

# Ancient Indian Philosophical System and Scientific Heritage of India

Shivani Kumari

Assistant Professor, Ramshobha College of Education, Bankheta, Ramgarh, Jharkhand, India

Email: [shivani.p.0136978\[at\]gmail.com](mailto:shivani.p.0136978[at]gmail.com)

**Abstract:** *Life on Earth is shared by humans and animals, but their approaches to existence differ significantly. Animals often live aimlessly, driven by instinct, while humans, endowed with intelligence and an inquisitive nature, seek to understand themselves and the world. Unlike animals, humans think beyond the present, contemplating the future and exploring the realities of life through logical reasoning. This inherent curiosity has led to the development of philosophy, known in Indian tradition as 'Darshan,' which translates to the 'love of knowledge' in English. Philosophy is fundamental to human nature, addressing profound questions such as: Who is man? What is the purpose of life? What is the nature of the world? Indian philosophy goes beyond intellectual curiosity, offering practical solutions to life's problems, alleviating sorrows, and addressing spiritual dissatisfaction. European philosophical history shows how the expansion of knowledge has led to the birth of various sciences, such as physics, chemistry, astronomy, and geology. In India, science has been deeply intertwined with philosophy since ancient times. It is one of the world's oldest scientific traditions. During the Indus Valley Civilization, Indians developed advanced urban planning, drainage systems, metallurgy, and textile manufacturing. With the arrival of the Aryans, Indian science flourished further, particularly in mathematics, astronomy, chemistry, and medical science. By 200 BCE, and until the 11th century CE, Indian science had reached remarkable levels of advancement. India's scientific contributions have profoundly shaped the modern world. The concept of zero and the decimal system, foundational to mathematics, were discovered in India, simplifying mathematical complexities. Eminent mathematicians like Aryabhata, Brahmagupta, and Bhaskaracharya significantly advanced algebra and trigonometry. Aryabhata calculated the value of pi and the Earth's circumference, while also explaining planetary motions and solar eclipses. Varahamihira made notable contributions to astrology and astronomy. In medicine, Ayurveda emerged during the post-Vedic period, with Charaka and Sushruta making pioneering advances documented in the Charaka Samhita and Sushruta Samhita. India also excelled in metallurgy, as evidenced by the Iron Pillar of Delhi, which has resisted rusting for over 1,600 years. In chemistry, Nagarjuna made substantial contributions to metallurgy and medicine. Atomic theory, as described in ancient Indian philosophy, aligns closely with modern scientific principles. Furthermore, Vedic astrology studied celestial phenomena, including the Sun, Moon, constellations, and seasons, contributing to a deeper understanding of the universe. The ancient Indian philosophical and scientific systems have not only shaped Indian society and culture but have also enriched global knowledge. These systems laid the foundation for the development of modern science and philosophy. Today, this rich heritage continues to inspire India's journey toward becoming a global leader, a source of immense pride for all Indians.*

**Keywords:** Darshan, Liberation, Tatvavigyan, Pramanavigyan, Manusmriti, Vastushastra, Metallurgy, Aryabhatiya, Panchsiddhantika, Brihat Samhita, Brihat Jataka, Sushruta Samhita, Charaka Samhita, Rasendraangal, Rasaratnakara, Kakshaputtantra, Arogya Manjari, Yogasar, Ashtanga Yoga

## 1. Introduction

The precise circumstances under which Indian philosophy originated remain unclear due to a lack of concrete evidence. However, it is well established that philosophy began to evolve as a distinct discipline during the Upanishadic period. This raises an important question: What is considered "philosophy" in the Indian tradition? In India, philosophy, or *Darshan*<sup>1</sup>, refers to the knowledge that enables one to understand the fundamental elements of existence in detail. Thus, *Darshan* can be described as the "knowledge of elements."

The foundations of Indian philosophy and its principles are rooted in the Vedas, considered the source of divine wisdom. The word "philosophy" originates from the Sanskrit root *drish*, meaning "to see." In this context, *Darshan* implies perceiving the truth, not just through the physical eyes but through the "inner eye" or the "eye of wisdom." As the Sanskrit saying states:

"दृश्यता इति दर्शनम्"

(Philosophy is that which enables one to perceive reality.)

This deeper vision, also referred to as the "divine eye" or "eye of knowledge," illuminates the path to wisdom. Another relevant verse asserts:

"ऋते ज्ञानात् न मुक्तिः"

(Liberation<sup>2</sup> cannot be attained without knowledge.)

