

Srinivasa Ramanujan: A different perception of his life and times

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Srinivasa Ramanujan was born into a poor South Indian Brahmin family on 22 December 1887 and died after a short life at the age of 32 on 26 April 1920. Despite the disadvantages associated with his humble origins and poverty-stricken life, he attained great eminence as a gifted and brilliant mathematician. He contributed some of the most beautiful ideas in the history of Mathematics, many of which have found applications in cosmology and computer science today.

Since his death, a number of biographies¹⁻⁶ have been written about the life and times of Ramanujan. But in our opinion these biographies do not seem to reflect the entire truth about his life. In all these biographies we detect an attempt to cover up the failure of the Indian society at that time to support a mathematical genius from its own ranks, and the efforts on the part of the British to disown the responsibility for the establishment and promotion of an education system in which creative geniuses, like Ramanujan were overlooked, while collectors and sub-collectors flourished.

The fact that a genius of the calibre of Ramanujan was denied employment in any of the Indian educational institutions at that time, tells us a great deal about the actual state of affairs in those institutions. In this context we quote what William Thackeray, an Englishman who had considerable experience in India as a judge and civil servant, recommended in 1807. He wrote: 'It is very proper that in England, a good share of the produce of the earth should be appropriated to support certain families in affluence, to produce senators, sages and heroes for the service and defense of the state; But in India that haughty spirit, independence and deep thought which the possession of great wealth sometimes gives ought to be suppressed. They are directly averse to our power and interest We do not want generals, statesmen and legislators; we want industrious husbandmen. If we wanted restless and ambitious spirits there are enough of them in Malabar to supply the whole peninsula.'⁴ Needless to say that an educational system which had been established with the explicit purpose of creating industrious husbandmen rather than gen-

erals, statesmen, and legislators continues to the present, turning out husbandmen for the welfare of the western societies at the expense of India. It may be recalled here that the district collector of Nellore, and President of the Indian Mathematical Society, R. Ramachandra Rao even had the audacity to say that 'In the plentitude of my mathematical wisdom I condescended to permit Ramanujan to walk into my presence!'⁶ When the then Vice-chancellor of Madras University recommended that Ramanujan be awarded a research scholarship, some members of the Syndicate, citing University regulations, which stipulated the possession of a Master's Degree as a necessary qualification, objected to the award of 75 rupees per month for two years². Subsequently, however, Ramanujan was awarded the scholarship on the intervention of Justice P. R. Sundaram Iyer. It is interesting to note the fate of some of the other Indian M.As interested in mathematics. V. Ramaswamy Iyer, who founded the Indian Mathematical Society, was a deputy collector; S. Narayana Iyer who also was interested in mathematics was employed as a manager in the port trust office; while one Richard Littlehales, M.A. was a professor of mathematics at the Presidency College!

We now turn our attention to the British attitude. As mentioned earlier, we can detect that while on the one hand there was an attempt to down play the genius of Ramanujan, on the other hand there was an attempt to get some credit for his achievements as well. For example, G. H. Hardy has repeatedly stated that Ramanujan's genius was influenced by the book, *A Synopsis of Elementary Results in Pure and Applied Mathematics*, by George Schoobridge Carr¹. Further, Hardy writes that Ramanujan had little exposure to some of the other more profound books on mathematics, and consequently his mathematical education had suffered an irreversible damage. It is worth noting that the influence of Carr's *Synopsis* was blown out of proportion by the British to make it appear that this book was instrumental in making Ramanujan the mathematical prodigy. But in none of the biographies is there any mention of Ramanujan personally

acknowledging Carr's *Synopsis* as an inspiration for his work. Neither is there a mention of this in Ramanujan's first letter to Hardy. Ramanujan, according to Hardy¹, 'would probably have been a greater mathematician if he could have been caught and tamed a little in his youth; he would have discovered more that was new, and that no doubt, of greater importance'. Obviously this was done with the purpose of getting credit for 'educating' Ramanujan in 'real' mathematics, thus implying that the mathematics of Ramanujan was somehow 'unreal'. This contradicts Hardy's own statement that most of Ramanujan's work in India was 'rediscoveries' of the results of the European mathematicians. How could one discover results in 'real' mathematics by doing not-so-real mathematics? Hardy fails to explain this contradiction. The eagerness of Hardy to bask in the glory of Ramanujan is obvious when we consider his claim to be the 'discoverer' of Ramanujan. The facts of 1912 and 1913 speak otherwise: it was Ramanujan who discovered Hardy⁴.

Hardy and John Littlewood, fellows of the Trinity College, were of the view that the idea of what is meant by a proof was not known to Ramanujan⁴. But this could not have been the case, since Hardy, cannot assert that Ramanujan did not grasp the concept of proof, and at the same time point out that the mathematical education of Ramanujan consisted of proving the results contained in Carr's *Synopsis*, without contradicting himself. Even children in the sixth grade learn to prove various theorems in plane geometry. Therefore to say that Ramanujan lacked the concept of a proof is not fair. It is very appropriate to note here what Littlewood said about the state of mathematics in England during his formative years: 'Rigor in argument was generally regarded - there were rare exceptions - with what is no exaggeration to call contempt; niggling over trifles instead of getting on with the real job'¹. Isn't this what Ramanujan did? We do not believe that Ramanujan lost much by not being exposed to books written by English mathematicians. But he might have benefited from books of European mathematicians. It is also not true that Ramanujan

