

**G.S:-1****VEDAS- INDIA'S SCIENCE BASE**

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INTRODUCTION

The basis for any scientific discoveries and inventions is to explore, observe, experiment and interpret. For this, one needs to bank on prior knowledge, facts that are documented, so that the results lead to new or improved status in the given realm. It is in this context that Vedas, which are the primary texts of Hinduism, assume great importance. The word Veda means knowledge and are the most sacred scriptures of Hinduism. The Vedas are also called *Śruti* meaning that was heard and revealed to the *Seers* and ascetics. The Vedas are also considered to be uncreated, eternal and exists as sound syllables. The Vedas contain hymns, incantations and rituals. Apart from their spiritual values, they provide mankind with values for every day life. The most holy hymns and *mantras* have been put together into four collections and these are called the Rig, Sama, Yajur and Atharva Vedas. The four Vedas contain information on many aspects of arts, crafts, science and engineering.

VEDAS AS BASIS FOR SCIENCE

The Vedas cover all fields of knowledge both material and spiritual. The Vedas constitute the principal source of ancient wisdom and the Upavedas and Upanishads are an integral part of the vedic texts. The Upanishads are of philosophical nature and it is actually the Upavedas that contain information which could be regarded as forming the basis for modern science. To mention a few

- Artha-Veda—dealing with statecraft
- Ayur-Veda— concerns medicine and health
- Dhanur-Veda— discusses military science
- Gandhrva-Veda—unfolds music and arts
- Sthapatya-Veda—explains architecture

The Vedas and its concepts of science have always been linked to spirituality and this happens to be one of the reasons for their lack of recognition. The Vedas have science as integral part of the religion and the ascetics and *Seers* who have contributed were tireless seekers of knowledge and wisdom. Their pursuit of knowledge was very much akin to those of modern scientist. Most of the modern discoveries have been referred to in the Vedas and these are not mere literary concepts but proofs are available for their existence. The vedic concepts as the basis of science of India would be useful to examine its impact on modern science.

ARCHITECTURAL CONCEPT IN THE VEDAS

The science of Vasthu Satra, which concerns with the layouts and the direction of building architecture and is hot current topic the world over, is traceable to at least the year 3000BC in the Vedas. The *Gumbaz* found on the mosques all over the world actually originated as the interlocking dome in the *Stupa* of the Buddhist architectural tradition in India. The temple architecture found all over India speaks volumes for the design concept related to engineering. The building of huge structures without the use of any modern equipments actually tell the story of advanced feat in construction practices.

MEDICINE ITS RELEVANCE AS FOUND IN THE VEDAS

Medicine was considered a divine stuff and great care was exercised for the purity of the drug and there were codes of conduct for the Physicians to follow. Methods of formulation, synthesis of drugs, proper mode of administering the

drugs were adequately documented. *Saraha Samhitha* clearly stipulates rules for these and is part of Ayurveda. Even surgical procedures and implements are dealt in detail in the classic of *Susrutha*. The ancient formulations like *Kayakalpa* and *chryavanprash* astonish modern drug formulators. Blending of noble metals like gold, silver, and mercury with certain herbs and their administration has sound basis in modern medicine too. This could be traced to the present day practice of administering the metallic salts as micronutrients. In the daily routine worship also use of particular herbs are stipulated which have medicinal properties. Classic examples that are being followed to this day include Tulsi, Bilva and neem to state a few. The divinity attached to the medical sciences is clearly evident from the fact that Lord Vishnu has been deified as Sri Dhanvanthri and worshipped as great physician. He is depicted as having elixir (*amrutha*) and a leech in his hands signifying removing of bad blood and its replacement with health giving elixir. This basic concept forms the governing principle even today for treating diseases. Mention of cataract removal, dental extraction also figure in the vedic texts giving indication of level of advancement prevalent in the times.

MATHEMATICAL SCIENCES IN THE VEDAS

Mathematics can be rightly called the queen of sciences. The vedic mathematics being revived now offer solutions to complex mathematical problems that are simple and easy to follow. The *Sulba Sutra* states the concept that the diagonal chord of the rectangle makes both the squares that the horizontal and vertical sides make separately. In Vedic mathematics a decimal system of tens, hundreds, and thousands etc. where the remainder from one column of numbers is carried over to the next has been developed. The advantage of this system of nine number signs and a zero is that it allows for calculations to be easily made. Further, it has been said that the introduction of zero or *Sunya* as it is called in India as a definite part of number system in an operational sense marks one of the most important contribution and development in mathematical sciences.

