

Dr. B. V. Raman

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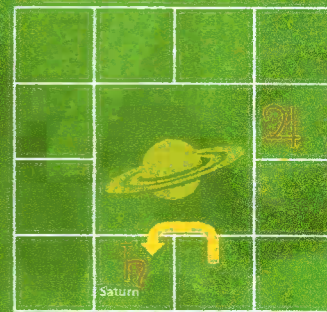
## Srinivasa Ramanujan

The Mathematical Genius

### Saturn Transits into Scorpio

Can the next 2 ½ years be good for you?

From this issue – Yoga Vashishta





# Srinivasa Ramanujan: The Genius Mathematician

*India's Eternal Gift to the World*

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**S**RINIVASA RAMANUJAN AIYANGAR, more popularly known as Genius Ramanujan was born to Komalatammal and her husband Srinivasa on Thursday, the ninth day of Margasirsha (Margazhi) of Sarvajit, corresponding to 22nd December 1897 at Erode. The time of birth in a family document is indicated as 6.00 PM. The family, although poor, came from a generation of Sanskrit scholars who were also familiar with Vedic Astrology. In spite of the "curse" of poverty on the family, mother Komlatammal struggled to keep the family together.

The story of Ramanujan's life is a remarkable one by any standards. A man born in an extremely poor family, filled with extraordinary challenges throughout his life and overcoming significant hurdles on the way ends up as the greatest mathematician the world has produced and possibly will ever produce in the future. He is the real role-model for any youngster who wants to be the next greatest mathematician, scientist, engineer, doctor or even the next "Ramanujan". It will not be a surprise if the world of the twenty first century and later will hardly believe that such a person ever existed on this planet.

There are many informative publications covering the life of Ramanujan and his extensive contribution to Mathematics. The book **The Man Who Knew Infinity (A Life of the Genius Ramanujan)** by Robert Kanigel is an outstanding biographical and information filled reference publication. It carries detailed information covering the life of Ramanujan as well as many technical aspects of mathematics specially covering his immense contribution to mathematics. Kanigel's book is a valuable reference for anyone interested in Ramanujan and mathematics. Many of Ramanujan's theorems and discoveries have found extensive and extraordinary applications in modern science and technology.

## Child Prodigy Evolves into Adult Genius

Ramanujan was a child prodigy. A significant and important aspect of his life was that he evolved as a self-taught genius in mathematics. He had mastered trigonometry thoroughly by the age of twelve. He was inventing and discovering advanced and specialized theorems that left his teachers with no words to express the genius shown by their young student. From the age of fourteen he received merit certificates and academic awards. He was completing the examinations in half or less of the allotted time and was already showing his familiarity with infinite series. Ramanujan was also knowledgeable in astrology and had apparently predicted his own death before the age of thirty five years. His intuition was remarkable and that is possibly a reason that while presenting complex mathematical theorems, he did not, unlike other mathematicians, make efforts to present solid or extensive proofs often needed or expected from mathematicians to prove the validity of the presented theorems.

He took great care about acknowledging the help he received from others. It is said that his conversation with friends mostly related to complex mathematics. He would try to explain

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his extraordinary discoveries or inventions to his school class mates for whom most of the material and explanations presented were way above their limited understanding of mathematics. Ramanujan entered college in Kumbakonam in 1903. His infinite passion for mathematics resulted in focusing only on its study and virtually ignoring all other subjects. It is reported that he would finish a three-hour mathematics examination in about thirty minutes. However, he failed in F.A. (first arts) examinations from Government College, Kumbakonam in 1904 and 1905. Again, he failed F.A. from Pachiyappa College, Madras (now Chennai) in 1906 and 1907. It appeared either he was not destined to get a degree in India or India was not fortunate enough to recognize one of her most distinguished genius son with a formal degree. Later, England was fortunate to award him degrees. It is important to recognize that even though there were "academic failures", Ramanujan's reputation as an outstanding mathematician continued to rise by leaps and bounds. At the Port Trust, he may have been an "ordinary clerk" but for those who came in contact with him, he was an extraordinary person and a genius in the making. He continued on his own advanced research studies. He could not afford even to buy writing paper to do the complex and voluminous mathematical calculations. He used a slate, a mini "black-board" (early nineteenth century non-

electronic "tablet"), wrote on it using a chalk-like "pencil" and used his elbow to erase the writing. Poverty never stopped him from his passion of pursuing mathematics to the highest levels possible to mankind.

