

GLIMPSES OF ANCIENT INDIAN MATHEMATICS

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Mathematics is a way of thinking, which enables us to see unifying patterns in diverse context and to analyze complex situation. The acquisition of these powers can be gratifying and in some cases addictive. Education means a process to extract knowledge from soul and apt change in the present situation. The grasping and expressing knowledge are two sides of Education. One has to acquire these qualities to develop the career and achieve various goals during life period. The seven criterion of JEEVAN VIDYA (: hard work, duty, innovations, skills, recognizing the other nature, gratitude and mercy) are to be incorporated in our proactive mindset. In my opinion, Mathematics works like CATALYST in this process.

Indian Mathematics has glorifying past, challenging present and prosperous future in leading the global Mathematics.

Lagadh was mathematician in 900 B.C. During 570 B.C. - 501 B.C. period, Bodhayan, Maitrayan, Apastambh, Katyayan and Hiranyakashi, were Mathematician who contributed to Shulba Formulae. The so called Pythagoras Theorem is actually by Bodhayan, given in these Formulae. Umaswati gave Jain mathematics in 150 B.C. Afterward Padmnabh, Varah mihir contributed to the field of Mathematics. In Bakshali writings, Mathematics is developed. Mahavir Jain had written "Ganit sar sangrah" in 850 A.D. Aryabhat who was living in Kusumpur(Patliputra) near Patna, wrote "Aryabhatiya" in 499 A.D. In Kerala, Calender based on Aryabhatiya, is followed in some places. Also the other work of Aryabhata known as "Aryashta shatam" is divided in three parts by Brahmagupta as GANITA, KALKRIYA, GOLA, Aryabhat (476 A.D.-550 A.D.) who was an Astronomer, gave value of pie, tables of sines, solutions of finding square roots, cube roots,; progressions. Later on Euler have given solutions of $ax - by = Ic$ similar to Aryabhat. Brahmgupta in 598 A.D. wrote "Brahmasphut" dealing with Pell's equation and indeterminate equations. In 1500 A.D. Neelkanth wrote a book TANTRASANGRAH. Later on Madhav, Parameshwar, Sridhar, Munjala, Sripati were some noteworthy Mathematicians who contributed to the field of Mathematics.

From 1911 A.D. to 1919 A.D., Swami Bharati Krishnateerth have given 16 main formulae and 13 supplementary formulae and Said that Mathematics is the process of stitching the tears. Before modern Mathematics era, Ramanujan (from 1887 A.D.- 1940A.D.) contributed to the Theory of Numbers and his work was acknowledged by Hardy. Smith told in his book that Hindu treatment of Indeterminate equations was original. Sir William Jones, a western Sanskrit scholar said "our discussion of geometric figures amply justify that the general character of theorems was rightly understood by Shulbkaras". This is also discussed by Burk that the Theorem of square (Pythagoras) on the diagonal, was known and proved in all it's generality by the Indian long before Pythagoras.

In “Ratri” part of Veda, the concept of limit is dealt. Mathematics principles are given in Thimtnaka and Satyanak parts of Veda. Tipnad Rishi in 1000 B.C gave gravitational concept which is now known by Newton. Kardap Rishi dealt with effective Acupressure treatment. He also gave Cloning idea by creating a cow form the skin of other cow.

I divide Ancient Indian Mathematics in four parts as follows:

