RAMANUJAN'S LAST DISCOVERY WAS CRANKS- NOT MOCK THETA FUNCTIONS

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ABSTRACT

The aim of this article to explain that the last discovery of Indian mathematical genius Srinivasa Ramanujan was Crank, not mock theta functions as known to us. We also discuss about his life and causes of his death.

Keywords: Crank, mock theta functions.

LIFE OF RAMANUJAN

Mathematical genius Srinivisa Ramanujan was born on December 22, 1887 in Erde, a small town in Tamil Nadu state of India. When Ramanujan was one year old, he moved to Kumbakonam, another small town in Tamil Nadu state, where his father Srinivasa was a cloth merchant's clerk. His mother's name was Komalata Ammal. In July 1909, Ramanujan married with S. Janaki Ammal, she was thirteen year younger than him; it was an arranged marriage. Ramanujan moved to Madras (now Chennai) in 1911 and Janaki Ammal joined him in 1912 to begin their married life. He took a post as a clerk in the accounting department of the Madras Port Trust to support them. In April 1914, on invitation of G.H.Hardy, an analyst and number theorist; Ramanujan arrived to Cambridge, home of many scientists and mathematicians. Ramanujan worked for about five years with Hardy in Cambridge and written thirty research papers, including seven with Hardy. In recognition of his extra ordinary contribution to mathematics, finally Ramanujan was elected a Fellow of the Royal Society (FRS), an honor shared by Sir Isaac Newton. In spring 1919, he returned to India and he died on April 26, 1920, in Madras. His total life span was only thirty two years, four months and fourteen days. He lived his life as a strict vegetarian.

CAUSES OF RAMANUJAN'S DEATH

The main reason for his declining health was malnutrition. Earlier he was diagnosed with tuberculosis; but recently hepatic amoebiasis, a parasitic infection of the liver has been suggested as the true cause of his illness and death [1].

BRIEF HISTORY OF CRANK

It is widely known that mock theta function was the last problem on which Ramanujan worked. It is based upon his last letter to Hardy on January 20, 1920, only 96 days before of his death. G.N. Watson wrote his one of the last papers on Ramanujan's work in 1936, title of the paper was the final problem: an account of the mock theta functions, which was also the title of his retiring presidential address to the London Mathematical Society [3].In 1944, F. Dyson, then an under graduate student at Cambridge University, introduce the idea of Crank through one of his article titled some guesses in the theory of partitions, for Eureka, the undergraduate mathematics journal of Cambridge [4]. In 1980, F. Garvan wrote his Ph.D. thesis in the Pennsylvania State University, precisely on the formulas of Ramanujan relative to the soon -to-be unearthed crank [5]. In 1987, G. E. Andrews and F. Garvan were able to find and describe the Crank that had been hiding in Ramanujan's work for 68 years [6].In December 1983, Bruce C. Berndt, a professor of mathematics at the University of Illinois and acclaimed Ramanujan

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expert, had visited to Ramanujan's native place in India. In conversation with Berndt, Ramanujan's widow, S. Janaki Ammal told him that her husband worked on mathematics or in her words that he was doing the sums until four days before he died, when his pain become too great and he could no longer concentrate on mathematics. Berndt mentioned to her that Ramanujan's lost notebook contains 138 pages. She claimed that Ramanujan had many more then 138 pages in his possession at his death. She related that as her husband did his sums, he would deposit his papers in a large leather trunk beneath his bed. She told to Berndt during her husband's funeral certain people came to her home and stolen most of her husband's paper and never returns to them. She later donated the unstolen papers of Ramanujan to the University of Madras. These papers certainly contain or possibly entirely comprise the lost notebook. Berndt has provided evidence that Ramanujan devoted his very last four days prior to his death to Cranks, although of course, Ramanujan would not have used this terminology [7].Also, the wide ranging content of the lost note book [8] gives evidence that Ramanujan probably derived theorems in several topics during the last three months of his life, which also confirmed that Ramanujan's results communicated to Hardy in letter on dated January 20, 1920, were not of his last discoveries.

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