## Destiny or Life

### Synthesis of Prarabdha Karma, Free-will and Intuition

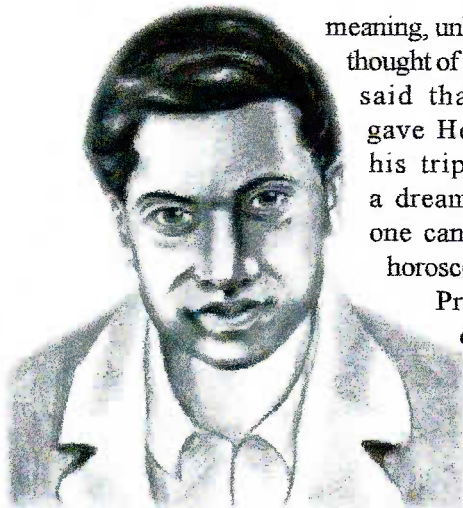
Astrology is the subject that correlates the indications shown by the planetary positions at birth with the possible events in an individual's life. The correlations are based on the principle that Prarabdhakarma or the karma that is generated by one's actions or inactions in previous life or lives has an effect on one's current life. Horoscope is the correlation map that indicates the locations of the planets and their geometry of relationships. The sages and seers have repeatedly said that the information provided by the horoscope is indicative and not deterministic. Further, the human free-will or human-effort possibly influences the indications. Therefore, an individual through free

will, can overcome or minimize the challenges or difficulties indicated in the horoscope, while also ensuring significant fulfillment of positive or encouraging indications. Thus, an individual creates his or her own satisfactory "destiny" when free-will

and Prarabdha Karma walk together. On the other hand, when an individual effort is not sufficient or inadequate, there is every possibility of Prarabdha Karma and free-will walking away from each other, thereby creating significantly less than a satisfactory "destiny" or life.

Divine Blessings as Ramanujan experienced in his life can be expressed or considered as intuition. Intuition is powerful possible catalyst for the successful synthesis of horoscope indications and human efforts. My father Dr. B.V. RAMAN has clearly and repeatedly indicated that intuition is a very helpful tool not only to the astrologers but also to all others. Ninth house represents intuition coupled with knowledge.

It is reasonable to consider that horoscope, free-will and intuition as the three principle pillars of "destiny" or life of an individual. They appeared to have significant roles in events and decisions that happened in Ramanujan's short life. The intuition in Ramanujan's life was not an "ordinary" intuition but an extraordinary one. Ramanujan and his family were ardent devotees of Goddess Namagiri (Goddess Lakshmi), consort of Lord Narasimha (fourth incarnation of Lord Vishnu) of Namakkal. Right from his young age he believed that his extraordinary ability to understand complex and advanced mathematics was due to the blessings of Goddess Namagiri. He said, "An equation for me has no



meaning, unless it represents a thought of God". Ramanujan said that the Goddess gave Her Blessings for his trip to England in a dream. In a nutshell, one can summarize that horoscope is the map of Prarabdha Karma or one's potential and intuition is the result of merging of faith or devotion and God's Blessings.

Some astrologers will debate endlessly, whether the effects of human-effort influenced Prarabdha Karma or divine-blessed intuition had a greater role in molding Ramanujan's destiny or life. Possibly, Ramanujan would have been the only person to know the truth.

As a devotee of Goddess Namagiri, Ramanujan would have expressed Life in the simplest mathematical form or equation.

$$\text{Destiny or Life} =$$

Prarabdha Karma (planetary indications) + Divine Blessing and/or Extraordinary Intuition + Free Will (human effort).

### Saturn and Venus Embrace Ramanujan

Just as Ramanujan appeared to be an enigma to many, the Rasi and Navamasa charts are also somewhat puzzling. One would normally expect that the chart of an exceptional person would indicate certain obvious, definite and clear pattern of planets occupying auspicious or favorable positions, such as one or more planets in exaltations, quadrants and trines, vargottama and/or favorable aspects.

It appears that a first look at the Rasi chart of Ramanujan shown alongside does not give an outright clue as to what makes it stand out. A single planet (Moon) is in an exalted position in the Navamasa chart. However, intuition, the mark of divine blessing, had a significant role in the life of the mathematician. The present astrological review will focus on the Rasi chart. The Ascendant is Gemini and Rasi or the Moon-sign is Pisces. Gemini ascendants are highly inclined towards mathematics and often become experts. The 2nd lord Moon is auspicious and located in the 10th house. Second house represents family, wealth and optimism. Ramanujan's optimism was superb and he had enough "wealth" to live a simple value and spiritual based life. He had good attachment to his family.

