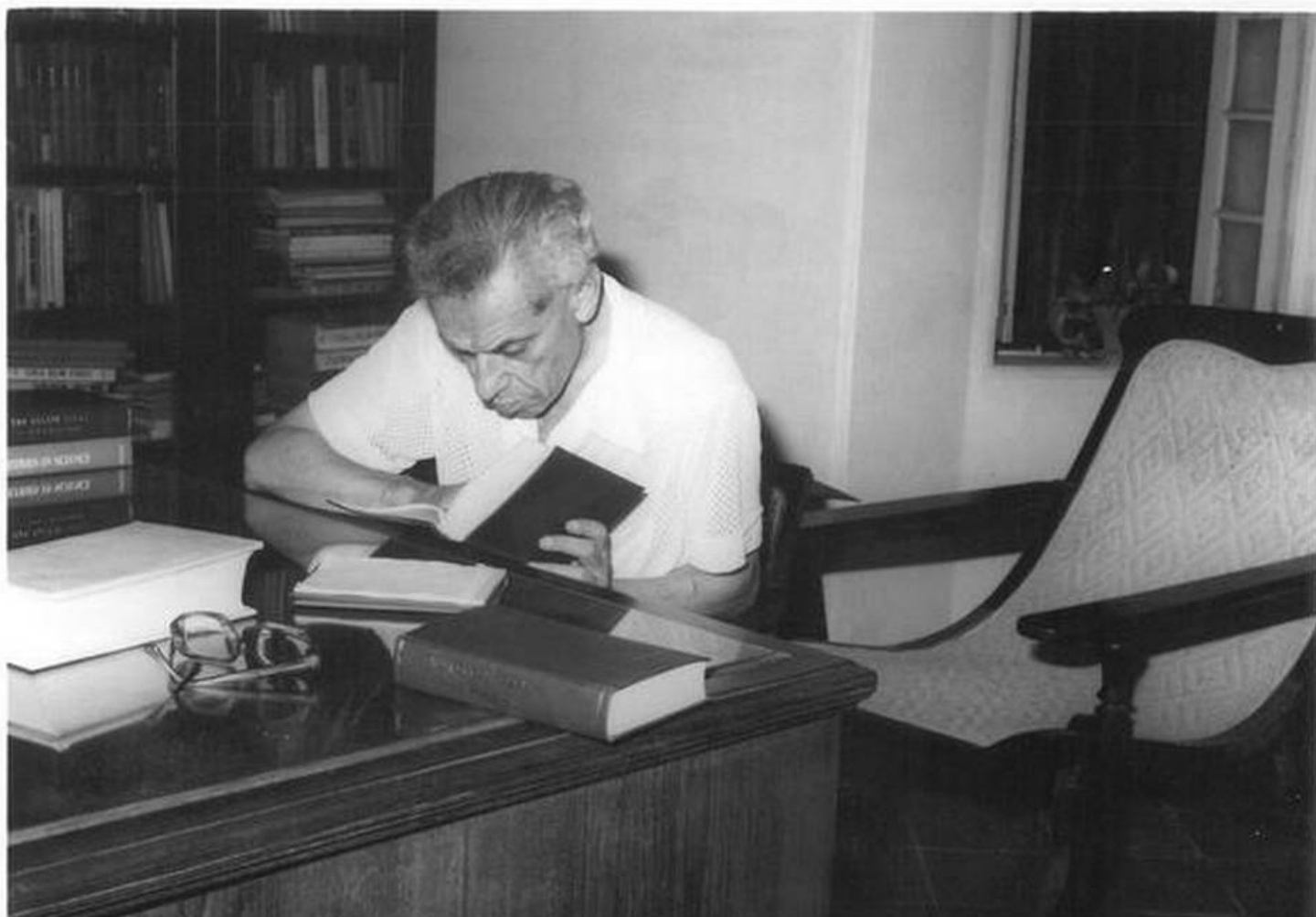


Paul Erdős, a legendary mathematician in Madras



Vijaysree Venkatraman

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A charming story of the Hungarian genius Paul Erdős and how he encouraged young students

On a winter's day in January 1975, two men walked down the sandy stretch of Marina Beach in Chennai. It was early afternoon, but there was a breeze blowing, and they had the place pretty much to themselves. One was a final year B.Sc. student from Ramakrishna Mission Vivekananda College; the other an older, frail-looking foreigner. Initially, the older man asked about some landmarks on that stretch, including the impressive Indo-Saracenic building that

houses the University of Madras, but after that the conversation drifted to advanced mathematics. Clearly, this man was no ordinary tourist.

