Myths and reality : On 'Vedic mathematics'

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We in India have good reasons to be proud of a rich heritage in science, philosophy and culture in general, coming to us down the ages. In mathematics, which is my own area of specialisation, the ancient Indians not only took great strides long before the Greek advent, which is a standard reference point in the Western historical perspective, but also enriched it for a long period making in particular some very fundamental contributions such as the place-value system for writing numbers as we have today, introduction of zero and so on. Further, the sustained development of mathematics in India in the post-Greek period was indirectly instrumental in the revival in Europe after "its dark ages".

Notwithstanding the enviable background, lack of adequate attention to academic pursuits over a prolonged period, occasioned by several factors, together with about two centuries of Macaulayan educational system, has unfortunately resulted, on the one hand, in a lack of awareness of our historical role in actual terms and, on the other, an empty sense of pride which is more of an emotional reaction to the colonial domination rather than an intellectual challenge. Together they provide a convenient ground for extremist and misguided elements in society to "reconstruct history" from nonexistent or concocted source material to whip up popular euphoria.

That this anti-intellectual endeavour is counter-productive in the long run and, more important, harmful to our image as a mature society, is either not recognised or ignored in favour of short-term considerations. Along with the obvious need to accelerate the process of creating an awareness of our past achievements, on the strength of authentic information, a more urgent need has also arisen to confront and expose such baseless constructs before it is too late. This is not merely a question of setting the record straight. The motivated versions have a way of corrupting the intellectual processes in society and weakening their very foundations in the long run, which needs to be prevented at all costs.

The so-called " Vedic mathematics" is a case in point. A book by that name written by Jagadguru Swami Shri Bharati Krishna Tirthaji Maharaja (Tirathji, 1965) is at the centre of this pursuit, which has now acquired wide following; Tirthaji was the Shankaracharya of Govardhan Math, Puri, from 1925 until he passed away in 1960. The book was published posthumously, but he had been carrying out a campaign on the theme for a long time, apparently for several decades, by means of lectures, blackboard demonstrations, classes and so on. It has been known from the beginning that there is no evidence of the contents of the book being of Vedic origin; the Foreword to the book by the General Editor, Dr. A.S.Agrawala, and an account of the genesis of the work written by Manjula Trivedi, a disciple of the swamiji, make this clear even before one gets to the text of the book. No one has come up with any positive evidence subsequently either.

There has, however, been a persistent propaganda that the material is from the Vedas. In the face of a false sense of national pride associated with it and the neglect, on the part of the knowledgeable, in countering the propaganda, even educated and well meaning people have tended to accept it uncritically. The vested interests have also involved politicians

in the propaganda process to gain state support. Several leaders have lent support to the "Vedic mathematics" over the years, evidently in the belief of its being from ancient scriptures. In the current environment, when a label as ancient seems to carry considerable premium irrespective of its authenticity or merit, the purveyors would have it going easy.

Large sums have been spent both by the Government and several private agencies to support this "Vedic mathematics", while authentic Vedic studies continue to be neglected. People, especially children, are encouraged to learn and spread the contents of the book, largely on the baseless premise of their being from the Vedas. With missionary zeal several "devotees" of this cause have striven to take the "message" around the world; not surprisingly, they have even met with some success in the West, not unlike some of the gurus and yogis peddling their own versions of "Indian philosophy". Several people are also engaged in "research" in the new "Vedic mathematics."

To top it all, when in the early nineties the Uttar Pradesh Government introduced "Vedic mathematics" in school text books, the contents of the swamiji's book were treated as if they were genuinely from the Vedas; this also naturally seems to have led them to include a list of the swamiji's sutras on one of the opening pages (presumably for the students to learn them by heart and recite!) and to accord the swamiji a place of honour in the " brief history of Indian mathematics" described in the beginning of the textbook, together with a chart, which curiously has Srinivasa Ramanujan's as the only other name from the twentieth century!