In essence, *Darshan* is the means to "see" or perceive the true nature of reality, both inwardly and logically. This perception is not limited to sensory experience but extends to intellectual and spiritual insights. Indian philosophy places a strong emphasis on metaphysics, defined as:

"दृश्यते यथार्थं तत्त्वमनेन"

(That which allows the experience of the ultimate reality is philosophy.)

Philosophy is thus deeply intertwined with the pursuit of elemental knowledge, guiding humanity to live life with a profound understanding of oneself and the world. Humans differ from animals in their capacity for reasoning and their ability to contemplate not just the present but also future outcomes. This pursuit of logical understanding and truth is called *Darshan*.

In English, *Darshan* translates to "philosophy," which literally means "the love of knowledge." Fundamental philosophical inquiries—such as "What is man?" and "How should one live?"—have been pondered across civilizations since the dawn of human existence. According to Indian philosophy, such contemplation leads to the vision of the ultimate reality. Thus, in India, philosophy is aptly called *Darshan*.

A study of European philosophy reveals that as human knowledge expanded, it branched into various disciplines, leading to the birth of sciences such as physics, chemistry, astrology, and geology. Since its inception, science has been an integral part of philosophy, and the two fields remain interrelated. In the modern era, science continues to expand, exploring new horizons. European philosophy now encompasses branches like metaphysics (*Tatva-Vigyan*<sup>3</sup>), epistemology (*Pramana-Vigyan*<sup>4</sup>), logic, ethics, and aesthetics.

In Indian philosophy, experience is classified into two categories:

- 1) **Sensuous Experience** (*Pratyaksha Anubhava*): Knowledge obtained directly through the senses.
- 2) **Non-Sensuous Experience** (*Paroksha Anubhava*): Knowledge acquired through spiritual or non-sensory means.

Indian philosophers emphasize that philosophy is not merely theoretical or bookish knowledge but the outcome of profound reasoning and contemplation. From its inception, Indian philosophy has been inherently practical, aiming to address the challenges of human existence. Philosophy is seen as a guiding path that helps individuals overcome suffering and lead meaningful lives. As stated:

"सम्यक् दर्शनं सम्पन्नः कर्मभिर्न निबद्धते।  
दर्शनेन विहीनस्तु संसारं प्रतिपाद्यते॥"

(A person who has attained the right vision (*Samyak Darshan*) is not bound by karma, while one devoid of this vision remains entangled in the worldly cycle.)

This sentiment, echoed in the *Manusmriti*<sup>5</sup>, underscores the importance of philosophy in Indian tradition. Indian philosophy integrates seamlessly into life, emphasizing practicality, self-improvement, and introspection.

Key concepts in Indian philosophy include religion (*Dharma*), karma, the transient nature of the world, suffering (*Dukha*), renunciation, and meditation. Core features of Indian philosophy include the pursuit of liberation (*Moksha*), belief in the soul's existence, optimism, the fruits of karma, and the doctrine of reincarnation. Philosophies aligned with the Vedas are termed theistic, while those that reject Vedic authority are classified as atheistic.

The primary schools of Indian philosophy include:

#### **Samkhya, Yoga, Nyaya, Vaisheshika, Mimamsa, Vedanta**

The ultimate aim of *Tatva Darshan* in Indian philosophy is the alleviation of all human suffering. Philosophy in India is closely linked to religion, with both serving as complementary paths toward wisdom. Through the pursuit

of knowledge, Indian philosophy seeks to illuminate truth and provide a comprehensive perspective on life.

By examining the arguments of various schools of thought—*Charvaka*, *Buddhist*, *Jain*, *Samkhya*, *Yoga*, *Nyaya*, *Vaisheshika*, and *Mimamsa*—Indian philosophy offers a profound framework for resolving life's challenges. It enables individuals to distinguish between the material and the spiritual, ultimately guiding them toward their life's purpose.

Philosophy is a powerful tool for navigating life's complexities, and Indian philosophy has significantly contributed to the growth and development of scientific thought.

#### **Scientific Heritage of India**

Indian philosophy has been a foundational basis for science. Now, let us explore India's scientific heritage, which has enabled Indian scientists to hold a prominent position in contributing to global advancements in science. Since ancient times, India has been the custodian of an immense intellectual legacy. The Indus Valley Civilization, one of the oldest in the world, existed between 7000 and 600 BCE as a developed historical society. Evidence of urban planning, advanced drainage systems, tools, agriculture, metals like copper and bronze, and various utensils has been unearthed from this civilization. These findings clearly demonstrate India's rich scientific and intellectual heritage dating back to antiquity.

