

the presence, besides the lines of mercury, also of other lines the positions of which varied with the substances under study. Amongst the numerous materials thus examined was a large block of clear ice. This showed sharp displaced lines in the spectrum of the scattered light in approximately same positions as the rather diffuse bands observed with pure water. Within a few days of the discovery, photographic spectra were successfully recorded in which the additional lines showed up very clearly."

Today, intense sources of radiation and powerful spectrographs are available for Raman studies. Techniques have been greatly improved and automatic recording devices pressed into service. The discovery of Laser action and Laser sources has introduced a new dimen-

sion to the phenomenon. The Raman spectrum of a new substance has now come to be regarded as its signature and is invariably studied.

It is of particular significance that the equipment which Professor Raman employed consisted of three items, namely, a mercury lamp, a flask of benzene and a direct vision spectroscope, all of which would be regarded as crude instruments at the present time. Even at that time, these would by no means qualify for being classed as sophisticated or expensive items. On the contrary, they were available to many physicists all the world over in every laboratory worth its name. Great discoveries always appear incredibly simple, but alas only after some devoted individual has made the discovery.

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### PROFESSOR RAMAN, "THE SCIENTIST-SAVANT" I ADMIRE

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**W**HO can write a near complete appreciation of our most colourful and dynamic personality of the community of scientists of modern India? Who, indeed, could dare attempt to fathom the intellectual brilliance of a unique personality India lost on that fateful day, November 21, 1970? To many, he was just Sir C. V. Raman, a venerable figure full of honours and the tallest among Indian scientists of this century, but to some of us who were admitted into his 'inner court' he was THE PROFESSOR which conveyed everything that the title signified. Whether we belong to diverse discipline of biology, physics, mathematics or the earth sciences, he was our guiding star and we looked upon him not only as a Nobel Laureate in Physics but also as a sole representative of a fast dwindling group of scientists who could be called Naturalist-Philosophers. For, who could have the courage to enter into fields like the Physiology of Vision or Floral Pigments (he coined a word 'Florachrome') or the colour of the sky or the oceans and make significant contributions?

Ever since he built his own Institute, Professor Raman's wide interests in science became more apparent than ever. His collections of natural objects ranged from colourful minerals to diamonds, rubies and sapphires; every type of musical instrument from the

mridangam to the violin; from birds, beetles and butterflies to the finest collection of roses, bougainvilleas and jacarandas; stately trees from the common eucalyptus to the rare mahogany—indeed, he was literally surrounded by a fantastic array of biological materials. I can never forget the way he laid two similarly dressed ores of copper and gold in the palms of the late Prime Minister Pandit Jawaharlal Nehru when he visited his Institute and switched on the ultra-violet light and asked the Prime Minister as to which was copper and which gold. The brighter piece under the ultra-violet light was promptly named gold by the Prime Minister and Professor Raman in his inimitable way burst out: "Mister Prime Minister, all that glitters is not gold."

Professor Raman had some very definite views on fundamental research as Society's soundest investment for the future. He, nevertheless, conceded that while technological innovations had their own marketplace importance, the future of science unquestionably demanded a high place for fundamental research and the scientific community would have to understand the rationale of it all and make science play a positive role in our society than ever before. While he did not deprecate the interdisciplinary approach in many new fields of specialization, Professor Raman made no

apologies about the awkwardness of groups of investigators sniffing around another's field of research for which they did not have the necessary training or competence.

In recent years, the Professor was much concerned with the rather poor quality of a good proportion of scientific papers that were submitted to Indian journals for publication. Despite this, he would promptly intercept any discussion at meetings on the need for tightening our systems of refereeing and declare: "Each man stands or falls by his own scientific writings." There can be little doubt that men of science in India owe a deep debt of gratitude to Professor Raman for his farsight in establishing the *Proceedings of the Indian Academy of Sciences* and the *Current Science* which have given generations of young men an excellent medium for projecting their scientific data. These organizations by themselves could make exacting demands on a scientist's time, but Professor Raman viewed it differently as his life's mission and a gift to the nation. Indeed, no sacrifice in the cause of science was too much for him: he gave his all to science.

Intensely national, on many occasions in recent years, Professor Raman had said in no unmistakable terms of his abiding and abundant faith in the young scientists of this country and this made him feel not so desperate as others when they took a dim view of the depletion of bright young scientific personnel through the much-publicized "brain drain". On the occasion of opening of a laboratory, Professor Raman asked in a cryptic way: "Where are the brains to put into this magnificent building; remember, Radium was discovered in a tin-shed!" The proper attitude to science

and scientific research was to him more important than major achievements which is given to the lot of very few men of science even in the most advanced countries.

I would like to end with a personal note. Looking back on my long association with this great savant, I can understand the big void the passing away of Professor Raman has created in Indian Science. He was one of those rare courageous men who would call 'a spade a spade'. He would suffer no fools. I am reminded of a memorable occasion when many spoke at a special function got up to honour Professor Raman on his 80th birthday at one of the Annual Sessions of the Academy at Ahmedabad. When the last speaker had finished, Professor Raman appreciated the many warm sentiments expressed but pointed out, with a twinkle in his eyes, to the singular absence of any reference to one quality he proudly cherished: "I wish someone had said that I had the heart of a lion!" In fact, what I admired in him most was his simplicity and high thinking, indomitable in defeat and insatiable in victory.

We shall miss him at the Annual Sessions of the Indian Academy of Sciences and his brilliant Presidential Addressés and scintillating after-dinner speeches, we shall miss him at the Council Meetings of the Academy held in his Institute under charming wooded surroundings, we shall miss him when we are in need of encouraging advice and wise counsel and we shall miss him most when a bold and authoritative voice would be needed to silence dilettantish attempts at introducing new science policies in our country in future.

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## PROFESSOR RAMAN'S GIFT TO OUR NATION

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**I**N recent years, increased emphasis has been laid on the need for changing the writing of history. It should not be simply a record of kings' reigns and wars and revolutions but should deal with more subtle and important factors that affect society and culture. In the evolution of the new complexion, historians of the right type should rise and be able to cope with the newer and ever-increasing demand on their ability and capacity to deal with factors

that build up the mind and spirit of a nation. In this respect, Prof. Raman's life and work should be considered to be of great value for the progress of modern India.

The progress of a developing nation is somewhat akin to a man running uphill. This effort requires strength and experience. For the nation these are provided by institutions and traditions. The former represent the long shadows of great personalities who built them