read only G. S. Carr's *Synopsis* and S. L. Loney's *Trigonometry*. In a letter to Hardy before going to England, Ramanujan referred to Hardy's own book, *Orders of Infinity and the Infinitesimal Calculus of Paul Du Bois-Reymond* published in 1910. Therefore Hardy's claim that Ramanujan was not aware of books on 'real' mathematics while in India, and thus did not understand the concept of a proof is not logical. The sad fact is that before Ramanujan was awarded a scholarship for his maintenance, he was often unable even to afford the luxury of paper to work out his mathematical problems. Once when his friend K. S. Srinivasan asked him why he did not use paper for all his calculations, Ramanujan replied, 'When food is a problem, how can I find money for paper? I may require four reams of paper every month⁶'. He did much of the work on the slate, and then recorded the results in his precious notebooks. This may explain why he did not always have proofs of his results. There just might not have been enough paper available for him to record the proofs. Further, it is likely that his intuition might have played a greater role in his endeavours. Perhaps, Ramanujan was, working along the lines of Indian Vedic mathematical tradition, which may appear to be unconventional to the Europeans. This aspect may also explain the persistent reference to the magical ways of his mind's working. Perhaps the truth is that mathematics does not always develop as a result of rigorous techniques. Apart from the brief emphasis on rigor by the Egyptian and Babylonian mathematicians, which was perfected by the Greeks, mathematics until the 17th century grew more along an intuitive path. It is the European continental mathematicians, starting from Augustin Louis Cauchy, who began to put mathematics on a firm logical foundation. Cauchy's greatest contribution to mathematical science was characterized by rigor on the methods that he introduced. Until the advent of 20th century, mathematics in England was mostly an outcome of intuitive thinking. In recent decades as well, the emphasis has moved away from rigor to intuition.

Ramanujan was born in India at a time

when it was under British occupation. At that time there was much that was forbidden to Indians in India and more so to Indians in England. When Ramanujan was nominated for a Trinity College fellowship, one of his foes went about openly saying, 'he wasn't going to have a black man as Fellow'⁴. Any sensitive mind would have raged under such a climate of oppression and racial insults. Ramanujan had a very sensitive mind, and while describing Ramanujan's state of mind the biographers are conveniently silent on this issue. Their silence is understandable since the original biographies on Ramanujan were written when the British ruled India and therefore no one dared to displease the rulers. The other biographies being derivatives of the earlier ones, cannot be exceptions. In our opinion, it was these insults rather than domestic problems, that drove Ramanujan towards an attempted suicide in England.

Another important issue is that throughout his stay at Cambridge University, Ramanujan remained a mere 'research student' even though he was intellectually far superior in mathematics to anyone who was a resident at that time at the University. The attempts on the part of the British to diminish the fame of Ramanujan can also be seen from the manner in which they handled Ramanujan's publications and notebooks. We learn from J. M. Whittaker that he salvaged one of Ramanujan's notebooks (which Ramanujan wrote from his death bed) from a pile of papers that was to be incinerated. But Whittaker, by his own admission, did not bother to search the pile of papers that 'covered the floor of a fair-sized room to depth of about a foot'. Instead, he was able to make just a few 'lucky dips' into the rubble and miraculously brought up one of Ramanujan's notebooks of about 140 pages, which was on Mock Theta Function. Since the papers that were saved were those of Ramanujan's works which he did *after* he returned to India from England, it appears that Indians did not care for what he was doing. The Indian society in general and the Tamilians in particular, seem to be always interested more in appearances, forms, and rituals rather than science or mathematics. We

are left to wonder what else was incinerated!

Another remarkable issue about Hardy's biographical sketch of Ramanujan was, his emphasis on the failure of Ramanujan. For example, once Ramanujan came up with a wrong expression for the number of primes less than a given number, Hardy made a point to reiterate this error again and again. This aspect of Hardy harping on Ramanujan's error is incomprehensible, since Ramanujan never published wrong results. He communicated his observations in a letter to Hardy.

The British biologist and mathematician, J. B. S. Haldane who lived in India for a while in the early 1960s complained that '... today in India Ramanujan could not get even a lectureship in a rural college because he had no degree. Much less could he get a post through the Union Public Service Commission. This fact is a disgrace to India. I am aware that he was offered a chair in India *after* becoming a Fellow of the Royal Society. But it is scandalous that India's great men should have to wait for foreign recognition. If Ramanujan's work had been recognized in India as early as it was in England, he might never have emigrated and might be alive today. We can cast the blame for Ramanujan's non recognition on the British Raj. We cannot do so when similar cases occur today.'

1. Hardy, G. H., *Ramanujan*, Chelsea Publishing Co., New York, 1940.
2. Seshu Iyer, P. V., *J. Indian Math. Soc.*, 1920, **12**, 81-86.
3. Ramachandra Rao, R., *J. Indian Math. Soc.*, 1920, **12**, 87-90.
4. Kanigel, R., *The Man Who Knew Infinity*, Abacus Books, London, 1992.
5. Berndt, B. C., *Ramanujan's Notebooks, Parts I & II*, Springer, New York, 1985-1989.
6. Ranganathan, S. R., *Ramanujan: The Man and the Mathematician*, Asia Publishing House, Bombay, 1967.

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