

C.V. RAMAN



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An Eventful Life

The great scientist of his times, Sir Chandrashekhara Venkata Raman, (November 7, 1888 - November 21, 1970) was an Indian physicist, who was awarded the 1930 Nobel Prize in Physics for his work on the scattering of light and his discovery of a unique form of scattering known as Raman scattering or the Raman effect. This effect is useful for analysing the compositions of solids, liquids, and gases. It can also be used to monitor manufacturing processes and to diagnose diseases.

Family Background

C. V. Raman was born on November 7, 1888, in Tiruchirapalli, Tamil Nadu to a Tamil Brahmin family. Raman's ancestors were agriculturists, established near Porasakudi Village and Mangudi in the Tanjore district. His father, Chandrashekharan Iyer, studied in a school in Kumbakonam and passed the Matriculation examination in 1881. Eventually, in 1891, he got a Bachelors of Arts degree in physics at the Society of the Promotion of the Gospel College in Tiruchirapalli. Chandrashekharan became lecturer in the same college. After passing the Matriculation Exam, he got married to Parvathi Ammal, and they had eight children — five sons and three daughters. On November 7, 1888, their second child, Raman, was born in his maternal grandfather's house in Tiruvanaikkaval.

Raman's elder brother, the first child, was C. Subramanian (better known as C. S. Iyer). C. S. Iyer grew up to become world famous as an extraordinary astrophysicist, and was the Morton D. Hull Distinguished Service Professor in the University of Chicago, and was also a Nobel Laureate.

Schooling

When Raman was four years old, his father, Chandrashekharan, moved to Vishakhapatnam to take up a post as a lecturer in the Mrs. A. V. Narasimha Rao College. There he taught physics, mathematics, and physical geography. Chandrashekharan was considered strong, both physically and mentally, as he was greatly involved in sports, physical culture, and Indian Carnatic music, among other activities.

Unlike his father, Raman was not physically strong; however, Raman had intellectually brilliant. He excelled in studies, and showed early signs of unusual talent by winning accolades from his teachers, and earning many prizes and scholarships.

Raman became interested in physics while still in school. He once built a dynamo by himself, and had deep curiosity to the workings of physical concepts and devices.

College Education

C. V. Raman finished school at an incredibly young age of eleven, by passing the Matriculation Examination with first rank (top marks). He then joined the A. V. N. College to study for the Intermediate. He again earned accolades, and finished with top marks in the university examination. In 1903, he left for Chennai (then Madras) with a scholarship to study for the BA degree in the Presidency College, where he was the youngest. The Presidency College was the best college in Southern India at that time. Most of the professors at the time Raman went to college were Europeans. Here, Raman's interest in physics became even more focused, and he also developed a great liking for English.

Middle Years

In 1904, Raman passed the BA examinations with first rank in the university, and won gold medals in English and Physics.

Raman's teachers advised him to go to England for further studies, but the Civil Surgeon of Madras ruled it out, claiming that the young Raman was too frail to withstand the England climate. Instead Raman did his MA in Presidency College to study Physics (he went to abroad only when he was thirty-three). With the professor of Physics at that time, R. Llewellyn Jones, Raman said he "enjoyed a measure of academic freedom which seems almost incredible. To mention only one detail, during the whole of my two years' work for the MA degree, I remember attending only one lecture..."

Pictures of Raman, his father Chandrashekharan, and Professor Jones hang at the entrance of the lecture hall of the Physics Department of Presidency College. In 1939, the Indian Academy of Sciences brought out a commemorative volume on Raman's fiftieth birthday.

First Paper

With the great freedom Raman found with Professor Jones, he productively used the time, designing and developing experiments to answer the boundless questions he had in Physics. Only the fundamental lab instruments were found at the Physics lab at the time (only enough for class work), but Raman made use of just these. Raman's questions were often those whose answers were not found in the published literature. Thus, the essence of research came instinctively to him, and this aura was enough to push him to conduct experiments throughout his life.

While Raman was well aware of light in a wave form, and the concept of diffraction, he experimented with asymmetric diffraction of light. He compiled his findings on this experiment, and gave it to Professor Jones for comments. However, Professor Jones offered no opinion for several months. Around that time, Raman was aware of a Philosophical Magazine, perhaps those subscribed by the Connemara Public Library about five km away from Presidency College (it is not certain how Raman came to know of this magazine). Then, taking his first step towards publications, Raman sent his paper on asymmetric diffraction to the Philosophical Magazine in London, under the title "Unsymmetrical diffraction bands due to a rectangular aperture."