For all their concern to inculcate a sense of national pride in children, those responsible for this have not cared for the simple fact that modern India has also produced several notable mathematicians and built a worthwhile edifice in mathematics (as also in many other areas). Harish Chandra's work is held in great esteem all over the world and several leading seats of learning of our times pride themselves in having members pursuing his ideas; (see, for instance, Langlands, 1993). Even among those based in India, several like Syamdas Mukhopadhyay, Ganesh Prasad, B.N.Prasad, K.Anand Rau, T.Vijayaraghavan, S.S.Pillai, S.Minakshisundaram, Hansraj Gupta, K.G.Ramanathan, B.S.Madhava Rao, V.V.Narlikar, P.L.Bhatnagar and so on and also many living Indian mathematicians have carved a niche for themselves on the international mathematical scene (see Narasimhan, 1991). Ignoring all this while introducing the swamiji's name in the "brief history" would inevitably create a warped perspective in children's minds, favouring gimmickry rather than professional work. What does the swamiji's "Vedic mathematics" seek to do and what does it achieve? In his preface of the book, grandly titled " A Descriptive Prefatory Note on the astounding Wonders of Ancient Indian Vedic Mathematics," the swamiji tells us that he strove from his childhood to study the Vedas critically " to prove to ourselves (and to others) the correctness (or otherwise)"of the "derivational meaning" of "Veda" that the " Vedas should contain within themselves all the knowledge needed by the mankind relating not only to spiritual matters but also those usually described as purely 'secular', 'temporal' or 'worldly'; in other words, simply because of the meaning of the word 'Veda', everything that is worth knowing is expected to be contained in the vedas and the swamiji seeks to prove it to be the case!

It may be worthwhile to point out here that there would be room for starting such

an enterprise with the word 'science'! He also describes how the " contemptuous or at best patronising " attitude of Orientalists, Indologists and so on strengthened his determination to unravel the too-long-hidden mysteries of philosophy and science contained in ancient India's Vedic lore, with the consequence that,"after eight years of concentrated contemplation in forest solitude, we were at long last able to recover the long lost keys which alone could unlock the portals thereof."

The mindset revealed in this can hardly be said to be suitable in scientific and objective inquiry or pursuit of knowledge, but perhaps one should not grudge it in someone from a totally different milieu, if the outcome is positive. One would have thought that with all the commitment and grit the author would have come up with at least a few new things which can be attributed to the Vedas, with solid evidence. This would have made a worthwhile contribution to our understanding of our heritage. Instead, all said and done there is only the author's certificate that "we were agreeably astonished and intensely gratified to find that exceedingly though mathematical problems can be easily and readily solved with the help of these ultra-easy Vedic sutras (or mathematical aphorisms) contained in the Parishishta (the appendix portion) of the Atharva Veda in a few simple steps and by methods which can be conscientiously described as mere 'mental arithmetic' (paragraph 9 in the preface). That passing reference to the Atharva Veda is all that is ever said by way of source material for the contents. The sutras, incidentally, which appeared later scattered in the book, are short phrases of just about two to four words in Sanskrit, such as Ekadhikena Purvena or Anurupye Shunyam Anyat. (There are 16 of them and in addition there are 13 of what are called sub-sutras, similar in nature to the sutras).

The first key question, which would occur to anyone, is where are these sutras to be found in the Atharva Veda. One does not mean this as a rhetorical question. Considering that at the outset the author seemed set to send all doubting Thomases packing, the least one would expect is that he would point out where the sutras are, say in which part, stanza, page and so on, especially since it is not a small article that is being referred to. Not only has the author not cared to do so, but when Prof.K.S.Shukla, a renowned scholar of ancient Indian mathematics, met him in 1950, when the swamiji visited Lucknow to give a blackboard demonstration of his "Vedic mathematics", and requested him to point out the sutras in question in the Parishishta of the Atharva Veda, of which he even carried a copy (the standard version edited by G.M.Bolling and J.Von Negelein), the swamiji is said to have told him that the 16 sutra demonstrated by him were not in those Parishishtas and that "they occurred in his own Parishishta and not any other" (Shukla, 1980, or Shukla, 1991). What justification the swamiji thought he had for introducing an appendix in the Atharva Veda, the contents of which are nevertheless to be viewed as from the Veda, is anybody's guess. In any case, even such a Parishishta, written by the swamiji, does not exist in the form of a Sanskrit text.

