

C. V. Raman and Kolkata Media

Rajinder Singh*

Institute of Physics, University of Oldenburg, Germany

(Received 24 April 2019; revised 23 July 2019)

Abstract

About ninety years ago from now, in 1928, Raman Effect was discovered by C. V. Raman at the Indian Association for the Cultivation of Science, Kolkata. Two years later, in 1930, Raman received the Physics Nobel Prize for this discovery. Raman spent 25 years in Kolkata and Kolkata's media extensively interacted with him as can be seen from reports published in the contemporary newspapers and journals such as *The Amrita Bazar Patrika*, *The Advance* and *The Modern Review*. The present communication presents analysis of the contemporary newspaper clippings to show Raman's relation with contemporary Bengal's men of science and local community.

Keywords: C. V. Raman, IACS, Kolkata community, Local media, Nobel Prize.

1 Introduction

C. V. Raman remains the only Indian who won the prestigious Nobel Prize in the field of natural sciences till this date. A number of biographies and articles dealing with various aspects of his life have appeared. To the best of my knowledge nothing has been written on Raman's interaction with the local media. The present article intends to fill the gap. However, the paper covers Raman's time period in Kolkata as this was the formative years of his scientific life.

2 Raman's scientific work and local press

Perhaps it is not known to many people that C. V. Raman was highly interested in astronomy apart from his main discipline physics. To the best of my knowledge only one article on the topic has been published in *Current Science*,

which shows that he made observations of the heavenly bodies with a small telescope; and took active part in the activities of the "forgotten" Indian Astronomical Society, Calcutta. He stopped working in this field as he was unable to buy expensive telescopes (Singh 2010, pp. 1127–1132). In the middle of 1960s, *The Hindu* under the title "Fifty Years Ago – May 31 to June 6, 1915" wrote:

A Naked Eye Comet – Mr. C. V. Raman, M.A. writes: - While at Trichinopoly on a short visit, I noticed at 4 a.m., on the morning of the 27th [Presumably 27th May, 1915] ultimo a fairly bright object, east of the constellation Sagittarius which was evidently comet and had the usual 'head' and 'tail' the latter extending about 4 degrees westwards from the head. I observed it again on the morning of the 28th, and it appeared that the comet was in rapid motion eastwards, i.e., towards the Sun. It promises to become an interesting visual object in the heavens. The tail was a very pretty sight in a pair of binoculars,. ...The identification of the comet is being dealt with.

It seems that Raman never published about it further; unlike his scientific work on acoustic and optics (detail later). It is well-known fact that he started his research career in 1907 at the Indian Association for the Cultivation of Science. Soon he became a well-known person among the educated Kolkata elites. In 1914 at the newly established University College of Science and Technology he was offered the prestigious “Palit Professor of Physics Chair”; which he joined in 1917.

From 1907 onwards he extensively worked in the field of acoustics. As we have seen above, in 1915 he informed the local media about his observations of a heavenly body. This leaves no doubt that he was aware of the power of the media. Unfortunately documents involving his interaction with Kolkata media during the time period between 1907 to 1919 are missing. More research is needed to cover this part of Raman’s life. The July 1920 issue of *The Modern Review*, reported:

The scientific aspect of sound theory has enjoyed much attention. The foremost prominence must be given to C. V. Raman’s memoir ‘On the mechanical theory of the vibrations of bowed strings and of musical instruments of the violin family, with experimental verification of the results...’ (Raman 1918, pp. 1–158).

The journal also mentioned about “A new method for the absolute determination of frequency” which Raman jointly wrote with his Bengali associate A. Dey (Raman and Dey 1919, pp. 533–545). *The Hindu*, in a supplement, on December 1922, published “Indian Whispering Galleries: Some Famous Models” by C. V. Raman–Palit Professor of Physics, Calcutta University. The newspaper devoted full-page to Raman’s researches on the investigations of different galleries in India, such as the Victoria Memorial, Calcutta, the Gol Gumbez at Bijapur and the Granary at Patna. Raman did not miss the opportunity to tell the readers that the results of his investigations were published in the prestigious British journal the *Proceedings of the Royal Society of London*. In 1921 Raman was nominated for the Fellowship of the Royal Society of London for his work on acoustic and optics; and was elected in 1924.