Some of the attributes or characteristics contained in Vedic Astrology for the location of planets in specific signs are indicated. *Sun in Sagittarius*: respected and popular; *Moon in Pisces*: good reputation and spiritually inclined; *Mercury in Scorpio*: bold and reckless. *Jupiter in Scorpio*: passionate and proud; *Saturn in Cancer*: poor and stubborn. *Venus in Libra*: Statesman. *Rahu and Ketu* give the results of the lords of the houses they occupy. Rahu gives the results of Sun in Cancer (expert astrologer and sickly) and Ketu gives the results of Saturn in Capricorn (intelligent, intellectual and learned).

The above indicated characteristics of the various planets, by and large, also defined Ramanujan's life and also laid the foundation for him to rise from a person of ordinary and simple background to the dazzling heights of extraordinary achievements.

Moon			Ascnd.			Venus	Sun Mars
	Rasi		Rahu (Saturn)	Mercury	Navamasa		Ketu
Ketu				Rahu Ascnd.			Jupiter
Sun	Jupiter Mercury	Venus	Mars		(Saturn)	Moon	

Venus, 5th and 12th lord, is located in Libra, its own house. Thus, Venus is favorable. A retrograde planet is favorable even in an enemy or depression rasi or navamasa and indicates effects similar to its location in the exalted position. Retrograde Saturn, 8th and 9th lord, is in 3rd house. Thus, any 8th house influence is rather limited. Therefore, Saturn is auspicious or favorable. Saturn's embrace is welcome and desirable. Thus Venus and Saturn, Mercury and Moon contribute to the overall glow of the chart.

Saturn dasa was from birth to July 1894. Mercury dasa was from July 1894 to July 1911. Ketu dasa lasted from July 1911 to July 1918. Venus dasa started in July 1918 and he was running Venus bhukthi at the time of his death on April 6, 1920. The dasas of Saturn, Mercury and Ketu helped Ramanujan to gradually ascend the divine-blessed pedestal of genius.

Further, as retrograde Saturn is in conjunction with Rahu, it reduces to a great extent, Rahu's role as a potential or possible mischief maker. The eighth house lord is Saturn and Ketu is in it and indicates religion and spiritual orientation. Rahu and Saturn aspect the 8th house. Saturn aspect of Ketu is favorable.

The 3rd house indicates courage, siblings and intelligence. Sun, lord of 3, is located in 7th house. This indicates Sun's influence tilts towards being more auspicious than otherwise.

Mother is represented by the 4th house. The fourth house lord is ascendant lord Mercury and is occupied by Mars, lord of 6 and 11. The fourth house is aspected by Moon, the lord of second and retrograde Saturn. Moon and Saturn influences are auspicious and signifies cordial relationship between the mathematician and his mother. Ramanujan was a dutiful son to his mother. His mother recognized from the comments and stories that went around the school and neighborhood that her son was not an ordinary youngster but an extraordinary genius. Her motherly intuition coupled with her interpretation of the horoscope clearly convinced her that her son would reach high pinnacle in life and would provide relief to her and the family from the poverty driven day-to-day-life. Even after death, Ramanujan's eternal reputation enabled continuing financial support to his mother and the two younger brothers.



Fifth house indicates fame and position. Venus in the 5th represents intelligence, affable manners, and statesmanlike ability. The 6th house denotes illness, diseases and enemies. Mars, lord of 6 and 11 is located in 4th and, therefore, the sixth house is not fully auspicious. Ramanujan experienced health problems throughout his life. He fell ill in England in 1917 and his condition worsened in England, possibly impacted by the limited availability of vegetarian food. He was diagnosed with tuberculosis and a severe vitamin deficiency. He was in England from 14th April 1914 to 27th February 1919. When, he returned to India in April 1919, he was very sick.

Mother Komalatammal was familiar in using local-language Panchanga (religious and astrological almanac) and other simple standard references that contained reasonable information related to religious ceremonies,

including marriage and various other samskaras (traditional social-religious-rituals). She seemed to have reasonable familiarity with comparisons of horoscopes for marriages and selecting a date for marriage. She compared the horoscopes of nine-year old Janaki and her twenty-two year old son and was satisfied that it was a reasonable and a comfortable match. The marriage took place on July 14, 1909. Apparently, Ramanujan's father Srinivasa was not happy because he was not actively involved in the selection of the bride. It may have been the reason for the father not attending the marriage. In 1912, three years later, Janaki joined her husband. They became a family.

Seventh house indicates spouse and marital happiness. Jupiter, lord of 7 and 10, is located in 6th. Jupiter is less favorable. Mercury is in the 6th house. But, as ascendant lord, Mercury is auspicious. In addition, auspicious Mercury tends to reduce any inauspicious influence of Jupiter. Venus in Libra is an indicator for a successful marriage. The short married life of Ramanujan and Janaki, though challenging, was a happy one. Ramanujan's work in higher mathematics was beyond the understanding of most people, including young Janaki.

