S Pancharatnam was born in Calcutta in 1934. His mother, Sitalaxmi, was the sister of C V Raman and his father, Sivaramakrishnan, worked in the Indian Accounts Service and was hence transferred to different parts of the country. He was the last of five brothers. Two of them, Ramaseshan and Chandrasekhar, before him, did their basic honours degree from the Science College, Nagpur and went on to doctoral work with C V Raman. They were both distinguished in their later careers. Ramaseshan worked in areas of optics, crystallography and materials science. Chandrasekhar is best known for his work on liquid crystals, in which he is recognised as a worldwide pioneer, building up a strong group at the Raman Research Institute, Bangalore, and writing an early, influential monograph. We reproduce a photograph of the three physicist brothers.

When Pancharatnam was a research student, there was a long period during which he stayed with his older brother Ramaseshan, a physicist at IISc, Bangalore. C V Raman joked that he had all the advantages of a married man with none of the disadvantages! Kausalya Ramaseshan, Pancharatnam’s sister-in-law, recounts an amusing but revealing incident from the RRI days. It shows the high esteem in which the then Prime Minister held science and Prof. Raman, and also the high regard Raman had for his student (it was said that he was fond of his students ‘to a fault’, but in this case he was justified!). And finally, one sees the mood of immediate post-independence India.

We give here two first hand accounts of Pancharatnam after he left the Raman Institute. The first is a glimpse of Pancharatnam as a teacher, through the eyes of an MSc student at Mysore, N V Madhusudana, who later went on to a distinguished career in the field of liquid crystals. It was in Mysore that Pancharatnam met and married Prema – a picture of the young couple in Oxford is given.

The second is by G W Series who headed a major laboratory at Oxford in the field of resonant interaction of light and matter, which exploded in the 1960’s. He was host to Pancharatnam in the period 1965–69. Series wrote a moving foreword to the Collected works of S. Pancharatnam, which brings out both the human side of Pancharatnam and the scientific achievement and promise, going well beyond the phase for which he is now best known.

Rajaram Nityananda
Bangalore

It was lunch time and Panchan (the family nickname for Pancharatnam) and I were waiting for my husband. He came with his right hand stretched and told us that he does not want to wash his hand as Pandit Jawaharlal Nehru had just shaken it. Pandit Nehru had visited the Indian Institute of Science and my husband (S Ramaseshan, Pancharatnam’s older brother) had taken him around the Department of Physics.

Then there was a smile on Panchan’s face and he said “then maybe I should not have a bath, for Nehru had embraced me this morning”. We were all so surprised. Then Panchan said, “Well, I was reading some book in the library in RRI when I realized that someone was standing next to me. I looked up and much to my surprise it was Pandit Jawaharlal Nehru. I stood up in surprise”. He smiled and hugged me and said “Carry on, young man”. I was so confused. Then he heard Prof. Raman saying “leave him alone, let’s go to see my minerals” and took him to show his collection of crystals and minerals.

Later on, Mr. Padmanabhan (Raman’s devoted assistant at RRI for more than two decades, who looked after his museum), gave us an account of the incident. Prof. and Mrs. Raman along with Mr. Padmanabhan were waiting for the Prime Minister. When he arrived, Raman asked him “Why do you want to visit me?” and Pandit Nehru said “No Raman, don’t get angry with me. I want to see your institute that’s all”. Then Raman said “All right – I will show you the museum where my collection of minerals is kept”. As they went upstairs, Raman saw Panchan in the library and said “Jawahar, see that young man. He is my brightest student and who knows he may get a Nobel Prize for our country”. Immediately Pandit Nehru went into the library, stood near Panchan for sometime and then hugged him!

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Pancharatnam with his brothers,
S Ramaseshan and S Chandrasekhar
Mysore

I joined the course a little late during the year and the classes had already started sometime earlier. The seniors (six in number) and juniors (seven in number) were clubbed together during the lecture time as there was only one classroom. It was quite an unusual experience on the first day to start it with a prayer – a few slokas from the Bhagavad Gita – following a tradition started by the first batch of students two years earlier. Shortly after the prayer was over, a young man with a pleasant face and khaddar dress walked in and recognizing a new face asked me my name and advised me to catch up with the portions that I had missed by looking into the notes of my classmates. Pancharatnam was giving his course on classical mechanics. He started discussing some aspects of the mechanics of a rigid rotator in the form of a general triaxial ellipsoid. The lecture was delivered in a measured tone and illustrated with relatively neat diagrams drawn on the board. It lasted for two hours, at the end of which he took out a small piece of paper from his shirt pocket in which he had apparently noted the main points he intended to cover in that class. Having satisfied himself that he had indeed done so, he asked if there were any questions. There was none and he returned to his room, or rather to his desk in a room which he shared with other staff members.