India's scientific tradition predates even the Rigvedic period. During that era, Indian civilization began making strides in various scientific fields. An analysis of ancient Indian texts such as the Vedas, Upanishads, and Puranas reveals that these works are not only spiritual and philosophical but also deeply connected to disciplines like mathematics, astronomy, and medical science. Great sages and philosophers of India made pioneering contributions not only in science but also in knowledge, art, literature, yoga, medical science, and metallurgy. The ancient heritage of India vividly illustrates the expansion of art, literature, science, and technology.

The mathematical discoveries of Indian scholars remain integral to modern science. For example, the concept of zero, which revolutionized mathematics, finds its roots in Vedic literature. Additionally, ancient Indian texts discuss techniques related to algebra, geometry, and the concept of square roots. Beyond mathematics, India's intellectual pursuits extended to areas such as gem therapy, astronomy, agriculture, and architecture, evident from the historical records of its civilization.

India is also credited with the invention of numerous games that have become part of global culture, such as chess, ludo, snakes and ladders, and card games.

With its rich cultural and philosophical traditions, ancient India also boasts an equally remarkable heritage in science and technology. Indian achievements in astronomy, mathematics, medicine, *Vastushastra*<sup>6</sup> (architecture), metallurgy<sup>7</sup>, and other fields were not only impressive for

their time but also served as a foundation for the development of modern science.

In this article, we will delve deeper into the scientific accomplishments of ancient India and their significant role in shaping the world as we know it today.

### Astronomy and Mathematics

Ancient Indian contributions to mathematics and astronomy stand out as unique achievements in world history. The discovery of zero, the decimal system, and the principles of advanced geometry are some of the remarkable contributions made by Indian mathematicians.

#### Aryabhata

Aryabhata's contributions to mathematics and astronomy are unparalleled. He introduced the concept of zero, which revolutionized the world of mathematics. Aryabhata accurately described the positions and movements of planets and significantly advanced the Indian numeral system. His work in astronomy clarified that the Earth rotates on its axis, a concept far ahead of its time. He also calculated the positions of planets in a heliocentric model and provided a precise value for Pi.

Aryabhata's renowned treatise, '**Aryabhatiya**<sup>8</sup>,' presents detailed descriptions of his principles and observations related to the positions and motions of planets, eclipses, seasons, and more. His contributions to mathematics include the explanation of zero, the square root and cube root of numbers, trigonometry, and the measurement of the Earth's circumference. He also explored the Earth's rotation and the conditions of planets with remarkable precision, making his work invaluable to the world.

#### Varahamihira

Varahamihira was a renowned sixth-century Indian mathematician and astronomer. His vast knowledge and contributions to science and astrology remain unparalleled. One of his most significant works is '**Panch-Siddhantika**<sup>9</sup>,' where he elaborated on five astronomical principles, shedding light on the complexities of the cosmos. He also authored the '**Brihat Samhita**<sup>10</sup>,' a comprehensive text that covers topics such as Vastushastra (architecture), astrology, planetary movements, cloud formation, eclipses, time calculation, and even agriculture.

In the field of Indian science, Varahamihira's contributions are immense and multifaceted. Another of his notable works, '**Brihat Jataka**<sup>11</sup>,' incorporates elements of geography, astronomy, botany, and animal science. His pioneering studies laid the groundwork for many modern scientific advancements and remain a testament to the rich intellectual tradition of ancient India.

### Ayurveda and Medical Science

Indian medical science, known as Ayurveda, is one of the oldest and most holistic medical systems in the world. The primary aim of Ayurveda is not only to treat diseases but also to maintain a balance between the physical, mental, and spiritual health of an individual.

#### Sushruta

Sushruta, regarded as the father of surgery in ancient India, made unparalleled contributions to medical science. His famous treatise, '**Sushruta Samhita**<sup>12</sup>,' is a monumental work that details surgical techniques and plastic surgery. This text describes various herbs and medicines to prevent infections and provides methods for treating over a thousand diseases. Sushruta Samhita includes surgical techniques for treating bone fractures, stopping bleeding, and other ailments. Remarkably, ancient Indian practices even used ants to join severed limbs instead of stitches.

Sushruta's work also describes advanced surgical procedures, including Caesarean section, cataract surgery, and rhinoplasty (reconstructive surgery of the nose). His forward-thinking approach laid the foundation for modern medicine and gave India a prominent identity in the field of ancient medical science.

#### Charak

Charak is synonymous with Ayurveda and is considered one of its greatest scholars. He combined his deep knowledge of scriptures with Sankhya and Vaisheshik philosophies. Charak extensively traveled to care for patients and provide medical services, earning him the title '**Charak**,' meaning one who moves or roams.