Let us suppose for a moment that the author indeed found the sutras in some manuscript of the Atharva Veda, which he came across. Would he not then have preserved the manuscript? Would he not have shown at least to some people where the sutras are in the manuscript? Would he not have revealed to some cherished students how to look for sutras with such profound mathematical implications as he attributes to the sutras in question, in that or other manuscripts that may be found? While there is a specific

mention in the write-up of Manjula Trivedi, in the beginning of the book, about some 16-volume manuscript written by the swamiji having been lost in 1956, there is no mention whatever (let alone any lamentation that would be due in such an event) either in her write-up nor in the swamiji's preface about any original manuscript having been lost. No one certainly has come forward with any information received from the swamiji with regard to the other questions above. It is to be noted that want of time could not be a factor in any of this, since the swamiji kindly informs us in the preface that " Ever since (i.e. since several decades ago), we have been carrying on an incessant and strenuous campaign for the India-wide diffusion of all this scientific knowledge".

The only natural explanation is that there was no such manuscript. It has in fact been mentioned by Agrawala in his general editor's foreword to the book, and also by Manjula Trivedi in the short account of the genesis of the work, included in the book together with a biographical sketch of the swamiji, that the sutras do not appear in hitherto known Parishishtas. The general editor also notes that the style of language of the sutras "point to their discovery by Shri Swamiji himself" (emphasis added); the language style being contemporary can be confirmed independently from other Sanskrit scholars as well. The question why then the contents should be considered" Vedic" apparently did not bother the general editor, as he agreed with the author that "by definition" the Vedas should contain all knowledge (never mind whether found in the 20th century, or perhaps even later)! Manjula Trivedi, the disciple has of course no problem with the sutras not being found in the Vedas as she in fact says that they were actually reconstructed by her beloved " Gurudeva," on the basis of intuitive revelation from material scattered here and there in the Atharva Veda, after " assiduous research and 'Tapas' for about eight years in the forests surrounding Shringeri." Isn't that adequate to consider them to be "Vedic"? Well, one can hardly argue with the devout! There is a little problem as to why the Gurudeva himself did not say so (that the sutras were reconstructed) rather than referring to them as sutras contained in the Parishishta of the Atharva Veda, but we will have to let it pass. Anyway the fact remains that she was aware that they could not actually be located in what we lesser mortals consider to be the Atharva Veda.

The question of the source of the sutras is merely the first that would come to mind, and already on that there is such a muddle. Actually, even if the sutras were to be found, say in the Atharva Veda or some other ancient text, that still leaves open another fundamental question as to whether they mean or yield, in some cognisable way, what the author claims; in other words, we would still need to know whether such a source really contains the mathematics the swamiji deals with or merely the phrases, may be in some quite different context. It is interesting to consider the swamiji's sutras in this light. One of them, for instance, is Ekadhikena Purvena which literally just means" by one more than the previous one." In chapter I, the swamiji tells us that it is a sutra for finding the digits in the decimal expansion of numbers such as 1/19, and 1/29, where the denominator is a number with 9 in the unit's place; he goes on to give a page-long description of the procedure to be followed, whose only connection with the sutra is that it involves, in particular, repeatedly multiplying by one more than the previous one, namely 2, 3 and so on, respectively, the "previous one" being the number before the unit's place; the full procedure involves a lot more by way of arranging the digits which can in no way be read

off from the phrase.

In Chapter II, we are told that the same sutra also means that to find the square of a number like 25 and 35, (with five in unit's place) multiply the number of tens by one more than itself and write 25 ahead of that; like 625, 1,225 and so on. The phrase Ekanyunena Purvena which means " by one less than the previous one" is however given to mean something which has neither to do with decimal expansions nor with squaring of numbers but concerns multiplying together two numbers, one of which has 9 in all places (like 99,999, so on.)!

