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Monkeys, morals, mathematics



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MANY OF us have read stories from the Indian classic *Panchatantra*, know also how that collection originated. A rich man had sons who refused to be taught the usual way. No method of classroom teaching made any impression on their brain. So how could they be educated into becoming responsible citizens? His problem was finally solved by Vishnu Sharma, a learned but practical minded teacher. He told the boys interesting stories that carried morals, which were of great use to them. The code of conduct that they assimilated from the tales would have been lost on them had it been presented as cut and dried commandments to be learnt by heart. Sharma's stories provided the rationale for the code and their very absorbing nature made it easy for the boys to appreciate them.

A somewhat similar method should be employed to make the usually tyrannical subject of mathematics "user friendly". All too often the subject is introduced to the hapless pupil as a collection of rules to be followed in order to solve problems, which also are often stated in an uninteresting fashion.

The student therefore looks upon the whole exercise as a ritual — to be learnt by heart and executed verbatim, without understanding the logical context of those problems.

The second off-putting aspect of this type of school maths is the importance given to number crunching. Firstly, the exercises in addition, subtraction, multiplication and division, followed in higher classes by manipulations of fractions already sap any enthusiasm a kid may have brought with him/her. Secondly, no attempt is made to know whether s/he can relate those exercises to worded problems. So if a kid grows with a liking for the subject it is in spite of, rather than because of our school teaching. Is there a way that opens up the logical treasure house, a method that shows kids that mathematics really is a subject to test one's thinking skills while also entertaining one's mind?

There surely is. It was my good fortune that I was introduced to it at an early age, when I was still in primary school. I was given books on recreational mathematics by my father. To most readers of this article the phrase "recreational mathematics" may sound an oxymoron. How can a subject that terrifies the child take on a recreational garb? But it does. As I discovered when I opened those books, there were no jungles of numbers to cope with. Instead there were pictures, cartoons, puzzles, even stories and anecdotes.

There was one crucial difference, however, between these books and purely recreational literature. When you read these books, you begin to appreciate that the text is trying to draw your attention to some problem that needs to be solved. There are puzzles that challenge you to solve them. And what is worth stressing, the expertise needed to solve them does not require number crunching but does demand strict adherence to the rules of logic.

Take this example. An island has two resident tribes. Tribe A is made of people who always tell the truth while those belonging to Tribe B always tell a lie and try to mislead. A tourist to the island encountered three natives walking together. He asked one of them: "Sir, to what tribe do you belong?" That worthy replied but the tourist could not follow what he said. So he asked the person standing next to him: "Will you please tell me what your friend just now said?" "Sir, he said that he belongs to Tribe A", replied the second person of the trio. At which the third gentleman said: "No, no! My friend said that he belongs to Tribe B". So, of the two companions, which one was telling the truth?

If you have got the answer, skip this paragraph otherwise read on. If the first native belonged to Tribe A, he would tell the truth and inform the tourist that he belongs to Tribe A. On the other hand, if he belonged to Tribe B, he has to tell a lie and so he would reply to the tourist that he belongs to Tribe A.

Thus, in either case, his reply would be that he belonged to Tribe A. Given this conclusion, we see that the second man was telling the truth and the third one was lying.

Notice that the problem or its solution did not involve any manipulation of numbers. Rather its solution leads us to use logical thinking. Indeed, as one drives deeper into the garden of mathematics, one discovers that logical arguments take the front seat and number crunching takes the backseat. This may help understand why in the world of expert mathematicians, a person with the mental ability of performing quick additions, multiplications etc., is not considered a mathematician. For the same reason, the so-called vedic mathematics is not an example of higher mathematics.

I, therefore, suggest that once a week the maths teacher should devote an entire period playing games and solving puzzles that have a mathematical base. This way the pupils will learn to appreciate the subject for what it really is and will cease to be afraid of it. Such entertaining byways to various aspects of mathematics do exist and are waiting to be enjoyed.

I end this account with a problem from *Lilavati*, the book of problems written by the 12th-century Indian mathematician, *Bhaskaracarya*, supposedly addressed to his talented daughter (of the same name as the book). It gives an example of the delightfully poetical way in which a mathematical problem can be posed: "The square root of half the total number of a swarm of bees went to a Malati tree, followed by another eight-ninth of the total. One bee was trapped inside a lotus flower, while his mate came humming in response to his call. O Lady, tell me how many bees were there in all?"

Ladies and Gentlemen, can you solve this question?

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