This paper was published in 1906 — Raman, only 18 and not yet out of college, was the sole author with no acknowledgements. Raman's achievement was even more astounding because Presidency College was not a research college, and Raman's paper was the first to come out of that institution.

Almost immediately after Raman's first publication, the famous R. W. Wood of Johns Hopkins University published another. Wood later sent a cable to *Nature*, exclaiming the discovery of the Raman Effect.

Books that Influenced Raman

Chandrashekhara Venkata Raman found several books he came across in his college career very useful and often eye-opening. Of the books that influenced him, he writes, "I finished my school and college career and my university examinations at the age of eighteen. In this short span of years, had been compressed the study of four languages and of a great variety of diverse subjects, in several cases up to the highest university standards. A list of all the volumes I had to study would be of terrifying length. Did these books influence me? Yes, in the narrow sense of making me tolerably familiar with subjects so diverse as Ancient Greek and Roman History, Theory and Public Finance, the late Sanskrit writers and minor English authors, to say nothing of Physiography, Chemistry and a dozen branches of Pure and Applied Mathematics, and of Experimental and Theoretical Physics. But out of this welter of subjects and books, can I pick out anything really to mould my mental and spiritual outlook and determine my chosen path in life? Yes, I can and I shall mention three books. ... The Light of Asia. I remember being powerfully moved by the story of Siddhartha's great renunciation, of his search for truth and of his final enlightenment. This was at a time when I was young enough to be impressionable, and this reading of the book fixed firmly in my mind the idea that this capacity for renunciation in the pursuit of exalted aims is the very essence of human greatness."

About books on science, Raman says, "The next set of books that I have to mention is one of the most remarkable works of all time namely, The Elements of Euclid. ... The pages of Euclid are like the opening bars of the music of the grand opera of Nature's

great drama. So to say, they lift the veil and show to our vision a glimpse of the vast world of natural knowledge awaiting study."

Raman had an innate sense of love for music and he was also influenced by the works of the great Helmholtz.

Raman said about this third of the three books of great influence on him, "It was my great good fortune, while I was still a student at college, to have possessed a copy of an English translation of his great work *The Sensations of Tone*... It can be said without exaggeration that it profoundly influenced my intellectual outlook. For the first time, I understood from its perusal what scientific research really meant and how it could be undertaken. I also gathered from it a variety of problems for research which were later to occupy my attention and keep me busy for many years."

Career

Raman took and passed his Masters examination in January 1907, again, with top marks and several accolades and prizes. While he wanted to focus on science (particularly research) opportunities for research in India (specifically for Indians) were zero. His possibility of going to England was out-ruled due to his weak health at the time. Therefore, Raman's eyes looked to work in Government service, as it is known to be safe, secure, and even prestigious. Even in this case, he wanted to join the esteemed Indian Civil Service (ICS), which was the highest position in Government service, but this required studying in England and also appearing for the examination there — this choice was also ruled out for medical reasons. His next choice was the Financial Civil Service (FCS), where Raman's brother C. S. Iyer was already a member. The FCS was the forerunner of the Indian Audit and Accounts Service of today. Author G. Venkataraman states in his book *Journey Into Light*, "Recruitment to it was by an all-India competitive examination, but even to appear for this examination one had to first go through an interview." Raman was screened, and as usual, stood first in the written examination, though he had to study some unfamiliar subjects like history and economics. Later, Raman's other brother, Mr. Ramaswamy, confided, "After returning from the screening interview Raman said, 'I took one look at all the candidates who had assembled, and I knew I was

going to stand first'." This instance shows the early formation of what was well known as the Raman Ego!

Marriage

Raman passed the FCS examination in 1907, and before having an official position, married Lokasundari. This part of his life happened in a very untraditional manner. Usually, Indian marriages are arranged by parents — this comprised of finding a proper horoscope match for their child. This included analysing the star positions on their birth date, and other horoscopic figures. Following this is a visit by the boy and his parents to the girl's house, to check to see if they like her — during this time, the girl usually is asked to give a musical presentation. Provided these arrangements have been in agreement and the girl's family offers enough dowry, the boy is set to marry the girl on a fixed date.