In the beginning of the 1920s, Raman extensively started working on the light scattering. His student Bidhu Bhushan Ray gave a new theory of corona and glories (Ray

1923, p. 183; Ray 1923, pp. 23–46). Raman’s other young Bengali associate S. K. Mitra produced “A New Geometrical Theory of the Diffraction Figures in a Heliometer” (Mitra 1919, pp. 289–301). Raman himself explained the blue colour of the sea (Raman 1922, pp. 64–80). A local newspaper reported under the title “Indian Scientist Honoured – Tribute to Dr. Raman by German Savant”, in which Raman and his students’ work in *Handbuch der Experimental Physik (Encyclopedia of Experimental Physics)*, was referred to. It stated that:

Extensive references are also made to Professor Raman’s discoveries in crystal optics, to his studies of the optical properties of liquid surfaces, to his explanation of the diffraction colours of metallic screens, and to his experimental proof of the failure of total reflexion (Document No. RP-6.40, Archive Raman Research Institute, Bangalore, henceforth ARRI).

And further:

The second volume contains a monograph on the molecular scattering of light based largely on the researches in this field carried out at Calcutta during the past few years. Professor [Richard M.] Gans who writes in the volume unreservedly accepts and supports Raman’s explanation of the blue colour of the deep sea as due to the diffusion of light by the molecules of water. The Raman-Ramanathan theory of the opalescence of solutions and liquid mixtures also receives complete acceptance. In all, some 65 original memoirs in optical science by some 35 Indian physicists are cited and their contents analysed in the two volumes.

Years-long work on light scattering, in the beginning of 1928, led to the discovery of a new effect, which was observed by Raman and his associates S. Venkateswaran and K. S. Krishnan that monochromatic light scattered by a transparent media like liquid is accompanied by other colours; which gives information about the molecular structure of the scattering substance. This effect later came to known as Raman Effect. Figure 1 shows the announcement of the discovery by Raman. The article was published on Feb. 29, 1928.

In an article entitled “Prof. Raman’s Remarkable Discovery – New Kind of Radiation of Light”, published in

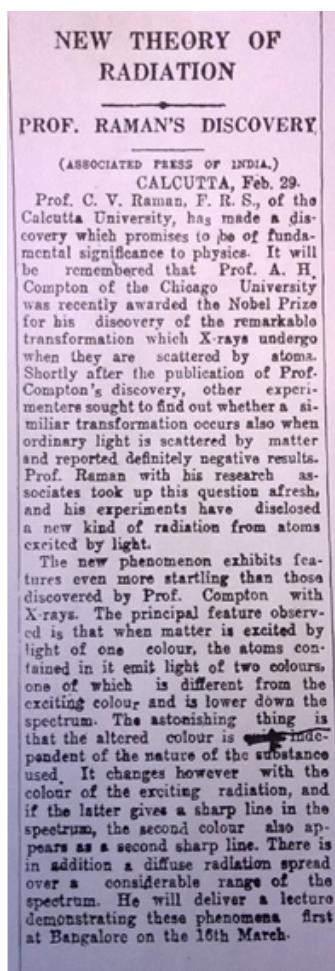


Figure 1 Announcement of the discovery of the “Raman Effect” by local press. It is not clear, whether Raman marked the text. (Credit: The Associated Press of India).

The Basumati, a Bengali daily on May 31, 1928, it was stated that Prof. A. Smekal from Vienna congratulated our Professor on his ‘wonderful and fundamental discovery’ emphasising that it opens out an entirely new territory of research.” Another newspaper published an article entitled: “Action of light on matter – Professor Raman’s notable discovery” Figure 2

In the article the exact explanation of observed effect and theoretical background applying the concept of Einstein’s light quanta was given. About the working ambience in Raman’s laboratory a journalist of *The Basumati* (May 31, 1928) wrote:

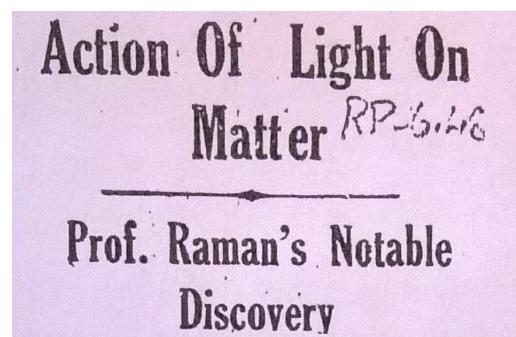


Figure 2 Publication on Raman’s discovery. (Credit: ARRI).