As others had done before me, I quickly realized that Pancharatnam was indeed a unique person. He was rather serious about whatever he did. As a teacher of the theoretical physics course, he would start from simple physical arguments and develop the subject in a meticulous fashion. After the course on classical mechanics, he moved on to optics. He obviously enjoyed lecturing about this topic in which he had made many significant contributions. Electromagnetic theory, interference, diffraction, crystal optics – the subject was developed in great detail and with much gusto. I remember particularly the Poincaré sphere representation of the polarization of light, which was not described in the normal textbooks on optics.

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Oxford

Pancharatnam was a scholar for whom to understand nature was more important than to exploit it. But he was more than a scholar: he was a man of deep sensitivity and compassion. His sensitivity was apparent to those who knew him, but the extent and manifestations of his compassion were known only to a few.

A foreword to a volume of scientific papers is not the place for a lengthy biography, but those who read these papers may have a desire to know something about the man who wrote them. Out of affection for him, and in gratitude for five years of scientific collaboration, I have undertaken to write these notes with the help of his wife and members of his family in India.

He was a young man—only 35 years old—when he died in Oxford on 28 May 1969. At that time he was a Research Fellow of St. Catherine’s College, a position he had held since 1964. He had some teaching duties in the College, but his research was carried out in the Clarendon Laboratory. A substantial part of the last two years of his life was spent in hospital where he worked on the manuscripts of the three papers which conclude this volume—papers published posthumously in Proceedings of the Royal Society. The first two of those three papers (on magnetic resonance) were intended, as it appears from notes which he left, to form part of a substantial monograph on optical pumping. They represent the atomic physics and magnetic resonance part. The remainder of the article was to have dealt with the propagation of light in the optically-pumped vapour, a topic which is represented here by the three papers immediately preceding the Royal Society publications. In particular, paper 20, delivered at the OPALS conference in Warsaw in 1968, comes closest to the incomplete notes which were evidently to have formed part of the monograph.

No apprenticeship could have been more fittingly devised for the writing of such a monograph than the years of Pancharatnam’s research activity. While the later publications record his contributions to the atomic physics of optical pumping, his earlier work on the propagation of light in crystals, represented by the earlier publications, had equipped him quite exceptionally with the tools for the description and analysis of the complementary optical phenomena. We, as scientists, are the poorer in that his premature death has deprived us of a manuscript which would have formed part of the enduring literature on optical pumping. Publication of this volume of his collected works will at least bring into juxtaposition the several threads that were to have been woven together.

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The work on the optics of crystals, published between 1954 and 1963 in the Proceedings of the Indian Academy of Sciences, was carried out with the encouragement of C. V. Raman, the Nobel Laureate, in the Research Institute which the latter had established some years earlier at Bangalore. It was a chance meeting with Raman which brought Pancharatnam to Bangalore, though he had already decided, at the conclusion of a brilliant undergraduate career at Nagpur University, that he would take up research in physics.

It was not only in physics that Pancharatnam had distinguished himself as a student: his concern for humanity first emerged during this period. The social and political consciousness which developed in him at that time found expression in his forceful writings as editor of the college magazine. Commenting on a news report of a graduate who had taken to the profession of rickshaw-pulling, he wrote 'It is bitter to face the fact that into a similar lot will more and more graduates, in future, be thrown. But it is far more bitter to swallow the fact that, in a sense, this is as it should be. To say this is not to be callous; it is to venture the distasteful and controversial assertion that a graduate is not to be endowed with a superior social status; ....What is wrong with taking a pan-wallah, giving him education, then letting him remain a pan-wallah?....Education, not universities!....A university (today) gives you a stamp, a licence to abhor manual labour, to demand more than the rest. Education gives you no such stamp—except in the head and heart.' The traditional Scottish ploughman and his Plato, it would seem, seen under the Indian sun, but seen with a compassion that was to grow in Pancharatnam until, in his days in Bangalore, it was as if the feeling that he himself was overprivileged grew to the point where he felt compelled to go out and serve the underprivileged, the out-castes and the undernourished. He gave not only money, but time and personal service, and all this privately, as if he were afraid that public knowledge would vitiate its value.

— G W Series