

some wars (like the war fought on the banks of Tigris and Euphrates) had some connections to water. We see trends of tensions in urban areas and inter-state disharmony (we should not forget the social unrest in Karnataka and Tamil Nadu only recently over water). Another future inter-state tension over water may be between Bihar and Jharkhand with the Bihar government proclaiming not to allow water to flow downwards and bringing *Gangamaiya* to the doorsteps of people at Patna. The river-linking project can easily, and at any moment, become a bone of contention even between nations like India, Pakistan, Nepal and Bangladesh as these countries share many common rivers. Neighbouring Bangladesh has already expressed concern about the river-linking project.

The sooner we realize that we must allow the rivers to flow freely, the better it is for our own survival. River dynamics is a complex phenomenon and it requires in-depth multi-disciplinary approach to study this. We are a scientific civilization. One suitable option, at this juncture, may be to go for linking of rivers to a very limited extent, maybe between sub-basins of a big basin and strengthen movements of rainwater harvesting, groundwater recharge, water conservation, water recycling and alternate irrigation like drip irrigation<sup>2</sup>. Some of these smaller projects are age-old, time-tested, effective and people-oriented and are of proven utility as far as our civilization goes. It is high time we rose to the occasion and realize ground realities, else the fanciful idea of interlinking the major rivers will

destroy the beautiful mosaic of society and delink the socio-economic-cultural threads that we have woven through time.

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1. Rao, K. K., *Curr. Sci.*, 2003, **85**, 565.
  2. Radhakrishna, B. P., *Curr. Sci.*, 2003, **84**, 1390–1394.
  3. Sharma, D. C., *Hindustan Times*, 28 February 2004.
  4. Gurjar, B. R., *Curr. Sci.*, 2003, **84**, 1381–1382.
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M. E. A. MONDAL

*Department of Geology,  
Aligarh Muslim University,  
Aligarh 202 002, India  
e-mail: emondal@lycos.com*

## Sivaraj Ramaseshan – A reminiscence

It was in the fall of 1995 that Falk Reiss and myself at the University of Oldenburg, Germany started research on C. V. Raman. Our leitmotiv was to replicate (that is, to repeat under original conditions as close as possible) Raman's experiments, which led to the discovery of Raman effect. After some preliminary research, we wrote letters to those who, we thought, knew about Raman. For the first time on 21 March 1996, Ramaseshan informed us about the existence of a Baby Quartz Spectrograph (which was used in 1928 by Raman) at the Indian Association for the Cultivation of Sciences, Kolkata. We realized that there could not be a historical work on Raman without help from Ramaseshan. But we did not know who Ramaseshan was and what he had to do with Raman. Soon the situation was going to change, and this 'curious wonderful person' was to become an integral part of my intellectual life.

From one of Ramaseshan's e-mails, we learnt about G. Venkataraman's excellent book on Raman<sup>1</sup>. Taking it as the starting point, in the following two years, I found interesting correspondence between Raman and some German physicists. One of them was Max Born. I discussed the content with Ramaseshan.

Later, one of the letters was reproduced in *Current Science*<sup>2</sup>. Its content was so important that *Nature* published a news item under the title 'Insult thwarted 1934 bid to raise profile of Indian Science'<sup>3</sup>. In the following months I received packets of Ramaseshan's articles: 'Dorothy Hodgkin and the Indian Connection', 'C. V. Raman's German Connection' and 'Raman Memorial Lectures'.

As I became familiar with Ramaseshan's contacts with various high-ranking scientists and his contribution to Indian science, I suggested to him to write his autobiography, as I was/am of the opinion that prominent scientists of India's post-independence era are a special case of India's scientific heritage. Their life history may give an insight into the successes and failures of our past. This may help us in planning the future with care. I was disappointed. On 5 March 1998, Ramaseshan wrote, 'I ink people like me should write their biographies. I do not think it will be of much educational value, although it may be of historical value in connection with some of the great men who I knew'. I tried to rebut his views but without success.

At another time, we discussed/disputed the issue related to 'Born-Raman lattice

dynamics theory'. On 18 April 1996, Ramaseshan wrote, 'I don't think it is worth going deeply into this controversy because Raman was obviously wrong in his formulation of the theory and his theory was just a very small part of a more comprehensive theory given by Born'. I was of the opinion that, from the historical point of view, the correctness or falsehood of a theory plays a minor role. The important questions are: What was going on behind the stage, while the controversy took place? How did the two parties react? In this particular case, how far should we believe Max Born's autobiography? According to me (I never told this to Ramaseshan), like most of the Indian physicists, Ramaseshan was influenced by Max Born's autobiography<sup>4</sup> and also by the words of British crystallographer Kathleen Lonsdale (1903–71), who was well known among Indian crystallographers.

Another issue that I wish to point out, is Ramaseshan's fascination for Raman and the Nobel Prize. On 26 June 1998, Ramaseshan told me that when he asked the Nobel Committee for nomination letters related to Raman's Nobel Prize, they turned down the request. In his words, 'Unless I am doing serious research on Raman, they would not send me those

copies. I did not know how to convince them that I have been doing a fair amount of research on Raman and his work'.