Professor Raman and his students are working night and day in order to push forward into the new regions of science opened up by his discovery. As one instance of its possible application, it may be mentioned that the new methods will enable the nature of molecular energy or heat and its dependence on chemical constitution to be accurately investigated.

The Amrita Bazar Patrika under the title “New Kind of Radiation – Dr. Raman’s Discovery Attracting World-Wide Attention” published the same content which was published in *The Basumati* (Figure 3).

The Modern Review, in its October 1928, issue under the title “Prof. C. V. Raman’s latest discovery”, wrote: “The strange phenomenon is exhibited by all transparent bodies, the position and the number of the new lines being different for different substances.” Also, it reported that:

So great is this field that Prof. R. W. Wood, a very distinguished Foreign Member of the Royal Society London, in cabling to the Editor of *Nature* confirming the Raman-Effect, characterizes it as a surprising and brilliant discovery with immense potentialities.

The Basumati also reported on Raman’s work on organic crystals in 1929 (Figure 4).

After the discovery of the Raman Effect, Raman and his associates started to determine whether light and sound have particle nature (Figure 5). *The Liberty* in 1931 published Raman’s views on the theory of relativity and dual nature of light. He justified an analogy between light and sound as follows:

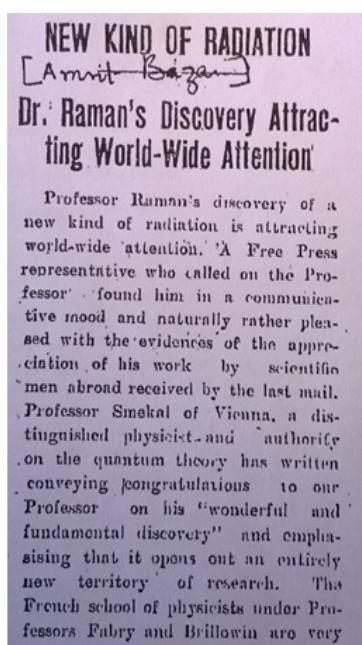


Figure 3 *The Amrita Bazar Patrika* report highlighting the reception of the discovery in Europe. (Credit: *The Amrita Bazar Patrika*).

It is known that sound-waves exert pressure on surface in a manner exactly analogous to light. In other words, they possess both energy and momentum. The conclusion seems irresistible that sound like light, possesses a dual character. It has the attributes of wave-motion, and it also consists of quanta or corpuscles of energy which can move through matter and can recoil after collision with particles of light.

Raman is supposed to have opposed Einstein's light quanta (Sur 1999, pp. 25–49; Stuewer 1975, pp. 268–269). However, his lecture gives a different picture. For instance, *The Free Press*, of January 3, 1929, published Raman's views as:

Further powerful support for a corpuscular idea of radiation came to hand a few years ago, when Prof. A. H. Compton, ..., discovered a remarkable phenomenon which is now known by his name as the Compton Effect, and for which he received the Nobel Prize a year ago. ... We appear thus to have reached the astonishing position that two distinct

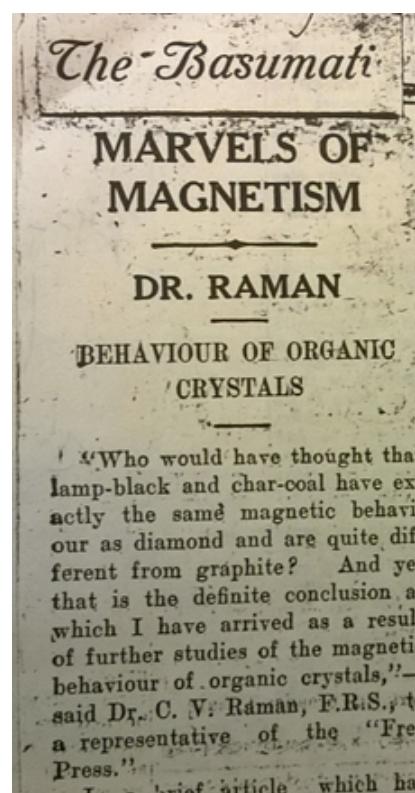


Figure 4 C. V. Raman and his researches on organic crystals. (Credit: *The Basumati*).

theories of light both claim our acceptance (Document No. RP-6.32, Archive Raman Research Institute, Bangalore).

