect on research world-wide. It became a powerful tool to study the structures of different materials.



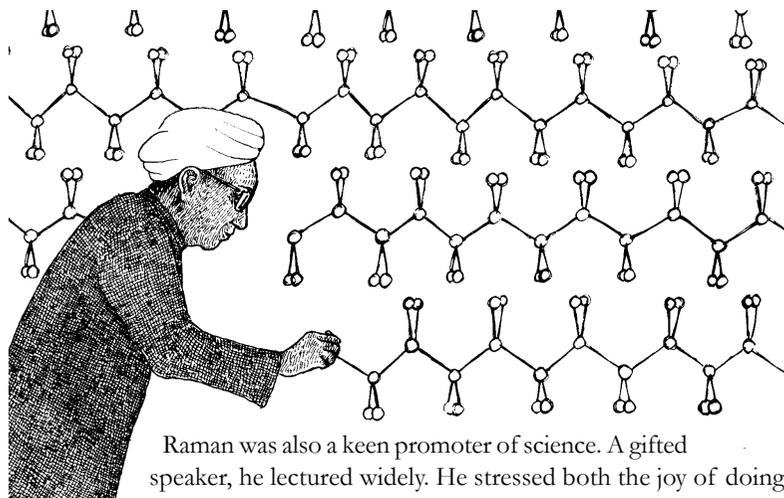
Recognition was not far in coming. Sir Ernest Rutherford announced the discovery of the *Raman Effect* in the Royal Society and the British government conferred a Knighthood. On 10 December 1930 came the highest award, the Nobel Prize. Raman was the first Asian and first non-white to get a Nobel Prize in science. Before him Rabindra Nath Tagore had received the Nobel Prize for Literature. Raman's nephew Subrahmanyan Chandrasekhar was later to win the Nobel Prize in 1983.

Subjugated by centuries of foreign rule this international honour enormously boosted the self-esteem of the Indian science community. For an Indian scientist, working entirely in India, to achieve the world's highest honour was indeed creditable.

In July 1933 Raman was appointed the first Indian Director of the Tata Institute of Science the forerunner of the Indian Institute of Science in Bangalore. During the next fifteen years that Raman spent at the Institute, he did much to set up and



develop the physics department into one of international repute. He inspired and trained a generation of world-class scientists. He initiated research on diffraction of X-rays, and on his favourite topic, the interaction between light and matter, both solid and liquid.



Raman was also a keen promoter of science. A gifted speaker, he lectured widely. He stressed both the joy of doing science and its key role in uplifting society. Sprinkled with good humour, his talks were simple yet profound. During his popular science lectures (or *performances* as he called them) Raman held his audience spellbound. His lectures were accompanied by lively demonstrations. His lecture on *Why the sky is blue?* is a veritable primer in communicating the scientific spirit and its method. Science is presented not as dry facts or formulas to be learnt by rote, but by way of step-by-step questioning. And by methodical reasoning, the working of nature is explained.

He was a founder member of the Indian National Science Academy (INSA).

Raman worked on the acoustics of musical instruments. He worked out the theory of transverse vibration of bowed strings, on the basis of superposition velocities. He was the first to investigate the harmonic nature of the sound of Indian drums such as the *tabla* and the *mridangam*.



He started a company called the Travancore Chemical and Manufacturing Co. Ltd. in 1943.

Before his retirement in 1948 Raman built up a research institute of his own, the Raman Research Institute in Bangalore. A notable feature of this institute was that it was funded entirely by private donations. He continued his research and exposition of science till 1970. On 2nd October 1970, he gave the customary Mahatma Gandhi Memorial lecture at the Raman Institute. Soon after he fell ill and on 21 November he passed away.