Allowing oneself such unlimited freedom of interpretation, one can also interpret the same three-word phrase to mean also many other things not only in mathematics but also in many other subjects such as physics, chemistry, biology, economics, sociology and politics. Consider, for instance, the following " meaning": the family size may be allowed to grow, at most, by one more than the previous one. In this we have the family-planning message of the 1960s; the "previous one" being the couple, the prescription is that they should have no more than three children. Thus the lal trikon (red triangle) formula may be seen to be " from the Atharva Veda," thanks to the swamiji's novel technique (with just a bit of credit to yours faithfully). If you think the three children norm now outdated, there is no need to despair. One can get the two-children or even the one-child formula also from the same sutra; count only the man as the "previous one" (the woman is an outsider joining in marriage, isn't she) and in the growth of the family either count only the children or include also the wife, depending on what suits the desired formula!

Another sutra is Yavadunam, which means "as much less;" a lifetime may not suffice to write down all the things such a phrase could "mean," in the spirit as above. There is even a sub-sutra, Vilokanam (observation) and that is supposed to mean various mathematical steps involving observation! In the same vein one can actually suggest a single sutra adequate not only for all of mathematics but many many subjects: Chintanam (think)!

It may be argued that there are, after all, ciphers which convey more information than meets the eye. But the meaning in those cases is either arrived at from the knowledge of the deciphering code or deduced in one or other way using various kinds of contexual information. Neither applies in the present case. The sutras in the swamiji's book are in reality mere names for various steps to be followed in various contexts; the steps themselves had to be known independently. In other words, the mathematical step is not arrived at by understanding or interpreting what are given as sutras; rather, sutras somewhat suggestive of the meaning of the steps are attached to them like names. It is like associating the 'sutra' VIBGYOR to the sequence of colours in rainbow (which make up the white light). Usage of words in Sanskrit, a language which the popular mind unquestioningly associates with the distant past(!), lend the contents a bit of antique finish!

An analysis of the mathematical contents of Tirthaji's book also shows that they cannot be from the Vedas. Though unfortunately there is considerable ignorance about the subject, mathematics from the Vedas is far from being an unexplored area. Painstaking efforts have been made for well over a century to study the original ancient texts from the point of view of understanding the extent of mathematical knowledge in ancient times. For instance, from the study of Vedic Samhitas and Brahamanas it has been noted that

they had the system of counting progressing in multiples of 10 as we have today and that they considered remarkably large numbers, even up to 14 digits, unlike other civilizations of those times. From the Vedanga period there is in fact available a significant body of mathematical literature in the form of Shulvasutras, from the period between 800 bc and 500 bc, or perhaps even earlier, some of which contain expositions of various mathematical principles involved in construction of sacrificial 'vedi's needed in performing 'yajna's (see, for instance, Sen and Bag 1983).

Baudhyana Shulvasutra, the earliest of the extant Shulvasutras, already contains, for instance, what is currently known as Pythagoras' Theorem (Sen and Bag, 1983, page 78, 1.12). It is the earliest known explicit statement of the theorem in the general form (anywhere in the world) and precedes Pythagoras by at least a few hundred years. The texts also show a remarkable familiarity with many other facts from the so-called Euclidean Geometry and it is clear that considerable use was made of these, long before the Greeks formulated them. The work of George Thibaut in the last century and that of A.Burk around the turn of the century brought to the attention of the world the significance of the mathematics of the Shulvasutras. It has been followed up in this century by both foreign and Indian historians of mathematics. It is this kind of authentic work, and not some mumbo-jumbo that would highlight our rich heritage. I would strongly recommend to the reader to peruse the monograph, The Sulbasutras by S.N.Sen and A.K.Bag (Sen and Bag, 1983), containing the original sutras, their translation and a detailed commentary, which includes a survey of a number of earlier works on the subject. There are also several books on ancient Indian mathematics from the Vedic period.