Several stone columns erected in India by the King Ashoka in about 250 B.C contain preserved examples of the number system which are still in use. Similar Inscriptions are found in caves near Pune dating back to 100 B.C and Nasik dating back to 200 B.C. These earliest Indian numerals appear in a script called *Brahmi*. Medieval Indian mathematicians like Brahmagupta (seventh century), Mahavira (ninth century) and Bhaskara (twelfth century) made several important contributions and discoveries which were not known in Europe till renaissance. Some of their important contributions include import of positive and negative quantities, extracting square and cube roots and solving certain type indeterminate and quadratic equations.

The great Indian mathematician Bhaskaracharya who preceded Newton over five hundred years made some discoveries concerning the principles of differential calculus. He also produced treatise on both plane and spherical geometry and algebra and the treatise contain remarkable solutions to problems not known in Europe till late seventeenth century. The binary code which is the very backbone of any software computer application, the algorithm and the WWW that are all fundamentally resting on the concept of zero, are found in the vedic literature.

STUDY OF SPACE AND MILITARY RELATED CONCEPTS IN THE VEDAS

Dhanur Veda explains in great detail the organization of armed forces i.e the military of the times. Well-defined rules have been laid out regarding armaments and warfare. There were



also mention of missiles and other weapons in the literature. It is really amazing that conceptually the rules and arts are comparable to modern times. The strength of the army was measured in terms of *Akroni* which is synonymous with that obtaining in modern parlance. There were also wellplanned traps known as *Viyuhas* to capture the enemy. These well defined strategies are given names based on their shapes like padma (lotus), chakra (circle), virichika (scorpion) etc; Spacecrafts are referred as *pushpak vimanas*, in the literature and surprisingly their mode of take off exactly resembles that of modern aircraft. Eclipses are predicted well in advance of their occurrence and this clearly prove that astronomy and space science were prevailing at great heights.

CHEMICAL SCIENCES FROM VEDIC SOURCES

The word sugar has its origin in Sanskrit and considered to be derived from the term *Sharkara* and the technology for the same has been perfected in the times of yore. Oxford dictionary also defines that the word camphor is derived from the term found in the sanskrit root word of *karapuram*. Metallurgy, the science of extraction of metals, is also found in its advanced state. Excavations at the ancient sites reveal the remnants of the metallic pieces that were made using Flake Copper Technology with Forge Finishing. The making of Tin metal was also known and the technical term for its ore viz. Cassiterite has its term related to the sanskrit word *Kasthira*. The art of making of ornamental silver, gold and other techniques of making the alloys were perfected during the vedic period.

Making of dyes from plant sources, its isolation and application have all been perfected, indicating the level of technical information available which form the basis of modern chemistry. The word Indigo for a dye has its origin relating to the term India, and the Aniline dyes have their term found in the Sanskrit word *Nilam* (blue).

Several synthetic methodologies which we adopt to this day in the practice of chemistry with modification and improvements were actually found in the Vedas though as abstract.

VEDAS VERSUS MODERN SCIENCE

The Vedas were written by *Seers* and ascetics who were not mere pontiffs or *pundits* but great thinkers and they practiced science in their routine. Many of the ancient wisdom and knowledge are in the form of abstract verses and hymns and the real secret lies in unraveling the truth. Vedas teach science not as something special for people with higher knowledge and thinking but as part and parcel of their day-to-day affairs. The Vedas could form the very potential basis for the modern science as research into the vedic concepts gain momentum by use of advanced scientific instruments. Environmental awareness, Organic farming and development of Green Technologies all speak volumes for the Vedas that advocates living in consonance with Nature which the modern science is in the process of rediscovering.

SUMMARY

The Vedas as the principle source of knowledge forming the basis of many of the scientific discoveries and inventions have been outlined. The significance of the presence of many a concepts in the Vedas have also been discussed to highlight their relevance to the various fields of science, arts and crafts. Since the subject of the Vedas is of enormous dimension only those aspects having impacts on the science base are mentioned that have significance for further thoughts. The scientific aspects of Vedas have already been attracting attention world-wide and it is hoped that the future rests on development of mankind along the righteous ways, which the modern science, strives for and the vedas stand for.