Raman's marriage took a completely different course of events. As a college student, Raman was friendly with Mr. Ramaswamy Sivan, who was a freemason, theosophist, and a man with progressive views. Raman often went to visit Mr. Sivan at his house, where one day, he heard music from an Indian Classical Instrument, veenai — it was played by Lokasundari, Sivan's sister-in-law, who came for a visit from Madurai. Lokasundari was quite talented at playing the veenai, and Raman became attracted to her immediately. At that time, as Lokasundari was of marriageable age and her family was looking for a suitable groom, Sivan discussed this idea to Raman, who instantly agreed. Raman then proceeded to get his parents' approval. But it was then found that Lokasundari, though of the same cast as Raman (Brahmin), was of a different subset — this match was, in those days, strictly forbidden. Raman's father, a very liberal-minded man, accepted the idea of Raman selecting his own bride, even one from a different subset. However, the rest of the family, including Raman's mother, were displeased. Regardless of such obstacles, however, Raman followed his heart and insisted on having his own way. In fact, he even refused to accept dowry from the girl's side.

Ramaseshan said, "The story has it that on the first occasion he saw her, she was playing on the veena the Tyagaraja keertana [composition] 'Rama ni Samanam Evaro?' [Rama, is there anyone

your equal?]. We shall never know whether it was by intent or by accident. Anyway, she insists that she still does not know if Raman married her for the extra allowance of Rs. 150 which the Finance Department gave to its married officers!"

Lokasundari came to be known as Lady Raman. In *Bhagavantam*, it was said of her, "Those who have known her ... had often said that her principal interest in life was to enable Professor Raman to carry on his scientific work with efficiency and in an uninterrupted manner ... Seldom did she permit projection in the public of her own personality as distinct from that of her husband. This aspect of hers, besides being in line with the best of Indian traditions, was so noticeable on occasions that she drew the admiration of all concerned."

Raman was given a position as Assistant Accountant-General in Calcutta in mid-1907 — he was still a teenager then. His salary was then Rs. 400, including marriage allowance. Raman and Lokasundari left for Calcutta, capital of what was then British India.

Raman made use of the diverse and scientific atmosphere of Calcutta, and was able to give full expression to his scientific creativity — Calcutta was then known as the premier city for science in the East. Apart from being posted in Calcutta, Raman was also sent to Nagpur and Rangoon; no matter the place, Raman always found ways to conduct experiments at home.

As the story goes, one evening while returning from work, he spotted the sign of the Indian Association for the Cultivation of Science. He started visiting the laboratory after office hours and did experiments, which culminated with his Nobel Prize winning work.

In 1917, Raman resigned from his government service and took up the newly created Palit Professorship in Physics at the University of Calcutta. Simultaneously, he continued doing research at the IACS, where he became the Honorary Secretary. Raman used to refer to this period as the golden era of his career. Many talented students gathered around him at the IACS and the University of Calcutta. He was president of the 16th session of the Indian Science Congress in 1929.

Raman won the 1930 Nobel Prize in Physics for his work on the scattering of light and for the discovery of the Raman effect. Raman spectroscopy is based on this phenomenon.

Raman also worked on the acoustics of musical instruments. He worked out the theory of transverse vibration of bowed strings, on the basis of superposition velocities. This does a better job in explaining bowed string vibration over Helmholtz's approach. He was also the first to investigate the harmonic nature of the sound of the Indian drums such as the *tabla* and the *mridangam*.

In 1933, Raman became the director of the newly established Indian Institute of Science (IISc) in Bangalore. The IISc was set up in 1909 with the main objective of bringing out original research and providing training in science and engineering. Up till Raman's appointment, all of IISc's directors were British and so were most of the faculty. Two years later, he continued as a Professor of Physics. In 1947, he was appointed as the first National Professor by the new government of Independent India.

He also started a company called Travancore Chemical and Manufacturing Co. Ltd. in 1943, along with Dr. Krishnamurthy. The Company during its 60 year history established four factories in Southern India.

He was knighted in 1929 and awarded the Bharat Ratna in 1954. Raman was also awarded the Lenin Peace Prize (1957).

C. V. Raman is the uncle of three world renowned Physicists Subramanyam Chandrasekhar Nobel laureate, Sivaramakrishna Chandrasekhar FRS, known for Liquid crystal research and Shivaraj Ramaseshan, former director of the Indian Institute of Science.

India celebrates National Science Day on the 28th February of every year to commemorate Raman's discovery in 1928.