Spiritual planet Ketu in 8th house is significantly influenced by retrograde Saturn and thus becomes auspicious. Spiritualism and values were significant part of Ramanujan's life. Ramanujan's devotion to Goddess was so intense that nothing else, including mathematics, meant anything to him. Ninth house signifies faith in divine, religion and spirituality. Retrograde Saturn as lord of 9th house is auspicious. This indicates good relationship with the father. The 10th house, indicator for career or profession, is influenced by Moon, Mars, and Jupiter. Moon, lord of the 2nd, is auspicious. Mars, 6th and 11th lord is in the 4th and aspects 10th house. Jupiter's effect can be considered to be not encouraging. Mars is neutral rather than showing tendencies of inauspiciousness. Ramanujan had a rewarding career as a mathematician par-excellence, but at every step he had to work very hard to achieve his rightful place in life and history. The umbrella of divinity protected him.

### Swayambu Ramanujan Discovers Hardy

Ramanujan wrote on 16th January 1913 a letter, in which was enclosed a long list of complex theorems, to Professors H. F. Baker, E. W. Hobson, and G. H. Hardy of Cambridge University. It was only the genius mathematician Professor Hardy, a Fellow of Trinity College, observed the brilliant material contained in Ramanujan's theorems. After reading the initial unsolicited communication by an unknown and "formally" untrained Indian mathematician, Hardy and his colleague J.E. Little wood appear to have commented

that, "not one theorem could have been set in the most advanced mathematical examination in the world." Even though, Hardy was one of the well-known mathematicians of that time and an expert in several areas, he added that many of the theorems "defeated me completely. I had never seen anything in the least like them before". After, understandably, some hesitancy, scepticism and disbelief, Hardy invited Ramanujan to England. It was the beginning of a very successful academic collaboration that not only brought a revolution in the field of mathematics but more importantly the world became aware that India could produce not merely a genius but possibly the greatest genius in the world-of-mathematics.

Hardy compared Ramanujan, in terms of genius, to the mathematical giants Leonard Euler and Carl Gustav Jacob Jacobi. Hardy said "I did not invent him. Like other great men, he invented himself". It is remarkable that Hardy, over the next thirty plus years, brought to the attention of the world to Ramanujan and his legacy. Many, directly or indirectly, claimed credit for "discovering" Ramanujan. One is reminded of a classical proverb that "success has many fathers and failure is an orphan". It is said that Ramanujan discovered Hardy. Many believe and have remarked that Ramanujan was *swayambu* or self-born. In simple terms, it is not an exaggeration to say that he had created himself.

Professor George Andrews, then a mathematics professor at University of Wisconsin made a visit to Cambridge in 1976. During the visit, he discovered the "Lost Notebook" from a huge pile of unorganized papers that were to be possibly destroyed in a matter of days. *The collection of "neglected" papers contained the very valuable "mock theta functions" document and other papers.* Mock theta function was the subject matter of Professor's thesis. This indicated that the discovered papers contained the work

conducted by Ramanujan during the last year of his life in India. His final invaluable gift to the world was the discovery of "mock theta functions".

Ramanujan was a pioneering mathematician who gave the world new theories and formulas that revolutionized this field of study. He is considered as one of the world's greatest-ever mathematicians, proving over 3,000 advanced theorems. Ramanujan's 1914 paper on "Modular Equations and Approximations to Pi" has led to computer algorithms for evaluating "pi" that are fastest in use today.

### Final Thoughts

Like many of the great personalities of the world, Ramanujan was recalled by God at the rather young age of thirty-two.

While Ramanujan's unique and extraordinary contribution to mathematics was recognized by England, America and other Western countries, India was rather slow to come forward to embrace her illustrious son who had brought so much glory to her. Janaki, the aging and later the aged orphan daughter of India was mostly ignored and for decades she led a difficult life. Limited pensions were given to her in her last years by the government and other institutions. She never complained at the treatment given to her. She was satisfied and extremely gracious to indicate that Ramanujan had once told her that mathematics would give financial support to her, regardless of whether he lived or not. She was 94, when she passed away in 1994.

While working on this article, I am delighted that I discovered that in the last half century or so many information filled books and articles on Ramanujan and his mathematical contributions were published and are available in libraries. Genius Ramanujan will be remembered for as long as the Sun and the Moon shine over the world. *(Written: 13th October 2014)* ■