In a long article on "The spin of light" (Figure 5) Raman informed the readers that:

Recent experiments on the scattering of light in gases carried out by Mr. S. Bhagavantam at Calcutta show that the light-quanta possess a spin which may be either left or right-handed, and is equal to one quantum unit of angular momentum. A crucial experiment was devised, and the results obtained were in agreement with the theory of spin, but unfavourable to the older or classical theory of light.

In general, newspapers are more interested in reporting or publishing events related to personal life, such as honours and awards than publishing scientific works of a scientist.

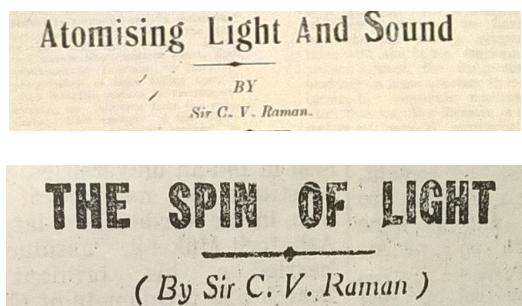


Figure 5 Raman wrote for general readers on the particle nature of light and sound. (Credit: *The Liberty*). The spin of light – Document No. RP-6.64 (Credit: ARRI).

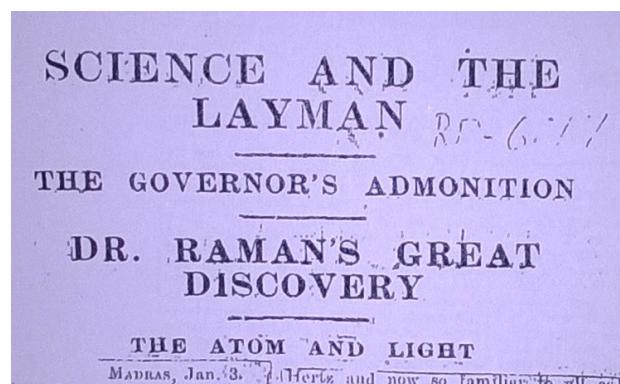


Figure 6 Indian Science Congress and Raman's lecture on the discovery. (Credit: ARRI).

Raman was no exception and this aspect of his life was published in detail.

3 Reportings on visits, honours and awards

The Associate Press of India reported that C. V. Raman would deliver a lecture on his discovery in Bangalore on 14th March. Indeed such a lecture was delivered before the Association of the South Indian Scientists. Here, Raman publicly showed for the first time, the first spectra of the incident and scattered light; clearly showing the existence of new lines. The lecture was published in the *Indian Journal of Physics* (Raman 1927–1928, pp. 387–398).

Raman was the President of the Indian Science Congress, 1929. *The Free Press* on January 3, 1929, published Raman's address, which he delivered at the 16th session of the Indian Science Congress, Madras (Figure 6). Understandably, it was on his discovery.

At the end of 1929, to make his discovery known abroad, Raman went to Europe. He got a grant from the University of Calcutta. Raman visited different countries. *The Englishman* (Figure 7) reported that the University of Freiburg gave him honorary degree of Doctor of Natural Philosophy. At Zurich he was elected to the Honorary Fellowship of the Physical Society of Switzerland. Besides initiating a discussion on the "Raman Effect" at Bristol under the auspices of the Faraday Society, he delivered four lectures at the London University and Physical Society of London. He was also asked by the University of

Cambridge and Edinburgh to deliver lectures. He met distinguished scientists like Sir Ernest Rutherford and Prof. Paul A. M. Dirac. The University of Paris also arranged two lectures at Sorbonne, where he met some eminent French scientists – Madam Curie, J. Perrin, and Louis de Broglie.

Raman also visited Italy. Emilio Segré, who in the late 1920s worked on Raman Effect; later migrated to the U.S.A.; years later, he recalled meeting Raman in an interview with Thomas S. Kuhn on 18 May 1964:

Then one day Raman showed up in person, and he came in on the birthday of the queen, by chance, so I was in high uniform, with a blue thing, dull gold, and all that. They phoned me at the barracks in a hurry; 'Come here; there is a guy who doesn't speak Italian; he speaks English, and apparently he's Raman, but we're not sure. Rush down!' So I came down, and I arrived, and Raman was very touched that I had put on all my gold braid, He had come to see [Franco] Rasetti, because Rasetti had been doing Raman Effect in gases in Pasadena. And we were at that time pretty active in Raman Effect, and so he was there. [E.] Fermi was away, I don't know. I was the only one." (www.aip.org/history-programs/niels-bohr-library/oral-histories/4875. Retrieved Dec. 17, 2017).

