Vedic Maths' : myths and facts

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What is "Vedic" Mathematics? I am referring here what has popularly come to be understood by that name, and not what it should strictly mean. Going by the propaganda reports "Vedic Maths"' is an *"amazingly compact and powerful system of calculation"*, and one also hears things like *"once you have learnt the 16 sutras by heart, you can solve any long problem orally"*, and so on. Incredible hyperbole indeed !! Actually it is nothing of the sort. It is essentially a compilation of some tricks in simple arithmetic and algebra. The term "trick" is not used here in any pejorative sense, meaning to convey deceit of some sort. It just means a short cut, with a bit of psychological appeal to it. "Vedic" mathematics is indeed a collection of short cut procedures, applicable to only an assortment of special situations, and quite an incoherent one at that. It is thus really not a "system", though there is a popular misconception to that effect.

The so called Vedic mathematics (VM) first made its appearance in print in the book **'Vedic Mathematics'**[12], first published in 1965, authored by **Sri Bharati Krishna Tirtha**, who was the Shankaryacharya of the Puri Mutt from 1925 until he passed away in 1960. The book was published posthumously by some disciples of the Shankaracharya. The book presents some "sutras", claimed to be from the ancient Vedic lore, and describes some procedures, supposedly coming from the sutras, to deal with some specific arithmetical/algebraic problems. Some background about the genesis of the book may be found in various write-ups included in the beginning of the book. Apparently Tirthaji had earlier been giving demonstrations on the theme for some decades, and there is a specific mention of some regular classes held at the Nagpur University in 1952. The write-ups provide also a variety of other details. Though on the whole one finds many specific details missing, and many statements there would not stand logical scrutiny, the accounts are readable to get an overall picture. In what follows we shall examine various issues about VM, both internal to it and concerning its significance in the present overall context; the reader is encouraged to see also the articles [2], [3], [4] by the author.

Are the "sutras" from the Vedas?

The Vedas have been well-documented and studied thoroughly by scholars, both Indian and western. There is nothing akin to the sutras of VM in the genuine Vedic literature. Indeed, there isn't *any text in Sanskrit* containing the sutras of VM. The sutras, adding up to barely 50 words in Sanskrit, first made their appearance in Tirthaji's book, which is *in English*.

Even if there were to be a text that was somehow escaped attention of the interested scholars, it would have similarities in style of language, presentation, overall contents etc. It is far from the case here. It has already been pointed out by the General Editor Dr. V.S. Agrawala in his Foreword to Tirthaji's book, concluding that *"the style of language [of the sutras] points to their discovery by Sri Swamiji himself"*.

When confronted by Prof. K.S. Shukla, a scholar of ancient Indian mathematics, to show the sutras in a copy of the Atharvaveda (as claimed by Tirthaji), the Shankaracharya said that *they were only in his own Parishishta to the Atharvaveda!* (see [10], [11]). Even a Shankaracharya can not add to the Vedas; or else they would cease to be ancient texts. Unfortunately however Tirthaji seems, as seen from the preface of the book he authored, to be given to using the term "Vedic" in a vague all-encompassing way, while at the same time treating it as ancient. Such a mixup is illogical and inadmissible even from a basic intellectual point of view.

Do the sutras convey mathematical ideas?

There is a naive belief, fostered by the author and later by others, that the "sutras" incorporate in them some mathematical ideas. This is blatantly absurd. For instance *"Ekadhikena purvena"*, which just means "by one more than the previous one" does not convey any full sense in any context, mathematical or otherwise. I once argued (see [2]) that if it can have the mathematical meaning as claimed, it can also be about family planning; while I meant to highlight the illogic of the contention, one of the well-known English proponents of VM thought that was a serious idea giving another application of the "sutra"! A string of words which can be interpreted in widely varied contexts in essence can not be said to have any of the meanings. Additional contextual factors can sometimes enable one to focus on a particular meaning, but no such context exists for the sutras of VM, which as we have seen are stand-alone strings of words.

What do the tricks of VM signify?

The so called sutras are nothing but tabs stuck to certain procedures, as short phrases or titles, which help recall the procedure or trick. The trick itself had to be known separately. The tabs could just as well have been in any other language. Their being in Sanskrit would (and was perhaps designed to) impress people, but has no contextual significance.

It is absurd to imagine that the 16 sutras hold the key for everything. They stand for specific procedures in each case, with an occasional variation here and there. Leave alone anything outside, the sutras do not even cover many things from the book itself; the author keeps adding what he calls "sub-sutra" and even with that many things are left out.

