

**Chandrasekhara Venkata Raman** was born in Tiruchirappalli, Southern India on November 7, 1888. His father, Chandrasekaran Ramanathan Iyer was a lecturer in Mathematics and Physics, his mother Parvathi Ammal, he completed his secondary and higher secondary education from St Aloysius' Anglo-Indian High School at the ages of 11 and 13, respectively. He passed his B.A. examination in 1904 from Presidency College, Madras winning the gold medal in physics. In 1907 he gained his M.A. degree, obtaining the highest distinctions. His first research paper, on diffraction of light, was published in 1906 while still a graduate student. He was 19, when he joined the Indian Finance Service in Kolkata as Assistant Accountant General. There he became acquainted with the Indian Association for the Cultivation of Science (IACS), the first research institute in India. IACS allowed him to do independent research and where he made his major contributions in acoustics and optics. In 1917, he was appointed as the first Palit Professor of Physics by Ashutosh Mukherjee at the Rajabazar Science College under the University of Calcutta.

### **RAMAN EFFECT**

In 1921, C.V. Raman was on a trip to Europe when he noticed the striking blue colour of some icebergs and the Mediterranean Sea. He was inspired to want to understand the reason behind the phenomenon.

The Raman Effect is the process of scattering of light particles by molecules of a medium. The scattering occurs due to a change in the wavelength of light as it enters the medium. When a beam of light travels through a dust-free, transparent chemical, a small fraction of the light emerges in directions other than where it should.

Light consists of particles called photons, whose energy is directly proportional to the frequency with which they travel. When they strike molecules in a medium at high speeds, they bounce back and scatter in different directions depending on the angle with which they hit the molecules. Most of these scatterings are elastic — the photons retain their energy and are deflected with the same speed as they were traveling with.

However, once in a while, the molecules of the medium light passes through absorb or give energy to photons that strike them. The light particles then bounce with decreased or increased energy, and thus, frequency. When frequency shifts, so does wavelength. This

means that light refracted from a body, like the Mediterranean Sea or an iceberg, can appear to be of a different colour.

## **SCIENCE DAY**

India celebrates National Science Day on 28 February every year in honour of physicist C.V. Raman's discovery of the Raman Effect, which gave Asia its first Nobel in the Sciences in 1930.

Raman and his student-collaborator K.S. Krishnan made the discovery of the phenomenon in 1928. But Raman's Nobel win came two years later. It was the first Nobel in Physics for a non-white person, and for an Indian scientist.

Raman moved to the Indian Institute of Science in Bangalore in 1933 to become its first Indian Director. There he founded the Indian Academy of Sciences the same year. He established the Raman Research Institute in 1948 where he worked to his last days. In 1954, the Government of India honoured him with the first Bharat Ratna, its highest civilian award. He later smashed the medallion in protest against Prime Minister Jawaharlal Nehru's policies on scientific research.

One of Raman's interests was understanding the physics of musical sounds. He was inspired by Helmholtz's *The Sensations of Tone*, the book he came across when he joined IACS. He studied and published his findings quite prolifically between 1916 and 1921.

Raman also studied the uniqueness of Indian drums. His analyses of the harmonic nature of the sound of tabla and mridangam were the first scientific studies on Indian percussion.