Last Days and Demise

Ramaseshan S., author of *C. V. Raman – A Pictorial Biography*, noted, "Many things happened [during the last decade of Raman's life and] time in his Institute and in the country which affected Raman greatly. The half a dozen graduate students whom he had hand-picked to work at his Institute began to leave. By 1960 all

of them had gone and he chose not to take any more and (except for two assistants) he was almost all alone." It was at this time that Raman started to isolate himself from the world outside his institute — he built high walls on the compounds of his institute to discourage visitors. He underwent depression.

Much of Raman's emotional boil was caused by the way things were happening in the newly independent country. Ramaseshan said, "It seemed to him that scientific administrators, not believing that there was sufficient strength in the country for science to grow, looked outside more and more for inspiration. The policy seemed to be that expenditure (however indiscriminate), would automatically further the progress of science and technology. He felt that the universities, which till then identified and generated talent, were denuded and decertified by the exodus of scientists and teachers to better-paid positions in large, impersonal Government laboratories. Quantity appeared to be mistaken for quality. His attitude towards everyone — especially the Government — became one of suspicion and cynicism." An example of Raman's source of disappointment with the Government is the idea that purchase and use of elaborate, expensive equipment from outside the country would greatly help advance scientific and technological progress. This contradicted Raman's belief that even simple experiments can be conducted to find great scientific theories, as that is what even he had done in the Presidency College himself. Depicting such thoughts, a story from *Journey Into Light* goes, "... once he saw one of his students in a crest-fallen mood. Upon enquiry he learnt that (spectroscopic) experiments similar to those being performed by his student were also in progress in England at the same time and the student's worry was that whereas he had merely a 1 kW lamp his competitor abroad had a 10 kW lamp. 'Don't worry,' Raman told the student, 'put a 10 kW brain on the problem'."

He retired from the Indian Institute of Science in 1948 and a year later he established the Raman Research Institute in Bangalore Karnataka, serving as its director and remained active there until his death in 1970.

Raman gave his last Gandhi Memorial Lecture, *On the Cochlea and the Perception of Sound*, on October 2, 1970. For the first and

last time in his life, he requested the audience to allow him to sit down while answering their questions. Ramaseshan said, "At the end of October he collapsed in his laboratory, the valves of his heart having given way. He was moved to hospital and the doctors gave him four hours to life. He survived and after a few days refused to stay in the hospital as he preferred to die in the gardens of his Institute surrounded by his flowers."

Two days before Raman died, he told one of his former students, "Do not allow the journals of the Academy to die, for they are the sensitive indicators of the quality of science being done in the country and whether science is taking root in it or not." Raman then gave his vision for the future of the Institute in a letter.

"This Institute was created by me in 1948 to provide a place in which I could continue my studies in an atmosphere more conducive to pure research than that found in most scientific institutions. To me the pursuit of science has been an aesthetic and joyous experience. The Institute has been the haven where I could carry on my highly personal research. This personal character of the Institute should obviously change after me. It must blossom into a great centre of learning embracing many branches of science. Scientists from different parts of India and all over the world must be attracted to it. With its beautiful gardens, large libraries, extensive museums, I feel that the Institute offers a perfect nucleus for the growth of a centre of higher learning. Science can only flower out when there is an internal urge. It cannot thrive under external pressures. Fundamental science cannot be driven by instructional, industrial, governmental or military pressure. This is the reason why I decided as far as possible not to accept money from Government. I have bequeathed all my property to the Institute. Unfortunately, this may not be sufficient for the growth of this centre of Learning. I shall therefore not put it as a condition that no governmental

funds should be accepted by the Institute. I would however strongly urge taking only funds that have no strings attached."

That same evening, Raman met with the Board of Management of his Institute and discussed (from his bed) with them any proceedings with regards to the Institute's management. Raman passed away from natural causes early next morning, November 21, 1970.

Raman and his Scientific Achievements

Raman Scattering

Raman scattering or the Raman effect is the inelastic scattering of a photon.

When light is scattered from an atom or molecule, most photons are elastically scattered (Rayleigh scattering). The scattered photons have the same energy (frequency) and, therefore, wavelength, as the incident photons. However, a small fraction of scattered light (approximately one in ten million photons) is scattered from excitations with optical frequencies different from, and usually lower than, the frequency of the incident photons. In a gas, Raman scattering can occur with a change in vibrational, rotational, or electronic energy of a molecule. Chemists are concerned primarily with the vibrational Raman effect.