The contents of the swamiji's book have practically nothing in common with what is known of the mathematics from the Vedic period or even with the subsequent rich tradition of mathematics in India until the advent of the modern era; incidentally, the descriptions of mathematical principles or procedures in ancient mathematical texts are quite explicit and not in terms of cryptic sutras. The very first chapter of the book (as also chapters XXVI to XXVIII) involves the notion of decimal fractions in an essential way. If the contents are to be Vedic, there would have had to be a good deal of familiarity with decimal fractions, even involving several digits, at that time. It turns out that while the Shulvasutras make extensive use of fractions in the usual form, nowhere is there any indication of fractions in decimal form. It is inconceivable that such an important notion would be left out, had it been known, from what are really like users manuals of those times, produced at different times over a prolonged period. Not only the Shulvasutras and the earlier Vedic works, but even the works of mathematicians such as Aryabhata, Brahmagupta and Bhaskara, are not found to contain any decimal fractions. Is it possible that none of them had access to some Vedic source that the swamiji could lay his hands on (and still not describe it specifically)? How far do we have to stretch our credulity?

The fact is that the use of decimal fractions started only in the 16th century, propagated to a large extent by Francois Viete; the use of the decimal point (separating the integer and the fractional parts) itself, as a notation for the decimal representation, began only towards the end of the century and acquired popularity in the 17th century following their use in John Napier's logarithm tables (see, for instance, Boyer, 1968, page 334).

Similarly, in chapter XXII the swamiji claims to give " sutras relevant to successive differentiation, covering the theorems of Leibnitz, Maclaurin, Taylor, etc. and a lot of other material which is yet to be studied and decided on by the great mathematicians of the present-day Western world;" it should perhaps be mentioned before we proceed that the chapter does not really deal with anything of the sort that would even remotely justify such a grandiloquent announcement, but rather deals with differentiation as an operation on polynomials, which is a very special case reducing it all to elementary algebra devoid of the very soul of calculus, as taught even at the college level.

Given the context, we shall leave Leibnitz and company alone, but consider the notions of derivative and successive differentiation. Did the notions exist in the Vedic times? While certain elements preliminary to calculus have been found in the works of Bhaskara II from the 12th century and later Indian mathematicians in the pre-calculus era in international mathematics, such crystallised notions as the derivative or the integral were not known. Though a case may be made that the developments here would have led to the discovery of calculus in India, no historians of Indian mathematics would dream of proposing that they actually had such a notion as the derivative, let alone successive differentiation; the question here is not about performing the operation on polynomials, but of the concept. A similar comment applies with regard to integration, in chapter XXIV. It should also be borne in mind that if calculus were to be known in India in the early times, it would have been acquired by foreigners as well, long before it actually came to be discovered, as there was enough interaction between India and the outside world.

If this is not enough, in Chapter XXXIX we learn that analytic conics has an " important and predominating place for itself in the Vedic system of mathematics," and in Chapter XL we find a whole list of subjects such as dynamics, statics, hydrostatics, pneumatics and applied mathematics listed alongside such elementary things as subtractions, ratios, proportions and such money matters as interest and annuities (!), discounts (!) to which we are assured, without going into details, that the Vedic sutras can be applied. Need we comment any further on this? The remaining chapters are mostly elementary in content, on account of which one does not see such marked incongruities in their respect. It has, however, been pointed out by Shukla that many of the topics considered in the book are alien to the pursuits of ancient Indian mathematicians, not only form the Vedic period but until much later (Shukla, 1989 or Shukla, 1991). These include many such topics as factorisation of algebraic expressions, HCF (highest common factor) of algebraic expressions and various types of simultaneous equations. The contents of the book are akin to much later mathematics, mostly of the kind that appeared in school books of our times or those of the swamiji's youth, and it is unthinkable, in the absence of any pressing evidence, that they go back to the Vedic lore. The book really consists of a compilation of tricks in elementary arithmetic and algebra, to be applied in computations with numbers and polynomials. By a "trick" I do not mean a sleight of hand or something like that; in a general sense a trick is a method or procedure which involves observing and exploring some special features of a situation, which generally tend to be overlooked; for example, the trick described for finding the square of numbers like 15 and 25 with 5 in the unit's place makes crucial use of the fact of 5 being half of 10, the latter being the base in which the numbers are written. Some of the tricks given in the book are quite interesting

and admittedly yield quicker solutions than by standard methods (though the comparison made in the book are facetious and misleading). They are of the kind that an intelligent hobbyist experimenting with numbers might be expected to come up with. The tricks are, however, based on well-understood mathematical principles and there is no mystery about them.