Paul Erdős, the legendary Hungarian mathematician, was on his first trip to Chennai, or Madras, as it was called then. At 21, he had earned his Ph.D. from the University of Budapest. This was in 1934. In the next six decades, he would go on to publish over 1,500 papers, an unsurpassed record. He made fundamental contributions to certain branches of mathematics – number theory, in particular – and pioneered discrete mathematics, the foundation of computer science. A bachelor, he had no permanent job or home address. In the pre-Internet era, he connected researchers across the globe who might otherwise have toiled away on problems on their own, making little headway. His life's mission to discover and nurture young mathematicians.

The young man who discussed mathematical concepts with Erdős on the beach was Krishnaswami Alladi, the son of Alladi Ramakrishnan, founder of the Institute of Mathematical Sciences (Matscience) in Chennai. While Ramakrishnan had invited many a brilliant scientist including Nobel laureates to the southern capital to talk about their work, Erdős had come mainly to speak to Krishnaswami.

Nomadic genius

Krishnaswami, who is now a professor of mathematics at the University of Florida, Gainesville, recalls how he had contacted the nomadic genius. As a B.Sc. student, working on an independent project on number theory, he had made some discoveries and had come up with questions that no one around him knew the answers to. He spoke to many people in the field in India and abroad. One name that came up a lot was Erdős, but no one knew his precise whereabouts. So, he was advised to write to him c/o The Hungarian Academy of Sciences. Within a month, Erdős responded, saying he was going to speak at a symposium at the Indian Statistical Institute in Calcutta later that year – could they meet there?

Krishnaswami's paper had also been accepted for the symposium, but he had his college half-yearly examinations and couldn't possibly travel to Calcutta that week. So, his father, an invited speaker at the symposium, offered to present the paper. Krishnaswami recounts that at the end of the presentation, Erdős came up to his father and said, "I am very pleased to meet you, but I'd be much happier to meet your son." Erdős was leaving for Australia the next week but was happy to re-route his trip via Madras.

Generosity and passion

This speaks volumes of his generosity and his passion to encourage young mathematicians, says Krishnaswami. When he went to the airport to receive the visitor, he recalls being nervous but Erdős broke the ice by reciting this poem.

*This is the city of Madras / The home
of the curry and the dal
Where Iyers speak only to Iyengars/
And Iyengars speak only to God.*

Erdős said he'd modelled it after this ditty about the privileged New England families famously known as the 'Boston Brahmins'.

*This is good old Boston / The home of
the bean and the cod
Where the Lowells speak to the
Cabots / And the Cabots speak only
to God.*

Erdős also met the Governor of Tamil Nadu, K.K. Shah who was amazed that such a frail-looking man could withstand the rigours of international travel. The minute Erdős heard of the governor's fund for scholarships to high-school students who excelled in mathematics, he reached into his pocket and pulled out a sheaf of rupee notes – the amount he was given for lectures in Madras – and donated it to the fund.

Before he left, Erdős asked Krishnaswami about his plans for graduate school. And right there, he wrote him a letter of recommendation to University of California, Los Angeles (UCLA). Ernst Straus, who had worked with Albert Einstein on relativity, would be his thesis advisor. It was a perfect fit, says Krishnaswami. In the fall of '75, he started graduate studies with a full fellowship at UCLA.

On another trip to Chennai, when Erdős heard of mathematician Srinivasa Ramanujan's destitute widow, he wrote her a cheque. This quirky genius gave away most of his earnings. He had few possessions and travelled the world, solving and posing research problems with collaborators.

Mathematicians of the 20th century like to brag about their 'Erdős number' or their collaborative distance to him. Every co-author of Erdős's has the coveted Erdős number of one. Krishnaswami has written five papers with Erdős, the first of which was based on the topic they discussed that afternoon on the Marina Beach. Publishing with Erdős's co-author would give a person an Erdős number of two. Ramanujan had an Erdős number of two. Though they never met, both had co-authored papers with the Cambridge mathematician G.H. Hardy.

Einstein has an Erdős number of two via Straus. Erdős, who was at the centre of it all, has an Erdős number of zero.

The perfect end

In 1996, Erdős died of a heart attack aged 83, while at a conference in Poland. An obituary said he often mused about the perfect death. It would occur just after a lecture, when he had finished presenting a proof, and a cantankerous member of the audience would raise a hand to ask, “What about the general case?” He would respond: “I think I’ll leave that to the next generation,” and then keel over and die.

The ending was not so dramatic; and his legacy far more substantial. Through his life and work, he continues to inspire mathematicians to find elegant solutions to long-standing puzzles and problems.

(Alladi Krishnaswami, who edited his father’s memoir, *The Alladi Diary*, is currently writing his own memoir titled *Mathematics: People, Personalities and the Profession* to be published by World Scientific.)

The writer is a Boston-based science journalist.

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