In 1922, Raman published his work on the "Molecular Diffraction of Light," the first of a series of investigations with his collaborators which ultimately led to his discovery (on February 28, 1928) of the radiation effect which bears his name. The Raman effect was first reported by C. V. Raman and K. S. Krishnan, and independently by Grigory Landsberg and Leonid Mandelstam, in 1928. Raman received the Nobel Prize in 1930 for his work on the scattering of light. In 1998 the Raman Effect was designated an ACS National Historical Chemical Landmark in recognition of its significance as a tool for analysing the composition of liquids, gases, and solids.

The Raman Effect differs from the process of fluorescence. For the latter, the incident light is completely absorbed and the system

is transferred to an energetically excited state, from which it can go to various lower states only after a certain period (resonance lifetime). The result of both processes is essentially the same: A photon with a frequency different from that of the incident photon is produced and the molecule is brought to a higher or lower energy level. But the major difference is that the Raman Effect can take place for any frequency of incident light. In contrast to the fluorescence effect, the Raman Effect is therefore not a resonant effect.

Ideology and Philosophy

Raman was a staunch nationalist, in a sense, that whatever he had achieved in life was through sheer personal efforts and indigenously prepared equipments. He was a strong propounder of self-reliance. Raman believed that the solution to India's economic problems lay in increasing agricultural and industrial production by harnessing science and the scientists on a massive scale. While addressing the Institution of Engineers in 1948, he spiritedly declared:

“There is only one solution for India's economic problems and that is science and more science. Let us not get away from that fact that the US is the wealthiest country in the world. What is the reason? There is no country in the world that has so consistently and steadily encouraged scientific studies and scientific research, which are the basis of all wealth. Wealth does not grow on the trees but is made by man – science, more science and science for all is the answer.”

Raman strongly advocated for science and scientific temper to be created within the country without aping or importing it from abroad. He deplored following of the camps or countries, in effect meant not to depend on the others. He rather preached the doctrine of indigenous manufacture and development of technology. Expressing this view in his address delivered in 1950 at Jadhavapur Engineering College, he said:

“In the past, India had shown her greatness in the fields of scholarship, philosophy and science but today

we are helplessly dependent on Western countries for the knowledge of science. India should not be a camp-follower but a leader in science. It is of no use getting our ideas from the West. We have to think out our problems and find the solutions to them."

He advocated self-reliance, which he practiced in his own activities and interests. To him, science was a personal endeavour, an aesthetic pursuit and above all a joyous experience.

Speaking once at St. Joseph's College, Bangalore, he forcefully said:

"There will be no science in India if we continue to rely on imported American and German equipment for research work. I call it paying for our ignorance and incompetence. This is a terrible problem in the country. A halo of infallibility has been built around American and German-made gadgets. Do not buy such equipment but make your own at home. Science can and shall advance in very simple ways. We often pay Rs. 50,000 for something, which can be made for only Rs. 5,000. The balance in difference we pay for our ignorance. There will be no situation and no real advance at this rate."

Raman never believed in the confinement of science within the four walls of the laboratory; but felt that everyone must enjoy the fruits of science. In the first meeting of the Academy in independent India at Cuttack, Raman called the scientists to serve the common man and fight to eradicate poverty, disease and illiteracy. Thus, it will ensure true usage of science for the humanity in general.

In 1942, at the convocation address of the Madras University, he said:

"True wealth of Nation consists not in the stored-up gold in its coffers and the banks, not in factories but in the intellectual and physical strength of its men, women and children."

In 1948, in his address to Orissa Chamber of Commerce, he said:

“Real growth of a country was in the hearts, minds, bodies and souls of young men and women of the country.”

Raman loved the youth passionately and had high hopes from them. He wished the youth to plunge daringly in the realms of science and achieve their aims in life. During a radio broadcast in 1943, he had said:

“... the principal requisite for success in science research is not the maturity of knowledge associated with age and experience but in freshness of outlook which is the natural attribute of youth.”

Thus, Raman saw bright future of India in its youth. In 1949, while speaking in Allahabad at a meeting organised by scientists to felicitate him on reaching the age of 60, he said:

“I give myself to the younger generation. I speak to them with condor. I know that my words will not fall on barren ground because there is the quality of sincerity, feeling and understanding. I am confident they will go home to the minds of the young and take root.”