Emilio Segré did not tell about the honour that poured on Raman in the form of the Matteucci Medal, about which a local newspaper in Calcutta proudly wrote:



Figure 7 Newspaper reporting about Raman's visit to Europe. (Credit: *The Englishman*).

The news received in Calcutta on Wednesday (Aug. 14) that the Society of Science has awarded the Matteucci Medal to Sir C. V. Raman is of more than ordinary significance to all who have watched with pride the development of an Indian School of scientific research.

Raman was the first Asian to receive this honour (Figure 8).

In the same year Raman was knighted by the British Empire. In a separate article, the reaction of the Calcutta University authorities is discussed in detail. Raman was the first Professor of the University of Calcutta to get this honour (Singh 2017, pp. 293–296). As far as the reaction of the local media is concerned, Figure 9 shows that not only the University but also whole Bengal was proud that Raman has been honoured.

In the second week of November 1930, *The Associate Press* published that for the year 1930 C. V. Raman and H. Fischer are declared the Nobel Prize winner for Physics and Chemistry respectively (Figure 10). Bengal men of science made it possible so that Raman went to Stockholm to receive the Nobel Prize. When Raman came back from Europe, he was warmly received (Figure 11). (Document No. RP-6.76. Archive Raman Research Institute, Banga-

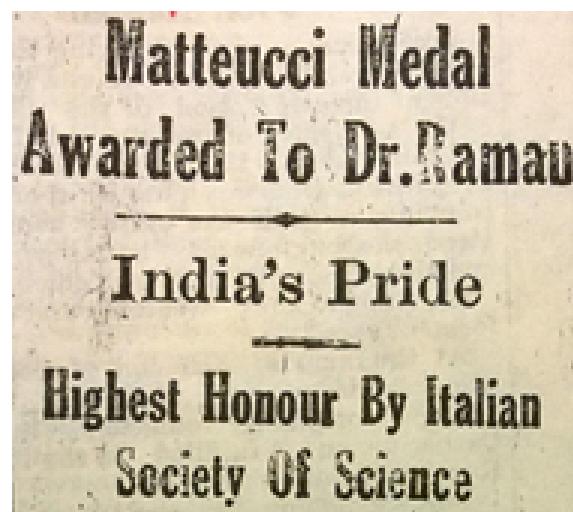


Figure 8 News about award to Raman in Italy. (Credit: ARRI).

lore).

According to a journalist:

Sir C. V. Raman, the Nobel prize winner, returned to Calcutta after a tour in Europe, yesterday. He was accorded an enthusiastic reception at Howrah station where he was met by Professors and students. The Calcutta Corporation was represented by Mr. Santosh Kumar Basu, the Deputy Mayor (Document No. RP-6.76. Archive Raman Research Institute, Bangalore).

After taking a short rest, at 2 p.m., he reached Science Association, which was decorated with flowers and flags, where his students and colleagues were waiting for him. The newspaper reported that Raman was for about three months in Europe, he delivered lectures at different places. The newspaper wrote:

He has sought to dispel the notions in Europe that India was rather the 'Spiritual.' With all his bias for the spiritual the Indian scientist is no mean competitor to his co-workers in Europe. Giving his impressions to a press representative Sir Raman said that he really shed tears of joy while in the act of receiving the Nobel Prize when he thought of the honour that was shown to India by the King of Sweden.

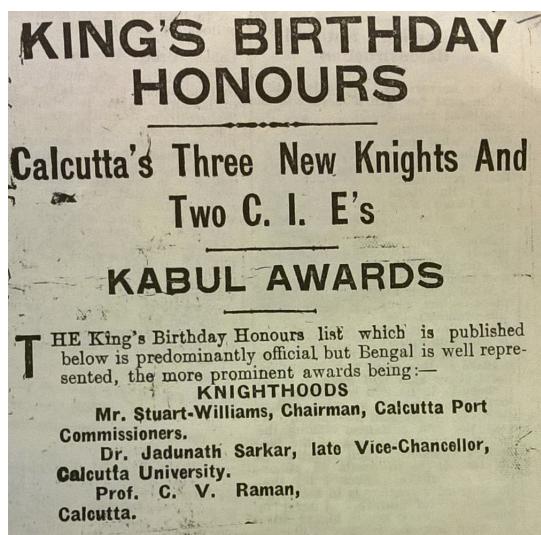


Figure 9 Raman getting Knighthood in 1929. (Credit: ARRI).

