Cranks' Constant

Popular Science and Vulgar Factions

By J V NARLIKAR

IN 1828, a young Frenchman, barely 17 years old, sent a manuscript to Professor Cauchy, the leading mathematician in France. In it, he had described what he believed were fundamentally new results in the theory of algebraic equations, results that he requested Professor Cauchy to submit to the French Academy. Cauchy promised to follow up with the matter, but forgot. What was worse, he lost the manuscript. That was the last that the young man ever heard of Cauchy's promise.

In 1913, another young man, this time a clerk in the Madras Port Trust sent a letter to Professor Hardy in Cambridge. The letter contained a list of mathematical formulae, which the author, with no formal training in higher mathematics, claimed to have obtained with his own efforts. Hardy's first inclination was to throw the letter into the wastepaper basket. But something held him back. On closer examination, he found that the formulae were of three types: some were wrong, some were known already to mathematicians and some were entirely new. The latter turned out to be non-trivial and needed sophisticated methods to prove. How could an obscure and untutored man have arrived at these results? Hardy replied to the letter and thereby started a train of events that were to bring momentous results in the theory of numbers.

Public Eye

For, Hardy had discovered Srinivas Ramanujan, the young genius whose contributions to this part of mathematics are still being discussed and argued about. What Cauchy had missed by his negligence was another genius, Evariste Galois, whose work in algebra was recognised largely after his death in a duel at the young age of 21. Ramanujan also died at a young age because of tuberculosis. But he was luckier than Galois in that, thanks to Hardy, his work was recognised during his lifetime.

Let us view these events from the eyes of Hardy or Cauchy. Known as distinguished mathematicians of their times, they were in the public eye. So their mail would include letters and manuscripts soliciting their opinion and support. For, an unknown and inexperienced persons needs the backing of a recognised expert in order to get a fair hearing from the establishment. It is easy in hindsight to blame Cauchy for his negligence and praise Hardy for his perceptiveness.

Indeed, what is not appreciated by those who pass such swift judgments is that, given the limited time at his disposal, the expert has to exercise value judgment in selecting a few and discarding a lot of such unsolicited mail. The sender of the mail may be a genius like Galois or Ramanujan, or he or she may be just a crank. And, the reality is that geniuses are few and far between while cranks are in plenty.

Quantum Theory

In this day and age of advanced and high-tech communication, crank mail has proliferated. First, because of media exposure many scientists are much more in the public eye than in the days of Hardy or Cauchy. And, secondly, it has become that much more easy to communicate.

Science advances through a method of trial and error, through a certain discipline in which speculations and verification have their roles to play. Scientific theories are forever on probation and can be dislodged if new facts so warrant. But theories that have withstood the tests of experimental checks for a long enough period acquire a confidence and stability that make them harder to dislodge. The special theory of relativity, quantum theory, the study of electromagnetic force, etc., are examples of such stabilised frameworks.

A mathematical theorem has an even more solid base. Given the basic assumptions, if a theorem has been rigorously proved, there can be no exceptions or loopholes in its validity. For example, it has been proved that barring a few special cases, you cannot trisect an angle with a ruler and compass. It is futile, therefore, on anybody's part to attempt to elaborate constructions purporting to do so. Inevitably, they turn out to be wrong somewhere.

From my own experience of crank mail, the largest number of senders are theorists. A favourite target of my correspondents is the theory of gravitation, whether Newton's or Einstein's. Again, they may not have a strong enough base in mathematics and physics to appreciate what these theories are: but they are ready with their own brand which they would claim as superior.

In my early days of such correspondence, I tried arguing with the cranks to convince them why they are wrong. In one case, I asked the theorist to provide the detailed mathematical version of his theory; only then would I pass comments. Back came the rejoinder: "Sir, as you are the mathematician, I was relying on you to provide the mathematical base of my ideas." It is a no-win situation.

Unless, you follow the practice of my friend who is a distinguished scientist in Cambridge. He keeps an address book of cranks with different theories and directs one to the other while himself withdrawing to the sidelines. Another scientist friend from Princeton, belonging to an earlier generation is known for his old world politeness. He would write to his correspondent who is bent on disproving the quantum theory in something like these words: "These are deep questions and I admire your courage in tackling such issues..."

My own practice nowadays is to concede defeat. I reply in the following words: "Because of my own weakness, I am unable to understand arguments without physical evidence and mathematical reasoning, and so I am unable to offer comments on your work".

Real Geniuses

Not all such letters are unrewarding, however. Amid a lot of crank letters claiming to trisect any angle with ruler and compass, a schoolteacher sent me a device which made a simple modification to the ruler and managed to trisect any angle. I forwarded his discovery to a mathematics teaching journal in the UK and it got published there.

But the path towards a fundamental discovery in science or mathematics is not easy, nor can it bypass what is already known and well established. The likes of Galois and Ramanujan occur very sparingly and discoveries like relativity or quantum theory are very few and far between. This article is not meant to discourage the real young geniuses who anyway combine inspiration with perspiration. It is aimed at the die-hard cranks. Yet I know it will not succeed: I will get more letters from them if they read this piece.

