

PROFESSOR SIR CHANDRASEKHARA VENKATA RAMAN, N.L.
FOUNDER-PRESIDENT OF THE INDIAN ACADEMY OF SCIENCES AND
FOUNDER-DIRECTOR OF THE RAMAN RESEARCH INSTITUTE, BANGALORE—
THE YEARS PRECEDING THE DISCOVERY OF THE RAMAN EFFECT

K. R. RAMANATHAN

Physical Research Laboratory, Ahmedabad-9

CHANDRASEKHARA VENKATA RAMAN was born on 7 November 1888, at Tiruchirapalli, an important South Indian city on the banks of the river Kaveri. His father, Sree Chandrasekhar Iyer, was a teacher in a local High School. A few years after Raman's birth, Chandrasekhar Iyer accepted a post of Lecturer in Mathematics and Physics in the Hindu College at the sea-coast town of Visakhapatnam (Waltair). He was greatly interested in music and could play like a professional on many musical instruments. Raman's mother came from a family of Sanskrit scholars. Music, Light and Colour in Nature, rivers, seas, skies, mountains, forests and flowers had a fascination for Raman from his early childhood. Till the last day of his dedicated life, this wide-eyed gifted Child of Nature looked with penetrating eyes at different manifestations of Nature and laboured unceasingly to probe into their inner workings. His success in unravelling some of Nature's deeper secrets, and communicating some of his own enthusiasm for science to young people of all ages, both scholars and laymen, was outstandingly great.

At a lecture delivered at Bangalore on 16 March 1928, Professor C. V. Raman announced the discovery made in the laboratories of the Indian Association for the Cultivation of Science, Calcutta, of the appearance of new radiations in the light scattered from several kinds of substances and briefly discussed the importance of the discovery. The announcement received immediate world-wide attention. Intense work followed, and a few months later, in July 1928, Prof. Raman and Krishnan communicated a short paper of less than 12 pages to the *Proceedings of the Royal Society*, in which they summarised the knowledge gained in the first few months after the discovery. For the great significance of the results and beauty of presentation, the paper is a classic in scientific writing.

The paper starts off in the following way :

"In two preliminary papers, we have recorded the discovery that when monochroma-

tic light is scattered by a transparent medium (be it gas, vapour, liquid, amorphous solid or crystal), the diffused radiation ceases to be monochromatic, and several new lines or sometimes bands (associated in many cases with a continuous spectrum) appeared in the spectrograms of the diffused radiation. Further, the radiations are, in general, strongly polarised.

Our preliminary studies have proved conclusively that the effect arises in the following way. The incident quantum of radiation is either scattered as a whole, in which case we have the classical scattering, or else is absorbed in part by the molecules of the medium, the remaining part appearing as a scattered quantum. The part absorbed shifts the molecules to a level of energy different from the initial state. Our experiments furnish definite proof of the possibility of such processes, and show that they may occur also in such complicated systems as the molecules of a vapour or a liquid or even a complete crystal."

In the course of the paper, the authors point out that the differences between the incident and scattered frequencies correspond to characteristic infra-red frequencies of the molecules and that several molecular frequencies, hitherto unknown, appear in these differences.

Three years later, in December 1930, when awarding the Hughes Medal of the Royal Society to Sir C. V. Raman, Lord Rutherford said as follows :

"Sir Venkata Raman is one of the leading authorities in Optics, in particular on the phenomenon of the scattering of light. In this connection, about three years ago, he discovered that the light's colour could be changed by scattering. This had been predicted sometime before, but in spite of search, the change had not been found. "The Raman Effect" must rank among the best three or four discoveries in Experimental Physics in the last decade. It has proved and will prove, an instrument of great power in the study of the theory of solids. In addition to important contributions in many fields of knowledge, he has developed an active school of research in Physical Science in the University of Calcutta."