Some of the "sub-sutras" ("veshtanam", "vilokanam") are too general even to tab a procedure. ("vilokanam" could as well be an instruction to watch out at the traffic lights!). They serve no purpose other than to show off with a bit of Sanskrit to the laity.

On the whole, the exercise may be compared to calling, say *"kanda batata thalipithu"* a "sutra" from say *Jnaneswari*, and claiming that *Jnaneswari* teaches you how to make masala dosas, magically just with those words, without having to describe anything of the recipe or procedure involved!

How ancient are the tricks?

The tricks by and large could not be very old. In the first place for a trick to be known the relevant concepts need to exist. The decimal point representations, involved in the opening trick, came to be introduced only in the sixteenth century. There are no decimal fractions even in the works of Bhaskaracharya from the 12 th century (or any of the earlier Indian mathematicians over the centuries like Aryabhata, Brahmagupta, Sridhara and so on) leave alone the ancient Vedic times. Many other operations involved in VM also have no relation to ancient Indian mathematics, all the way from the Shulbasutras from the Vedic times, to the Kerala mathematics of the fourteenth to sixteenth centuries [8]; Tirthaji's book also shows acute lack of knowledge of the genuine ancient Indian mathematics, given especially the context that the author is trying to be superlative about Indian achievements; (for ancient Indian mathematics the reader may refer for example [5], [9] and [8])

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The kind of calculations dealt with could not have been of frequent occurrence until the twentieth century. Tirthaji's exposition of the tricks (perhaps only some of them to begin with) came in around the middle of the twentieth century. They may in fact have come into general use just around then, and Tirthaji may have been the first expositor. It is interesting to note that similar compilation also came about in Germany at the hands of Trachtenberg, at around the same time.

What is role of VM in mathematics?

Mathematics in all its majesty consists of deep ideas concerning numbers, computation, shapes, symmetry, movement, interrelation between various structures etc., and has several branches such as, number theory, group theory, topology, algebraic geometry, harmonic analysis, combinatorial mathematics - to name just a few.

VM on the other hand is a handful of tricks involving elementary arithmetic and algebra. Moreover these lack generality in applicability, and theoretical coherence. Tirthaji in his book talks of applications to calculus, and there are attempts by proponents of VM to show that it is applicable to other areas as well, but the results are shabby and superficial, and do not reach anywhere near the heart of the matter. They have hardly found any acceptance in the professional mathematical community, as can be seen from even a cursory look at such professional sources as the Mathematical Reviews.

In mathematics it is important to focus on concepts and their interrelations. VM simply tends to spoon-feed a few concoctions which are far from being needful to the mathematical diet of the students.

How worthwhile is it to pursue VM?

The only use of tricks of VM is to help speed calculations in certain special situations. In particular the main aspects of clarification of concepts, logical thinking etc. are not served by VM. Excessive focus on VM can therefore be positively harmful to the overall growth of a child's mathematical talents.

Being able to calculate fast has lost whatever importance it had, with the advent of calculators. It may be compared with developing the ability to run fast on a special race track. While it could indeed be useful on occasion, only a

few would find it worth investing effort and money on such an endeavour, when for all your practical needs you can use a vehicle to go much faster, rather than slog over a bumpy and rough road to which you would not have got used to. Both of these are worthwhile if you either have a flare for it, or your particular context demands it in some way. However you have to consider how much time, effort and money are worth spending on it, and not be carried away by the propaganda around.

It is often claimed that VM is well-appreciated in other countries, and even taught in some schools in UK etc.. St. James Independent School, London which is often quoted in this context, is a school run by the 'School of Economic Science' which is, as I learnt from a letter I received from Mr. James Glover, the Head of Mathematics at the School (and writer of the recent books on VM), "engaged in the practical study of Advaita philosophy". Of course it is a matter of individual choice as to how to view such a connection, but the point I wish to make is that general claims of appreciation abroad can thus be very misleading.

If attaining skill in speed arithmetic is the aim, VM is really but one stream. There are also other systems, going back to the "Trachtenberg speed arithmetic" from the 1950's and its later day variants (see [1], [7] and [6]). One ought to take a comprehensive and objective view, and not be carried away by the load of "ancient wisdom" ballyhoo, which is not even remotely true in this instance.

While of course the utility of VM can not be totally refuted (as with many other things), its cost-effectiveness is a serious issue. It is in the nature of things in VM that the principle of diminishing returns sets in very fast. The examples that you learn at the outset, while being introduced to it in introductory exposures, could easily be the last worthwhile things you may learn, making the rest of the pursuit quite futile.

TAKE CARE !!!

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