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Gaja-sastra: India's forgotten Elephant Science

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Abstract

This article revisits *Gaja-sastra*, the forgotten Indian science of elephants, and traces the evolution of elephantology in India from the 3rd century BC onwards. Drawing on classical texts such as *Gajasastra*, *Hastyayurveda*, *Matangalila*, *Manasollasa* and *Hastividyarnava*, it shows how ancient Indian scholars developed systematic knowledge of elephant behaviour, medicine, training, cognition, and welfare through observation and practical experience. Far from being purely mythological, these traditions embodied a proto-scientific framework that integrated ethics, management, and ecological understanding. At a time of intensifying human–elephant conflict and wider conservation challenges, revisiting these indigenous knowledge systems offers valuable insights into coexistence, animal welfare, behavioural understanding and culturally rooted approaches to elephant management that may inform current conservation practices.

Keywords: Ancient Indian science, Asian elephant, elephant medicine, ethology, traditional ecological knowledge.

Introduction

In the present day, elephants are too often seen as antagonists, especially when incidents of human-elephant conflict receive wide media attention because they involve loss of life or property. In such discussions, however, we often forget the depth of the human-elephant relationship. Archaeological evidence suggest that hominin engagement with elephants extends deep into pre-history (Agam & Barkai, 2018; Ben-Dor *et al.*, 2011). Asian elephants are thought to have emerged in what is now Myanmar and to have spread across Asia, while several hominin species already inhabited the region (Lim & Campos-Arceiz, 2022). Although the phrase "evolutionary times" should be used cautiously, humans and elephants do share a very long history of co-existence and interaction. Particularly in India, elephants were integral to society from at least the Indus Valley period and were referred to as '*Pilu*', an Indic word derived from tooth or tusk (Ketkar, 1952). Subsequently, names such as *Ibha*, *Hastin*, *Gaja*, *Kunjara* and *Matang* (Witzel, 1997) appeared in Sanskrit and other ancient and medieval texts (Ketkar, 1952). Many of these names seem to derive not only from elephants' association with humans, but also from close attention to their ecological roles, physical traits, and behavioural characteristics. In Nilkantha's *Matanglila*, for instance, elephants are called *Karin* because of the long trunk, and *Danti* or *Dvirada* because of the tusks. The name *Ibha* points to a behavioural disposition, probably reactivity or fearfulness, while *Abhyadhika* suggests majestic form. Names such as *Naga*, *Kunjara*, *Padmi*, and *Gajah* also appear to arise from ecological and behavioural observations, where *Kunjara* refers to one whose feet crush the earth, *Naga* suggests mobility across varied terrains, *Padmi* refers to fondness for lotuses, and *Gajah* is one who roars or conquers. At the same time, some names clearly reflect the elephant's role in human society, warfare and statecraft. *Ashtaprahara*, for example, refers to one who strikes with eight blows, one each with trunk, tail, two tusks and four feet. As documented in *Matanglila*, these synonyms themselves reflect the depth and systematic nature of ancient Indian knowledge on elephant biology, behaviour and ecology (Edgerton, 1985; Dhammaloka, 2025).

The story of elephants did not only remain confined to religious or *Puranic* literature and story traditions in India. Over time, it also took shape into a rich body of manuals and scholarly works that went beyond mythological and symbolic representations and were grounded in close observations and practical engagement (Witzel, 1997). Since the rise of the ancient kingdoms, elephants occupied a central place in polity, diplomacy and warfare (Bilhana & Bharadwaj, 1958). They became associated with strength and auspicious power. As a result, Indian society developed a systematic and unparalleled knowledge tradition on elephants long before modern science assumed its present form.

