Importance of Mathematical Skills of the Vedic Period in the Modern Era

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Abstract:-
This Paper discusses about the mathematical skills that prevailed in India since the ancient vedic period and its importance and effectiveness from then to the post-vedic period and its relevance in the modern era. The different Vedas, their divisions, their meanings and contributions are dealt with to enumerate the subject under discussion. Discoveries in the field of Mathematics during the vedic and post vedic period are mentioned. The educational system that existed during those periods, the great scholars of the period and their contributions to enrich and immortalize the subjects and the times are mentioned. Various reasons for the decline of this glorious period too has been analysed.

Key words:-
Adroitness, epoch-making, sutras, Vedic Math, scriptures, cumbersome, superiority.

Introduction:-
India has been greatly renowned and respected for her adroitness in the field of mathematical sciences since ancient times. The reason for India’s being in the limelight can be ascribed to the several epoch making discoveries her people had made in the realm of mathematics. Some of these great discoveries made by Indians include the 16 sutras, the zero sign, decimal place, value system, use of minus sign, algebra of letters of the alphabet to denote unknown quantities etc. It is quite praise worthy to note that Indian people are gifted with an exceptionally great sense of time and number. An example for this can be seen in the fact that in the initial stages itself, Indians held the opinion that the universe we inhabit has a basic mathematical structure. A thorough study of the ancient period reveals that the knowledge of mathematics was highly advanced during the vedic period, that is from 500 BC to 1700 BC. A closer look in to the lives of the Indians during the vedic period brings out the reality that they were not mere pastoral people but they had proved their expertise in all levels and branches of knowledge and that too in both the theoretical and practical aspects.

Meaning of the term ‘Veda’
According to wiktionary, the word “veda” in hinduism refers to “a large body of the texts originating in ancient India.” They comprise the oldest layer of Sanskrit literature and the ancient sacred texts of Hinduism. This very word ‘veda’ has derivational meaning, and it stands for the origin, the basis and store house of all knowledge. The Vedas constitute the most ancient scriptures i.e., they deal with all branches of knowledge. Thus it can be said that the word veda has its origin from the root ‘vid’ which means ‘to know’. And the four Vedas represent divine knowledge. A detailed and thorough study of this field revels that the seers hailing from the vedic period had their eyes on developing a sort of knowledge which will encompass the worldly or the physical along with the spiritual. Human race was badly in need of this knowledge as their target was to achieve complete success and that too from various directions. Once they had materialized this, their concentration was on enhancing this store of knowledge, with future advancements and additions. They could fulfill their ambitions in the post vedic period starting from 500 BC and extending up to 1000 AD which had witnessed a great accommodation to the previously stored foundation of knowledge. In order to to attain at least a rough idea of the vast amount of knowledge gained in those times, it is divided in to different phases. The first is:-

The Initial Stage
This focuses on the period from 500 BC to 1700 BC. A look at this period discloses the fact that this was one of the most eventful periods in Indian history on account of the reason that it had the
witnessed the explosion of knowledge in the form of the four Vedas. This is the result of the meditations of all the reverent sages, seers and saints of the vedic period in absolute solitude in the deep forest. Just like Sidhartha, who had converted to Gautam Budha, these great men our forefathers had their own realizations, which is the resultant vedantic philosophy. This gave birth to the four Vedas which are Rigveda, Samaveda, Yajurveda and Atharvaveda respectively. There are certain Upanishads too that were known as Ayurveda, Gandharvaveda, Dhanurveda, and Sthapatyaveda. When each and every one of this veda is dealt with in detail it is seen that Athervaveda’s major concern is with the mathematical sciences and it is observed that even some of the parisistas of Atharvaveda and Upaveda Sthapatyaveda constitute part of mathematical sutras such as thread, clue and formulas. Other than this there are sixteen sutras and similar number of sub-sutras which can be utilized for solving any mathematical problem. These problems may pertain to arithmetic, algebra, geometry, be it plane or spherical, astronomy calculus, differential integral etc. Sthapatya upaveda on the other hand is related to engineering, architecture and all the other branches of mathematics in general.

The very famous vedic argument in prevalence always upheld the idea that the universe inhabited by humanity has its basis on a mathematical structure. Hence it was considered very essential for every human being to abide by the rules of mathematical measures and relations to gain knowledge of any fact and that too to any degree of precision one intends to. Even in the Bible when Jesus was born in the manger in Bethlehem the three wise men and the kings were guided by the star moving above their heads to take them to baby Jesus in the manger. And wonderfully they reached there quite perfectly. This same principle is applicable to the world of animals and birds who by instinct are gifted mathematicians. A very good example is that of the migratory birds which fly every year thousands of miles away from their dwelling place to distant shores in search of food and better climatic conditions and after their stay there for the stipulated period, they return to their own nests quite unharmed and without any human guidance. In a similar fashion, astral conjugation also takes place at the perfect time.