Raman continuously worried about the backwardness of our universities and persistently insisted for their vitalisation. In the convocation address at Madras University in 1942, he said:

“(Indian) Universities are not strong enough to bear the burden of free India. Let us try to make our universities best. We should not be satisfied with anything less than the best. What will be the result? Instead of a great many of our young men going out of the country, they will remain here and strive to advance our reputation and that will make us strive for more good things.”

The above speaks for his foresight that is very much prevalent amongst the youth of India, who aspire to seek better opportunities

leading to the phenomenon of "Brain-Drain". After acquiring necessary education in India, youth in the name of further studies, today, go abroad never to return to serve their motherland. The youth must be brought back so as to serve the country and the onerous task of doing so, rests not only on the government or politicians shoulders, but upon every Indian also.

Citing the example of the American philanthropists, he appealed to all who afforded easily to donate for the cause of education.

He once declared that:

"Has it not been truly said that he who gives for learning will be remembered long after Kings and Emperors are forgotten. There is no greatest gift a man can make than a gift in the cause of learning."

Knowing the value of education as a force of life and culture, in 1950 at Bombay, Raman said:

"Countryside is the best laboratory you can have. It provides far better scope than big institutions costing thousands and lacs of rupees."

In 1966, at the convocation address of IIT Madras, he said:

"I have been on a joy ride through the campus and was thrilled to see the wonderful old Banyan trees, the wild grass, the thorns here and there and the occasional buildings.

Study, lectures, books and examinations contribute a small part in a man's or woman's education. The greatest teacher of all is Nature herself — the supreme artist who creates forms of beauty, loveliness and colour that have been unsurpassed since the beginning of time. She has not been the inspiration not only of artists, painters and sculptors but to a man of science too. Life is not merely a matter of getting food, clothes and shelter. Its finer aspects are to be found in music, flowers, colours and beauty, and the aesthetic sense and satisfaction that are derived from the enjoyment of all these."

In 1941, addressing the Patna University he said about the women that:

“I have a feeling that if the women of India take to science and interest themselves in the progress and the advance of science as well, they will achieve even what men have failed to do. Women have one quality — the quality of devotion. It is one of the most important passports to success in science. Let us therefore not imagine that intellect is the sole prerogative of males only in science.”

Raman was a great humanist by heart, soul and mind. He was totally against, the wars that frequently took place between nations. At the same time he condemned the use of atom bomb too. In 1941, speaking on Science and War at Patna, he said:

“Lust, greed and racial hatred are the three important causes of human conflict. He pleaded for the mutual understanding between nations and an effort to settle differences by peaceful means.”

Such was his humanistic approach. In a way his was a belief in non-violence resembling to Gandhiji's concept of non-violence. At the same time Raman was very clear that in case of aggression, a fitting reply must be given.

Raman had great liking for Gandhiji and his operational philosophy. Once speaking to the college students in Ahmedabad, Raman said:

“Gandhiji's teaching stressed the supreme virtue of the human spirit utterly indestructible and unconquerable. India can never hope to find a place in the sun, unless it upholds the value of human spirit.”

Raman remained very active in science throughout his life. The scientific investigation was his spiritual quest. In Plato's sense spiritual quest is described as Truth, Goodness and Beauty, which our ancients referred to it as Satyam, Shivam and Sundaram.

Raman did not go after rituals and institutionalised religion. He did it all according to the Bhagwad Gita. He believed in intrinsic divinity of soul and further that Nature is the manifestation of God.

In 1950, in his convocation at Utkal University, Raman said:

“What is science in the last analysis but the study and love of Nature displayed not in the form of abstract worship but in practical form of seeking to understand Nature? The more I pursue science, the more I am impressed with the infinite loveliness and wonders of the world. I have often gone to give an expression to this. Whenever I was asked whether I believed in God. I tell you, if there is God. He is in this world before us.”

In 1955, while speaking at a Bhoodan function, Raman said:

“God lives in us. See God in your own soul and heart. The human soul is the repository of the Divine. Never shall we lay aside that feeling of devotion, which has been India's standard through the ages.”

Raman found a great resemblance between Science and Indian Philosophy. In this context, he added:

“One aspect of Indian culture was its profound understanding of Nature. Much of India's philosophy is related itself to the understanding of the rationale and the meaning of Nature.”