

## Book Review

# The Ancient Roots of Indian Science

Arvind Gupta

*Science in Sanskrit Scriptures, Yash Gupta,*

*Matrix Publishers, New Delhi, 2023.*

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**W**ith over five thousand-year-old continuous living civilisation, India has given a lot to the world in the realms of ideas, thoughts and culture. Unfortunately, its contributions have remained neglected and under-researched. The concepts of atom, the heliocentric solar system, and galaxies were known to ancient Indians. Indian thinking in astronomy and medicine was quite advanced. Mathematics was enriched by the decimal system that originated in India. Trigonometric ratios and the Pythagoras theorem were known to ancient Indians and Indian numerals were picked up by the Arabs and transferred to the Europeans. There is renewed interest in the Indian traditional medicine system. Ayurveda — a holistic approach to healing the mind, body and soul together — has been known since ancient times and is still widely practiced. Yoga and meditation have gained immense popularity around the world. The present generation, steeped in western ideas, thus needs to be made aware of the vast, interconnected Indian knowledge system.

Indian thinkers approached the world in a holistic framework, combining materialism and spiritualism in a pragmatic way. In Indian thought, nature is worshipped and women are regarded as 'Shakti' (force) and given God-like status. While India's invention of the 'zero' is well known, less known is the fact that ancient Indian 'Rishis',

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sages and saints had thought deeply about the nature of the universe, the physical world, mind, body and spirit to come up with ideas which are extremely relevant even today.

### **Rich Scientific Heritage**

Dr. Yash Gupta, a Fellow of the Royal College of Surgeons (FRCS), has a practice in plastic and trauma surgery in Oxford and London. He is an alumnus of the Harvard leadership programme. While at Harvard, Gupta came across some verses in India's Sanskrit literature which aroused his curiosity about how science was regarded in ancient India. He delved into ancient Sanskrit texts like *Brahma Samhita*, *Sushruta Samhita*, *Bhagavad Gita*, *Isopanishada*, *Srimad Bhagavad*, etc., where he found a rich treasure of scientific ideas whose relevance modern science is discovering today. For instance, whereas *Brahma Samhita* described the Sun along with other planets rotating in a giant orbit in a galaxy, the idea of a sun-centric solar system was propounded by Galileo only in the fifteenth century and he was punished for it by the Church. *Srimad Bhagavad Purana* has even a detailed description of the velocity of the Sun. The ideas of modern physics about nature find a reflection in Vedic hymns and verses.

*Sushruta Samhita*, written by Sushruta around 500 BCE (Before the Common Era), has detailed description of what is now called plastic surgery. It describes the instruments and techniques of plastic surgery. The author, a plastic surgeon himself, points out that the technique for cheek rhinoplasty surgery was originally described by Sushruta (500 BCE), and mentioned by Vagbhata 400 CE (Common Era), in his book *Ashtanga Hridayam*. *The Gentleman's Magazine* (1794) carried an article describing an incident in which a potter of Pune, successfully, reconstructed the nose of a prisoner who had been disfigured in a battle.

### **Fascination with Time**

Indian thinking was fascinated with time and the cycles of creation and destruction. The author holds, "the concept of time is so clearly and acutely defined, from the micro-second to 311.04 trillion years in a number of Vedic scriptures of which *Srimad Bhagavatam* offers a fairly accurate description of these concepts". A shloka (verse) in *Srimad Bhagavatam* describes sixteen principal forces which shape the universe. The concept of 'anu' (atom), 'parmanu' (smaller than atom or nucleus) has been mentioned

in several places in the *Bhagavad Gita and Srimad Bhagwat Purana*. Indians were aware that the universe (Brahmanda) had a large number of galaxies and that matter could be divided and sub-divided into fine particles.

Mathematics and science were quite advanced in the first millennia. Sanskrit texts like *Surya Sidhanta* by Aryabhata (4<sup>th</sup> century CE), have also been mentioned by the author. *Surya Sidhanta* travelled to the Arabs (8<sup>th</sup> century CE) and from there to Europe. The concept of 'zero' is contained in a verse in *Isopanishad* which says "that is complete, this is complete, complete arises from complete and complete taken from complete then complete remain." A Sanskrit verse contained a numerical code which describes the value of Pi accurately. Aryabhata had calculated the value of Pi as 3.1416, which is a fair approximation.

Military science was quite advanced in ancient times. The authors of *Mahabharata* and *Srimad Bhagavad Purana* give descriptions of 'brahamastras' or 'divine' weapons, which are akin to ballistic missiles of today. There are many stories in Sanskrit literature with vivid descriptions of aircraft and spacecraft moving to far away constellations. They reveal a high degree of scientific imagination going back thousands of years.

### **Informative Annexures**

The book has two informative annexures. The first annexure gives a description of the present age. The second provides key references to Sanskrit texts. Hindus believe in the ever-repeating time cycle of yugas – *Satyuga, Treta Yuga, Dwapar Yuga* and *Kaliyuga*. One cycle of *yuga* is 4.32 million years. One thousand *yugas* is equal to 8.64 billion years. Creation cycle is one hundred years of *Brahma*, which comes to 311.40 trillion years. This shows that the ancient Indian thinkers could comprehend a vast stretch of time extending trillions of years. In the cycle of four *yugas*, *Kaliyuga* is the latest. It can be dated from 3102 BCE. Aryabhata, in his book *Arayabhattiya* in 499 CE, gives the exact date of the beginning of the *Kaliyuga* as 3102 BCE. The same date is confirmed in the Aihole inscription of the Chalukyan Pulakeshin-II (7<sup>th</sup> century CE).

*Science in Sanskrit Scriptures* is meant for the lay reader. It is an introductory work that arouses the curiosity of the reader in ancient Indian scientific thinking. The book establishes beyond doubt that ancient Indian philosophers contemplated deeply about nature, human psychology and the practical aspects of life. There is now a growing

interest among scholars in ancient Indian philosophy. In Indian thinking, there was no dichotomy between science and religion. Logic and free thinking were encouraged. Indian outlook towards science was integrative as opposed to the Cartesian approach of the modern scientific method. Contemplation and experience were regarded as legitimate methods of acquiring knowledge. The notion that what is ancient is necessarily anti-science is itself unscientific. Lucid and well-illustrated, this book is a welcome addition to the growing literature on ancient Indian scientific thinking.