Of course to produce such a body of tricks, even using the well-known is still a non-trivial task and there is a serious question of how this came to be accomplished. It is sometimes suggested that Tirthaji himself might have invented the tricks. The fact that he had a M.A.degree in mathematics is notable in this context. It is also possible that he might have learnt some of the tricks from some elders during an early period in his life and developed on them during those "eight years of concentrated contemplation in forest solitude:" this would mean that they do involve a certain element of tradition, though not to the absurd extent that is claimed. These can, however, be viewed only as possibilities and it would not be easy to settle these details. But it is quite clear that the choice is only between alternatives involving only the recent times.

It may be recalled here that there have also been other instances of exposition and propagation of such faster methods of computation applicable in various special situations (without claims of their coming from ancient sources). Trachtenberg's Speed System (see Arther and McShane, 1965) and Lester Meyers' book, High-Speed Mathematics (Meyers, 1947) are some well-known examples of this. Trachtenberg had even set up an Institute in Germany to provide training in high-speed mathematics. While the swamiji's methods are independent of these, for the most part they are similar in spirit.

One may wonder why such methods are not commonly adopted for practical purposes. One main point is that they turn out to be quicker only for certain special classes of examples. For a general example the amount of effort involved (for instance, the count of the individual operations needed to be performed with digits, in arriving at the final answer) is about the same as required by the standard methods; in the swamiji's book, this is often concealed by not writing some of the steps involved, viewing it as "mental arithmetic." Using such methods of fast arithmetic involves the ability or practice to recognise various patterns which would simplify the calculations. Without that, one would actually spend more time, in first trying to recognise patterns and then working by rote anyway, since in most cases it is not easy to find useful patterns.

People who in the course of their work have to do computations as they arise, rather than choose the figures suitably as in the demonstrations, would hardly find it convenient to carry them out by employing umpteen different ways depending on the particular case, as the methods of fast arithmetic involve. It is more convenient to follow the standard method, in which one has only to follow a set procedure to find the answer, even though in some cases this might take more time. Besides, equipment such as calculators and computers have made it unnecessary to tax one's mind with arithmetical computations. Incidentally, the suggestion that this "Vedic mathematics" of the Shankaracharya could lead to improvement in computers is totally fallacious, since the underlying mathematical principles involved in it were by no means unfamiliar in professional circles.

One of the factors causing people not to pay due attention to the obvious questions

about "Vedic mathematics" seems to be that they are overwhelmed by a sense of wonderment by the tricks. The swamiji tells us in the preface how "the educationists, the cream of the English educated section of the people including highest officials (e.g.the high court judges, the ministers etc.) and the general public as such were all highly impressed; nay thrilled, wonder-struck and flabbergasted!" at his demonstrations of the "Vedic mathematics." Sometimes one comes across reports about similar thrilling demonstrations by some of the present-day expositors of the subject. Though inevitably they have to be taken with a pinch of salt, I do not entirely doubt the truth of such reports. Since most people have had a difficult time with their arithmetic at school and even those who might have been fairly good would have lost touch, the very fact of someone doing some computations rather fast can make an impressive sight. This effect may be enhanced with well-chosen examples, where some quicker methods are applicable.

Even in the case of general examples where the method employed is not really more efficient than the standard one, the computations might appear to be fast, since the demonstrator would have a lot more practice than the people in the audience. An objective assessment of the methods from the point of view of overall use can only be made by comparing how many individual calculations are involved in working out various general examples, on an average, and in this respect the methods of fast arithmetic do not show any marked advantage which would offset the inconvenience indicated earlier. In any case, it would be irrational to let the element of surprise interfere in judging the issue of origin of " Vedic mathematics" or create a dreamy and false picture of its providing solutions to all kinds of problems.