Since time immemorial great importance has been attributed to vedic mathematics on account of the fact that with the assistance of 16 simple vedic sutras, tedious and cumbersome arithmetic operations could be carried out properly and perfectly. These vedic sutras had enabled humans to solve many difficult arithmetic problems. As these sutras are very short, all arithmetic problems turn out to be very easy to solve and do not remain as problem at all. That is, these cumbersome figures can be solved without using even a pen, pencil, calculators or computers. On the contrary, with the help of mere mental arithmetic the digits are just tossed off or reeled off one after another. There is nothing to doubt that with the help of continuous practice any one can achieve so much proficiency that he will be able to solve problems faster than a computer. The mastery of these 16 sutras will help anyone to solve any problem that can be confronted under any particular heading. If any additional typical characteristics of a problem had to be solved, there are 13 sub-sutras readily available to help at anytime. If the above mentioned are the attainments of the vedic period, there are greater ones in the period that ensued.

**Achievements of post vedic period**

The knowledge gained during the vedic period had motivated many Indians to strive for better discoveries in different fields. In the field of mathematics also the same was witnessed. Some of these wonderful discoveries are described below: to denote unknown quantities, in algebra letters of the alphabet had become very useful. The use of Minus sign and Zero sign became popular in this period. To substantiate this point, one of the spiritual Indian book that belonged to 200 B.C. mentioned the earliest use of the Zero symbol. G.P. Halstead claims that “And no single mathematical creation (Zero) has been more potent for the general on-go of intelligence and powers.” It is a matter worthy of appreciation that the ancient Indians were gifted with a vast conception of time and space and were able to measure the astronomical distances of the stars. This is proved by the fact that in Hindu ceremonies of the modern era too, geometrical figures of that time are still in use. Astronomer Aryabhata, born in 476 A.D. had written the earliest extant book on algebra. Others who had rendered
A noteworthy contribution in mathematics are Bhaskara-I (522 A.D.), Brahmagupta (628 A D) Bhaskar-II (1114 A D) etc. One such significant contribution is ‘Lilavati’ written by Bhaskar (II) on arithmetic. Hogbens has praised this great contribution of India in the field of numbers and symbols.

Though the vedic and post-vedic periods had witnessed great achievements and contributions in not only mathematics, but in other fields also, the period that followed had given way to decay and was not as fruitful as these.

**Reasons for the Decline After this Glorious Period.**

Gupta empire raging from A D-320-600 is considered as a golden age of knowledge and creativity. And after this period signs of decay were visible in this field. There are many reasons contributing to this which are narrated below.

i) On account of long drawn-out political conflicts with the foreign invaders, Indo-Aryan races and their intellectuals had suffered a lot.

ii) As a result of these upheavals, there was the absence of freshness of thoughts and creativity in areas of knowledge.

iii) Though there were some revival of literary works in between, the minds of Indian people were gripped by an overall weakness.

iv) After Bhaskara (II) in 12th century in mathematics there was no great genius still Shrinivasa Ramanujan in the 20th century.

v) Other than internal decay, the rivalry among small kingdoms for superiority had an adverse effect.

vi) The fountain head of innovations and ideas, rural and urban industries had declined.

vii) Caste rigidity and the growing rigidity in social structure had resulted in the shrinking of the expanding Indian economy.

viii) Denial of education and opportunities to low caste people.

ix) Growth of local sentiments, small groups and feudalistic feelings in the place of larger conception of India as one.

All these reasons had paved the way for the declining phase that the country had experienced after the glorious achievements of the vedic and post-vedic period in knowledge and creativity.

**Conclusion**

All the above mentioned points sufficiently throw light on the fact that the mathematical skills dealt with in the Vedas and the Upavedas can quite effectively solve the tedious and difficult problems that used to arise. As discussed earlier, the post-vedic period had contributed some epoch-making discoveries not only in mathematics but in other branches of knowledge also. It couldn’t flourish further on account of the frequent invasions and rigid social structure that had brought about an unsettled condition in India and an overall decay in knowledge and creativity. These new developments were detrimental to individual’s innovative and creative ideas. Because of the negativities and loss of passion for knowledge of the people, the situation had worsened. If this situation has to be revived, both the government and also the eminent mathematicians of our times have to come forward together and work hand in hand. It will be highly beneficial to introduce vedic mathematics at school, college and university levels to nurture a fresh approach to learning mathematics in the learners of the modern generation. In the long run this will help to eliminate the permanent fear in the mind of the learners for the subject of mathematics. For many students and especially for those hailing from the rural areas and who are primarily first generation learners, mathematics is a killer subject and they all try their level best to escape from this burden. Instead of planning to remove the subject mathematics from the curriculum, the authorities should concentrate on how to make it more interesting, beneficial and creative for the learners. If the introduction of vedic mathematics will solve this problem, that must be given first priority, to enable listeners to practice mathematical skills more effectively and fruitfully. This will nourish their personality and contribute in their all around development as useful citizens of the country.

**References**