The ancient systematic study of elephants, also referred to as *Gajasastra* or Indian elephantology (Krishmaswamy, 1952; Geetha, 2013), has roots in early historic India. Over time, this knowledge system assumed a more structured form through works such as the *Gaja-sastra* and the *Hastyayurveda*, traditionally attributed to Palakapya Muni (Cheeran, 2013). Although the exact dates of these writings remain uncertain, they are frequently credited to sage Palakapya, who is often placed between early historic and early classical periods of Indian history. Over time, these texts also appear to have undergone transmission, compilation, and redaction (Cheeran, 2013; Pollock, 2006; Trautmann, 2019). Even so, these writings marked a major turning point by transforming accumulated practical knowledge into an organised system of understanding. For more than two millennia thereafter, scholars, physicians, trainers, and elephant handlers enriched this specialised body of knowledge devoted entirely to elephants. This tradition was not simply mythological or religious (Pollock, 2006); it included technical manuals related to classification, veterinary medicine, behaviour, training, and long-term management of elephants in captivity. It is therefore useful to think of it as a proto-scientific tradition in elephant knowledge. In the context of contemporary human-elephant conflict, debates on captivity are confined to perception rather than looking into the annals of elephant knowledge systems and practices of co-existence since time immemorial (Rangarajan, 2012), and the future of conservation is going to be challenging with growing economic aspirations, revisiting this forgotten science and practice on elephants in the country is going to be crucial and more than just an academic exercise to make youth aware of our history with elephants and kind of traditional knowledge system the country had, as well as the long history of how Indian society understood, used and lived with elephants.

This review draws upon both primary and secondary sources. Primary sources include available editions and translations of classical elephantological treaties such as *Gaja-sastra* and *Hastyayurveda*, Nilkantha's *Matanglila*, Somesvara III's *Manasollasa* and *Hastividyarvana*. These texts are read alongside contemporary historical and academic evaluations. Secondary literature was used to compare scholarly interpretations and provide historical context.

Gaja-van, Gajadhyaksha and a symbol of royal fortune in ancient times

If we look closely at history, elephants were never peripheral animals in Indian society but have always demanded deep knowledge and sustained care since the earliest times. They stood at the centre of warfare, statecraft, forestry, transport and kingship (Chitrav, 1937; Bilhana, & Bharadwaj, 1958). During that time, trained elephants could determine the outcome of a battle, haul enormous timber (Watt, 1890) or symbolise royal authority. Raising them was a long-term commitment, and maintaining them required constant care and vigilance. Losing them to illness, stress, or mishandling was an enormous political and economic setback. Managing such animals, enormous in size, endowed with great physical strength, sharp intelligence and emotional complexity, through casual treatments and ritualistic practices alone was impossible, and hence it demanded a serious, systematic and experience-based approach, which ultimately gave rise to rich traditions of elephant knowledge in India. Elephants, by their very nature, compelled humans to observe closely, predict their behaviour, test methods and pass on reliable knowledge to generations. They demanded systems that worked not once, but repeatedly. In short, elephants forced commitment and disciplined engagement from people in matters of their upkeep, health and care. This is how elephantology in India emerged and evolved, and interestingly, not as an abstract theory, but as applied knowledge shaped by necessity, observations made and traditional acquired wisdom of the community.

Long before the emergence of specialised treaties on elephants, the *Arthasastra*, written in the 3rd century BC by Kautilya, treated the '*Gaja*' as a vital pillar of state power, combining military, economic, and administrative significance. The *Gaja* formed an essential component of the army (Chitrav, 1937), as they had the ability to break enemy formations, breach fortifications, and generate immense psychological shock in warfare (Trautman, 2019). Recognising their strategic importance, the *Arthasastra* prescribes a highly organised system for their management under a designated superintendent called *Gajadhyaksha*, who oversaw capture, training, feeding, and healthcare. The text also emphasises the protection of elephant forests; the *Gaja-van*, reflecting an early form of state-controlled conservation, where the unauthorised killing or injury of elephants was strictly prohibited and punished. Detailed classifications are provided based on region, physical attributes, and temperament, indicating a proto-scientific approach to selection and training. Elephants were considered royal assets, often used in diplomacy and as symbols of sovereignty, enhancing the prestige of the king (Blochman, 1927). Overall, the *Arthasastra* presents elephants not merely as animals but as carefully regulated instruments of governance and warfare, illustrating an advanced understanding of wildlife management, military logistics, and statecraft in ancient India (Shamashastry, 1961; Vachaspati, 1962).