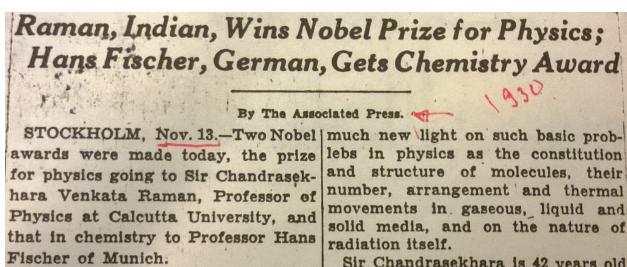


Figure 10 The Associate Press of India informing its readers about the winning of the Nobel Prize by Raman. (Credit: The Associate Press).

Lady Raman accompanied her husband. As Raman had no time, she was interviewed by a journalist; who was positively surprised, because she spoke fluent and flawless Bengali. In the end the journalist told Lady Raman:

You left Calcutta on the very day the Nobel Prize announcement was made and people could get no time to show their love and honour to Professor Raman who has practically made Calcutta his home and the centre of all his activities in the domain of science (Document No. RP-6.76).

To honour Raman the Calcutta Municipality brought out a booklet "The Calcutta Municipal Gazette – Raman Number", which was published on 4th July, 1931; and edited by

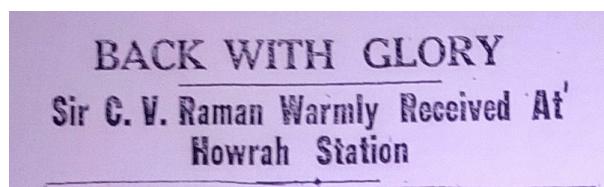


Figure 11 Reception of Raman and his wife at Howrah Station by Bengali students, professors and political leaders like Mayor of the city. (Credit ARRI).

Amal Home. In 1988, again a special issue of the Calcutta Municipal Gazette was published. It contains Raman's views about the IACS (Basak, et al., 1988). *The Englishman* on June 29, 1931, declared him "Prominent personality of India" and *The Liberty* in its "Puja" special issue in 1931 published Raman's huge photographs (Figure 12).

In the August 1932 issue, *The Modern Review* published that with effect from April next, Raman is supposed to be the director of the Indian Institute of Science (Figure 13). "A similar announcement was made some time ago, but was contradicted as a little too precious. Perhaps the news recently published is not incorrect", wrote a journalist.

Raman was offered the Directorship of the Indian Institute of Sciences, Bangalore. The letter published by the newspaper shows that Raman was appointed as Director of the I.I.Sc. for a term of 15 years on a salary of Rupees 3000 per month. In the letter, Raman wrote:

I presume that during my absence my work as Head of the Department could continue to be carried out by Professor D. M. Bose who is already officiating for me in that capacity. I propose, however, during the period of leave asked for to continue to guide and supervise the work of my research assistants and research scholar.

Raman was given a salary double of what he got at the University of Calcutta. Raman was the first Indian to become Director of the Indian Institute of Sciences, as well as Head of the Physics Department, which was established by him.



Figure 12 Huge photographs published by *The Englishman* (left) and *The Liberty* (right). (Credit: *The Englishman* and *The Liberty*).

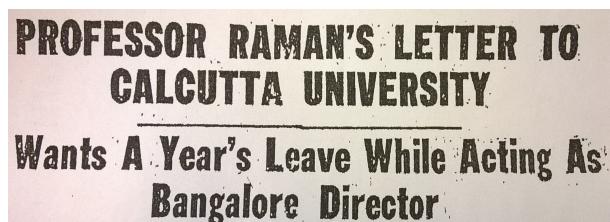


Figure 13 Raman taking leave of the Calcutta University became a public issue. (Credit: *The Modern Review*).

4 Conclusion

The most important lesson to be learnt from Raman is that (1) establishing contact with local press is helpful. This enabled Raman to publish his inventions immediately; and assured to maintain priority over the discovery. In contrast in scientific journals his discovery was published at least one month later. (2) a scientist can propagate his invention in a popular way that a “non-scientific” man could understand his researches. Raman was a brilliant author as the publication of his various articles in local newspapers shows.