It should also be borne in mind that the book really deals only with some middle and high school level mathematics; this is true despite what appear to be chapters dealing with some notions in calculus and coordinate geometry and the mention of a few, little more advanced topics, in the book. The swamiji's claim that "there is no part of mathematics, pure or applied, which is beyond their jurisdiction" is ludicrous. Mathematics actually means a lot more than arithmetic of numbers and algebra of polynomials; in fact multiplying big numbers together, which a lot of people take for mathematics, is hardly something a mathematician of today needs to engage himself in. The mathematics of today concerns a great variety of objects beyond the high school level, involving various kinds of abstract objects generalising numbers, shapes, geometries, measures and so on and several combinations of such structures, various kinds of operations, often involving infinitely many entities; this is not the case only about the frontiers of mathematics but a whole lot of it, including many topics applied in physics, engineering, medicine, finance and various other subjects.

Despite all its pretentious verbiage page after page, the swamiji's book offers nothing worthwhile in advanced mathematics whether concretely or by way of insight. Modern mathematics with its multitude of disciplines (group theory, topology, algebraic geometry, harmonic analysis, ergodic theory, combinatorial mathematics-to name just a few) would be a long way from the level of the swamiji's book. There are occasionally reports of some "researchers" applying the swamiji's "Vedic mathematics" to advanced problems such as Kepler's problem, but such work involves nothing more than tinkering superficially with the topic, in the manner of the swamiji's treatment of calculus, and offers nothing of

interest to professionals in the area.

Even at the school level "Vedic mathematics" deals only with a small part and, more importantly, there too it concerns itself with only one particular aspect, that of faster computation. One of the main aims of mathematics education even at the elementary level consists of developing familiarity with a variety of concepts and their significance. Not only does the approach of " Vedic mathematics" not contribute anything towards this crucial objective, but in fact might work to its detriment, because of the undue emphasis laid on faster computation. The swamiji's assertion "8 months (or 12 months) at an average rate of 2 or 3 hours per day should suffice for completing the whole course of mathematical studies on these Vedic lines instead of 15 or 20 years required according to the existing systems of the Indian and also foreign universities," is patently absurd and hopefully nobody takes it seriously, even among the activists in the area. It would work as a cruel joke if some people choose to make such a substitution in respect of their children.

It is often claimed that " Vedic mathematics" is well-appreciated in other countries, and even taught in some schools in UK etc.. In the normal course one would not have the means to examine such claims, especially since few details are generally supplied while making the claims. Thanks to certain special circumstances I came to know a few things about the St. James Independent School, London which I had seen quoted in this context. The School is run by the 'School of Economic Science' which is, according to a letter to me from Mr. James Glover, the Head of Mathematics at the School, "engaged in the practical study of Advaita philosophy". The people who run it have had substantial involvement with religious groups in India over a long period. Thus in essence their adopting " Vedic mathematics" is much like a school in India run by a religious group adopting it; that school being in London is beside the point. (It may be noted here that while privately run schools in India have limited freedom in choosing their curricula, it is not the case in England). It would be interesting to look into the background and motivation of other institutions about which similar claims are made. At any rate, adoption by institutions abroad is another propaganda feature, like being from ancient source, and should not sway us.

It is not the contention here that the contents of the book are not of any value. Indeed, some of the observations could be used in teaching in schools. They are entertaining and could to some extent enable children to enjoy mathematics. It would, however, be more appropriate to use them as aids in teaching the related concepts, rather than like a series of tricks of magic. Ultimately, it is the understanding that is more important than the transient excitement, By and large, however, such pedagogical application has limited scope and needs to be made with adequate caution, without being carried away by motivated propaganda.

It is shocking to see the extent to which vested interests and persons driven by misguided notions are able to exploit the urge for cultural self-assertion felt by the Indian psyche. One would hardly have imagined that a book which is transparently not from any ancient source or of any great mathematical significance would one day be passed off as a storehouse of some ancient mathematical treasure. It is high time saner elements joined hands to educate people on the truth of this so-called Vedic mathematics and prevent the

use of public money and energy on its propagation, beyond the limited extent that may be deserved, lest the intellectual and educational life in the country should get vitiated further and result in wrong attitudes to both history and mathematics, especially in the coming generation.

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