In his renowned text, '**Charaka Samhita**<sup>13</sup>,' Charak elaborated on the origins and development of the fetus, human anatomy, and the functioning of the body. He explained the imbalances of the three primary doshas—Vata (air), Pitta (bile), and Kapha (phlegm)—and their impact on health. Charak also addressed disease prevention, diagnosis, treatment, and rejuvenation techniques. His contributions solidify India's role in providing the world with the scientific heritage of Ayurveda.

### Metallurgy and Chemistry

Ancient India made extraordinary progress in metallurgy and chemistry, as evidenced by the iron pillar of Delhi, which remains rust-free even after centuries. Techniques for refining gold, copper, and other metals originated in India and laid the groundwork for modern chemical sciences.

#### Nagarjuna

Nagarjuna was a pioneering Indian scientist and philosopher who excelled in metallurgy, chemistry, and medicine. His famous works, '**Rasaratnakara**<sup>14</sup>' and '**Rasendra-Mangal**<sup>15</sup>,' are testaments to his groundbreaking research. Nagarjuna also studied mercury for 12 years, identifying 18 significant processes (sanskaras) of mercury, which became the basis for later experiments in the field.

In addition to metallurgy, Nagarjuna contributed significantly to medicine, authoring texts like '**Kakshaputtantra**<sup>16</sup>,' '**Arogya Manjari**<sup>17</sup>,' and '**Yogasar**<sup>18</sup>.' His research on gold and mercury helped create remedies for rare diseases. Western scientific advancements in the field of chemistry are often linked to principles established by Nagarjuna, underscoring his vital role in shaping global chemical sciences.

## Architecture and City-Building

Indian architectural traditions date back to the Indus Valley Civilization, which showcased sophisticated city planning, drainage systems, and fortified structures.

### Indus Valley Civilization

The Indus Valley Civilization displayed advanced engineering techniques for water management and harvesting. Homes were equipped with efficient drainage systems and bathrooms. Tools made from various metals, evidence of city layouts, and utensils illustrate the civilization's advanced technological and architectural progress.

### Yoga

Yoga, first mentioned in the **Rigveda**, is described as a spiritual practice for attaining higher knowledge. Originating in northern India during the Indus-Saraswati civilization, yoga has been practiced for millennia, as evidenced by seals and artifacts showing yogic postures.

### Maharishi Patanjali

Maharishi Patanjali, a revered sage of Indian culture, made invaluable contributions to yoga, Ayurveda, and Sanskrit grammar. His seminal work, the '**Yoga Sutras**,' forms the foundation of yogic philosophy and practice. Patanjali outlined the **eight limbs of yoga (Ashtanga Yoga<sup>19</sup>)**, which guide practitioners toward physical, mental, and spiritual well-being. These eight limbs are:

- 1) **Yama** - Ethical disciplines
- 2) **Niyama** - Self-discipline
- 3) **Asana** - Physical postures
- 4) **Pranayama** - Breath control
- 5) **Pratyahara** - Sense withdrawal
- 6) **Dharana** - Concentration
- 7) **Dhyana** - Meditation
- 8) **Samadhi** - Union with the divine

Patanjali's teachings emphasize not only physical health but also mental tranquility and spiritual enlightenment, making his contributions timeless and universal.

## 2. Conclusion

Ancient Indian scientific heritage is a source of inspiration not only for Indian society but for the entire humanity. Thus, it is evident that India has made unique progress not only in the cultural and spiritual fields but also in science and technology. The need of the hour is for modern scientists and scholars to study this heritage and use it to address today's challenges.

Ancient Indian science should therefore be evaluated not only from a historical perspective but also in terms of its potential to contribute to the future. Philosophy and science are two complementary aspects of the same truth. Science cannot exist without philosophy, nor can philosophy thrive without science.

Indian scientific heritage is deeply rooted in Indian philosophy. It has been mentioned in our ancient scriptures, Vedas, and Upanishads that science originated in India long ago. This legacy highlights the significant role India has

played in positioning the world as a leader in the realm of science.

Research in specific fields, based on contemporary needs, should be prioritized to ensure this heritage is utilized effectively. Ultimately, the above discussion establishes that Indian cultural and knowledge traditions are not only literary and spiritual but are fundamentally grounded in science.

Thus, the ancient Indian scientific heritage, which is vast and intertwined with the Indian philosophical system, deserves to be showcased to the world for its timeless relevance and immense potential to contribute to human progress.

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