1. From 1500 B.C to 200 B.C.
2. From 200 B.C. to 400 A.D.
3. From 400 A.D to 1200 A.D.
4. From 1200 A.D to 1940 A.D.

In all above ancient mathematicians I have deliberately not told about giant king of Mathematics because He is at the top of Himalayan work of Ancient Mathematics and hence to be dealt in detail. His name is Bhaskaracharya. In fact there were two BHASKARA2 (in 1114 A.D. ; 1185 A.D) and disciple of Aryabhat have written MAHABHASKARIYA, LAGHU BHASKARIYA, and EXTENDED ARYABHATA’s WORK. He explained Eclipses, lengths, breadths, inter relation of PLANETS, the values of pie, sine and proved that if p is prime no., then $1+(p-1)^2$ is divided by p. Now it is established in the name Wilson’s Principle. Bhaskara 1 gave alternative ways of solving equations given by Brahmugupta. Bhaskaracharya (Bhaskara 2) was educated by his father Maheshwar who was well known Astronomer and have written KARANGRANTH, JATKATIKA. Bhaskaracharya gave nice principles of Mathematics in his book entitled SIDHANT SHIROMANI, KARANKU-TUHAL, VASISHTA ATULYA, SARVATO BHADRAYAM, VIVAH PATALA. These books were taught for nearly seven centuries throughout our country. His famous book SIDHANT SHIROMANI consist of four parts as LEELAVATI, BIJGANITA, GOLADHYAY, GRAH-GANITA. In Ujjain, K Bhaskaracharya established a school of Mathematics. Bhaskaracharya is the last Mathematician who explained mathematical principles in a poetic way. LEELAVATI was translated in various countries and in different languages including English, Persian, Marathi. It si noted writings on TAMRAPAT; that nobody to ready for argument and interaction on Mathematics with disciples of Bhaskaracharya due to their generous brain power.

Bhaskaracharya initiated various mathematical concepts such as permutation, combination, surds, integers, different angles, parallax, infinity, Pascals triangle, Pells equation, indeterminate equations of one, two & higher degrees, areas & volumes of geometric figures. He also had given concepts of Differential & Integral Calculus which are now in the names of Euler & Newton. In fifteenth century Madhav & Parmeshwar from Kerala have extended and developed the work of Bhaskaracharya. It is said that there are 120 dimensions in our brain & most of us are using at the most 25% of them. But it seems that our ancient Indian Mathematicians might be using more than 50% of the dimensions of their respective brains.

In Rigveda, creation of Universe & some unsolved questions regarding Universe are discussed. The same occurs in different forms in interactions of scientists working in present era. Only 4% is known about Universe & still 96% is yet to be invented. Most of the Indians feel that our ancient knowledge is ignorable & foreigners knowledge is acceptable. But when inventions of ancient Indian were original, noteworthy & leading to new branches of science & technology globally.

Note that Vedic nagari is established in U.S.A & Vedic Research Institute is in England. Andrew Nicolas have written a book VERTICALLY CROSSWISE dealing with ancient Indian Mathematics.

In the early decades of twentieth century, Ramanujan & Hardy had collaboration in developing concepts of Number theory. The Number theory is much developed by Indians. Mr. D.R Kaparekar from Maharashtra gave Demlo numbers in mid period of Twentieth century. One of his Demlo number concepts is Kaparekars constant 6174. It is obtained as follows:

Take any four digit number. Arrange it in descending order. From this number, subtract the number obtained by reversing these digits. Continue this procedure. After some steps, Kaparekars constant 6174 is bound to come.

To conclude : Modern Mathematics has various branches as Topology ; Real, Complex & Functional Analysis, Algebraic Topology, Topological Algebraic Analysis, Homotopy, Homotological Algebra, Bio-mathematics, Combinatorial Mathematics, Graph Theory.

By charging our inbuilt BRAIN & MIND MOBILES with our WILL POWER charger, Ancient Mathematics is to be studied more to explore more ideas in order to lead researchers in the innovative directions of the global ongoing Mathematics.

Lastly I Say :
OUR LIFE IS MATHEMATICS =

1. ADD OUR FRIENDS BY SUCH CONFERENCES & ACTIVITIES.
2. SUBTRACT THE ENEMIES OF MATHEMATICS
3. MULTIPLY OUR JOYS WITH PATH SHOWING INVENTIONS IN MATHEMATICS
4. DIVIDE OUR SORROW & ATTEMPTS IN SOLVING YET UNSOLVED PROBLEMS OF MATHEMATICS.

WISHING THE BEST CAREER TO YOU ALL, I CONCLUDE MY TALK with one EXAMPLE of 17 Peacocks and three brothers.