Arithmetic of nostalgia



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The absence of a credible proof that the sutras date back to the Vedic times makes it very difficult for scholars to accept adjective 'Vedic'

What is Vedic mathematics? Normally, the phrase should mean "mathematics of Vedic origin". Indeed there are mathematical results that can be traced back to the Vedic times. In particular, one may mention the Shulva Sutra, which contains important results in geometry. The sacrificial rituals of those times required specific dimensions for the platform, as well as other details of geometrical and numerical nature. Ropes were used for measuring sections and the word "shulva" means a rope. One can trace the origin of the famous Pythagoras theorem or the Diophantine equations to Vedic times, thus long predating the Greek savants Pythagoras and Diophantus. There was one difference, however. The Greeks were more taken up with proving a theorem starting with a set of axioms; whereas our Vedic ancestors were more interested in the facts that the theorem suggested and not in the logical interconnections in the form of a proof.

While results such as these can be claimed as being of Vedic times, what is commonly called "Vedic mathematics" is something quite different. It relates to a specific piece of work claimed by the late Jagadguru Shankaracharya Swami Shri Bharati Krishna Tirthaji Maharaj (referred to henceforth as Swamiji), to belong to the Atharva Veda, which is known to be the last of the four Vedas. The work itself consists of 16 sutras describing quick short cuts to carrying out certain basic mathematical operations. These were described by Swamiji in a book entitled *Vedic Mathematics*. And there he mentions that these were found by him in the Appendix to the Atharva Veda.

Unfortunately, no authorised edition of the Atharva Veda contains these 16 sutras. Since the book mentioned above was published posthumously, we do not have any further clarification from the learned author as to where he first saw them. Manjula Trivedi, a disciple of Swamiji who was instrumental in the book being brought out, gives an account of the genesis of the book. But, again, this preface does not give a proof of the Vedic origin of these sutras.

In this context, Prof. S.G. Dani, a mathematician from the Tata Institute of Fundamental Research, has written a critical article in the *Economic and Political Weekly* in which he has argued forcefully as to why this work cannot be considered of Vedic origin and also why as a piece of mathematics it is very elementary. Prof. Dani mentions the discussion K.S. Shukla, a renowned scholar of Ancient Indian Mathematics, had with Swamiji. When Mr Shukla pointed out that the cited work does not appear in any authorised edition of the Atharva Veda, Swamiji is said to have replied that the work appeared in his own Parishishta and not in any other. This episode and the absence of a credible proof that the sutras date back to the Vedic times make it very difficult for scholars to accept the adjective "Vedic".

Leaving aside the question of origin, we could still rejoice if the actual work were of high enough standard to be considered a seminal contribution to the mathematical knowledge. An example of this type of work can be cited in another context. The late Srinivas Ramanujan had made extraordinary contributions to the mathematical branch of number theory. During his, sadly very brief, lifetime Ramanujan was recognised as a prodigy and his work was internationally appreciated. When he died, his papers were gifted to his Trinity College, Cambridge, where they are preserved in the library. Long after his death, when scholars happened to look through some of these papers, they discovered a mine of new results, many of them unproven. These provided challenges to later mathematicians who while proving them saw them as highly original contributions to the theory of numbers. The same criterion can be applied to these sutras. Do they in any way advance our understanding of mathematics? Hardly. They are tricks of performing arithmetical operations quickly and by no standard of assessment can they be considered fundamental contributions to advanced mathematics.

In this context we may make a comparison. Consider a person who has the ability to perform arithmetical operations fast. There are such persons so gifted that some of them have beaten a pocket calculator in a race to perform various sums based on these operations. Can we put them in the same class as Ramanujan? While appreciating their extraordinary ability to perform such sums quickly, we should also be aware that what they are doing is elementary maths. No doubt, those who are habitually intimidated by school maths are struck with awe when they come across such demonstrations. However, judged against the international level of mathematics, we know that these are exercises in number crunching and do not constitute real mathematics.

Indeed, as one crosses the barrier of school mathematics and widens one's scope and horizon one notices the reason why mathematics is often called an "art" rather than a science. For, then one finds different varieties of the subject, each with its own aesthetic driving force, to be viewed like a picture or a piece of sculpture or to be enjoyed as a musical composition. In this scheme logically connected arguments lead one to the final destination. Numbers may or may not form part of this scheme: if they do, they are not the main actors in the drama being played. Which is why, what is called Vedic mathematics, besides not being Vedic, is not mathematics either.

Considerable work is still needed to determine how much science or mathematics was known to our Vedic ancestors. There are several difficulties that may arise. One of those is typified by the above example of the so-called Vedic mathematics. Many of our ancient writings have been contaminated by later additions and so, *prima facie*, one is not sure whether a certain piece of literature is authentically of the era it is supposed to belong to.

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