In the beginning of 1999, Ramaseshan took personal interest regarding my visit to Raman Research Institute and made necessary arrangements. I still vividly remember how he received me with his characteristic smile on our first meeting. We went to his office. He apologized, because before he could attend to me, he needed to see his post. He said, 'Now, I am not doing much work. I come to the institute to see my post related to *Current Science*. It has priority'. After a few minutes, all of a sudden, he had in his hands an issue of the *Indian Journal of History of Science*. He asked me, 'Why didn't you send your paper to us?' His remark was about the article 'C. V. Raman, M. N. Saha and the Nobel Prize for the year 1930'<sup>5</sup>. I justified that not only the readers of *Current Science* but other historians also should know about my work. I could not judge whether he agreed with my view. He tried to convince me that *Current Science* is equally interested in the history of science.

After discussing my stay-plan in Bangalore, we met the next day at 'Raman's Mineral Museum'. Ramaseshan took me around the museum personally, detailing each and every object. Although he had had a stroke a few months earlier, he spent nearly two hours in the museum; it was a sign of his attachment as well as fascination for Raman.

Another day he invited me for dinner at his house. Mrs Ramaseshan served delicious food and told me about Lokasundari's (Lady Raman) social activities. Thereafter, we talked about the research work of our group pertaining to history of science.

In spite of our controversial views on many historical issues, our contacts continued. For instance, in one of my papers, I showed that shortly after Raman's appointment as Palit Professor at the University of Calcutta, due to some particular reason Raman had a dispute with Jagadis Chunder Bose (1856–1937)<sup>6</sup>. Ramaseshan was not quite happy with this paper. In somewhat of a 'hard commanding tone', he suggested to me not to give too much importance to such an issue, but to check:

what type of instruments were being prepared in Bose's workshop? What was their relevance to Raman's work? This discussion prompted me to do research on the scientific instruments of Raman and Bose. The results were presented at two international conferences.

I would not be doing justice to a man whom I admire, if I do not discuss one more aspect of his life. It is about the objectivity in his writings when he wrote about Raman. The reader gets a feeling that the author tries to defend someone. I often thought about it. It took me long to understand Ramaseshan. Many points became clear to me only after he passed away and after I read all his letters, e-mails and articles in one span. In his Raman Memorial Lecture at the Indian Institute of Science, Bangalore, after a short introduction, Ramaseshan started his lecture as follows: 'This talk is not going to be a sociological or psychological study of Raman. I was his student and I knew him for more than 25 years. For this very reason, mine is likely to be a prejudiced view'. Here we see an honest man, who has no hesitation in accepting his 'prejudiced views'.

In order to understand the Raman–Ramaseshan relationship, one needs to know much more about latter's last span of life. My impression is that Ramaseshan was the only person with whom Raman shared his problems. In this context, Raman–Ramaseshan contacts were more than uncle–nephew or teacher–pupil relationships. They were of the highest intellectual level. No wonder, whenever Ramaseshan felt that Raman was being attacked or Raman's name was being misused, he came in Raman's defence. This he did until the last, as we know in the case of introduction of astrology as a subject in university curricula, with the argument that Raman believed in astrology (see *The Hindu*, 20 April 2001). After Raman passed away, Ramaseshan tried his best to maintain everything related to the former. P. Balaram, who knew Ramaseshan far better than I do, wrote in an editorial in *Current Science* (1998, **75**, 977). '... the Raman legacy was nurtured through the difficult days of the post-Raman period by Sivaraj Ramaseshan, for whom this act was indeed a labour of love. It is largely a consequence

of his efforts and those of many other individuals that all of Raman's creations are both viable and vigorous today'. Similar views have been expressed by G. Srinivasan<sup>7</sup>.

In conclusion, I think we can learn a number of lessons from Ramaseshan's life. Some of them are as follows:

Retired and emeritus professors are an important part of our society. They can contribute to the development of our country.

Neither age, nor field of study nor scientific position plays any role; common interests bring people together.

In many cases, emeritus professors could be more open for discussion and criticism towards society or give feedback to younger scientists, as the former have nothing to lose and do not need to compete for resources and positions.

Particularly in India, scientists like Ramaseshan are indispensable for the history of science, because they represent a critical and interesting period of India's development in the field of science and technology. Modern historians and social scientists need to talk to such scientists to analyse the past and plan for future, as through the past we see the future!

1. Venkataraman, G., *Journey into Light – Life and Science of C. V. Raman*, Indian Academy of Sciences, Bangalore, 1988.
2. Ramaseshan, S., *Curr. Sci.*, 1998, **74**, 379–380.
3. Jayaraman, K. S., *Nature*, 1998, **392**, 112.
4. Born, M., *My Life: Recollections of a Nobel Laureate*, Taylor and Francis Ltd, London, 1978.
5. Singh, R. and Reiss, F., *Indian J. Hist. Sci.*, 1999, **34**, 61–75.
6. Singh, R., *Phys. Perspect.*, 2002, **4**, 399–420.
7. Srinivasan, G., *Curr. Sci.*, 2004, **86**, 224–226.

RAJINDER SINGH

*University of Oldenburg,  
Faculty V – Institute of Physics,  
Department of Higher Education and  
History of Physics,  
D-26111 Oldenburg, Germany,  
e-mail: rajinder.singh@mail.unioldenburg.de*