Acknowledgements

Thanks are due to two referees for their valuable suggestions which were helpful in improving the paper. I am thankful to Professor Suprakash C. Roy, Member of the History of Science Commission, INSA, for commenting and correcting the early version of the manuscript. Most of the references to Newspaper clipping were provided to me by the Archive of the Raman Research Institute, Bangalore. I am thankful to the members of the RRI for their kind help. *The Modern Review* is in the possession of the Archive of the University of Hamburg. Last but not the least, I am thankful to the Editor of the *Indian Journal of History of Science* for editorial work.

Bibliography

- [1] Banerjee S. C. V. Raman and Colonial Physics: Acoustics and the Quantum, *Physics in Perspective*, 16(2014): 146–178.
- [2] Basak A., Basu, J., Basu, D., et al. Chandrasekhara Venkata Raman Birth Centenary, Special Number 1988, The Calcutta Municipal Corporation, Calcutta, 1988.

- [3] Biswas A. K. Raman, Krishnan and the IACS episodes of the 1930s, *Indian Journal of History of Science*, 48(2013): 61–77.
- [4] Jayaraman A. C. V. *Raman—A Memoir*, Affiliated East-West Private Ltd., New Delhi, 1989.
- [5] Keswani G. H. *Raman and his Effect*, National Book Trust India, New Delhi, 1980.
- [6] Krishnamurti P. *Sir C. V. Raman: A Short Biographical Sketch*, The Bangalore Press, Bangalore, 1938.
- [7] Mitra S. K. On the Large Angle Diffraction by Apertures with Curvilinear Boundaries, *Philosophical Magazine* 38(1919): 289–301.
- [8] Parmeswaran U. C. V. *Raman – A Biography*, Penguin Books India, Delhi, 2011.
- [9] Pisharoty P. R. *Builders of Modern India – C. V. Raman*, Publication Division, Government of India, New Delhi, 1982.
- [10] Raman C. V. A New Radiation, *Indian Journal of Physics*, 2(1927–1928): 387–398.
- [11] Raman C. V. On the Mechanical Theory of the Vibrations of Bowed Strings and of Musical Instruments of the Violin Family, with Experimental Verification of the Results, Part I, *Bulletin of the Indian Association for the Cultivation of Science* 15(1918): 11–58.
- [12] Raman C. V. On the Molecular Scattering of Light in Water and the Colour of the Sea, *Proceedings of the Royal Society of London*. 101(1922): 64–80.
- [13] Raman C. V., Dey, A. A new Method for the Absolute determination of Frequency, *Proceedings of the Royal Society of London* 95(1919): 533–545.
- [14] Ramaseshan S. and Rao C. R. C. V. *Raman – A Pictorial Biography*, Indian Academy of Sciences, Bangalore, 1988.
- [15] Ray B. B. The Formation of Coloured Bows and Glories, *Nature*, 111(1923): 183.
- [16] Ray B. B. The Scattering of Light by Liquid Droplets, and the Theory of Coronas, Glories and Iridescent Clouds, *Proceedings of Indian Association for Cultivation of Science*, 8(1923): 23–46.
- [17] Sen S. N. *Prof. C. V. Raman—Scientific work at Calcutta*, Indian Association for the Cultivation of Science, Calcutta, 1988.
- [18] Singh R. C. V. Raman's Research in Astronomy, *Current Science*, 99(2010): 1127–1132.
- [19] Singh R. *Nobel Laureate C. V. Raman's Science, Philosophy and Religion*, Dharmaram Publications, Bangalore, 2005.
- [20] Singh R. *Nobel Laureate C. V. Raman's Work on Light Scattering*, Logos Verlag, Berlin, 2004.
- [21] Singh R. University of Calcutta and Knighthood for Chandra Sekhara Raman, *Science Culture*, 83(2017): 293–296.
- [22] Stuewer R. H. *The Compton Effect—Turning point in Physics*, Science History Publications, New York, 1975.
- [23] Sur A. Aesthetics, Authority, and Control in an Indian Laboratory—The Raman-Born Controversy on Lattice Dynamics, *Isis* 90(1999): 25–49.
- [24] Venkataraman G. *Journey into Light-Life and science of C. V. Raman*, Penguin Books India (P) Ltd., New Delhi, 1994.
- [25] Venkataraman G. *Raman and his Effect*, University Press (India) Ltd., Hyderabad, 1995.