In addition to the *Arthasastra*, the '*Brihat Samhita*' of Varahamihira contains several references to elephants, though not in the form of a full-fledged elephant manual like *the Gaja-sastra* texts (Bhat,1981; Sastri & Bhat, 1947). Instead, elephants appear within a broader framework of omens, physiognomy, royal symbolism, and natural science. In the text, elephants are discussed mainly in terms of auspicious and inauspicious characteristics called *lakshana*, as described in Chapter 67, *Hasti-laksana* (Bhat, 1981). This chapter classifies elephants into four morphological types- *Bhadra* (prosperous), *Manda* (slow), *Mrga* (wild) and *Sankirna* (hybrid), depending on body proportion, tusk shape, skin texture, gait, colour and temperamental disposition. Elephants with ideal physical traits such as honey coloured tusks, symmetrical limbs, large frontal lobes and vigorous musth discharge were considered auspicious and suitable for royal use. Those who seemed otherwise were deemed unsuitable. Varahamihira describes ideal traits of elephants suitable for kings, such as the right proportion of limbs, smooth skin, deep and resonant sounds, and a calm yet powerful temperament. Such elephants were believed to bring victory, prosperity, and stability to the kingdom. Deformities or unusual features were treated as inauspicious signs, potentially indicating misfortune. While rooted in cosmological beliefs of the period, these classifications were based on detailed morphological observations that parallel systems of *Gajasastra* and *Matanglila* also describe. Conversely, Chapter 94, *Hasti-vestita*, of *Brihat Samhita* shifts more clearly toward behavioural description, listing elephant behaviour and their perceived meanings (Bhat, 1981). There are two distinct components in the chapter that need to be discussed separately. First, the text accurately documents a number of behavioural indicators that are recognisable to contemporary ethology and veterinary science on an empirical level, like musth, vigorous movements and patterns of vocalisation are described as signs of vitality, while reduced appetite, abnormal gait, absence of ear movement, excessive urination, weeping eyes and restlessness are signs of distress. Second component interprets these behaviours using cosmological – omenological framework that is characteristic of this historical period, but must be acknowledged as such, like breaking of tusk is interpreted as royal misfortune and the outcome with an elephant-crocodile encounter is presented as predictive of royal fortune. These interpretations belong to systems of divination and cosmological beliefs (*Nimitta-sastra*) that dominated ancient Indian statecraft. In other words, the *Brihat Samhita* is best understood as an encyclopaedic text that contains observational content with a broader astrological and omenological framework. The observational theory merits acknowledgement as a contribution to scientific natural history and should be read as such (Bhat, 1981; Sastri & Bhat, 1947).

A discipline of science and traditional knowledge

One of the clearest signs that elephantology was a serious intellectual tradition is its disciplinary structure. Elephant knowledge in India was not merely scattered folklore but organised documentation with distinct domains, each addressing a specific problem. The five major scriptures that form the basis of Indian elephantology are *Gajasastra*, *Hastyayurveda*, *Matangalila*, *Manasollasa*, and *Hastividyarnava*. The ancient works of *Gajasastra* and *Hastyayurveda* are traditionally attributed to Palkapya Muni. Although the exact dates remain uncertain, scholars regard them as the earliest surviving treatises devoted to elephants and their management (Cheeran, 2013; Trautmann, 2019). The *Gajasastra* focuses on the classification, capture, and training of elephants, whereas the *Hastyayurveda* deals exclusively with elephant medicine and treatment for diseases. A medieval work, *Matangalila* by Nilakantha, written around the 12th century AD, examines the behaviour and temperament of elephants and focuses on their ethological sensitivity and emotional states (Dhammaloka, 2025). During the same period, the Chalukya king Somesvara III wrote a text called *Manasollasa*, also known as *Abhilashitartha Chintamani*, written in Sanskrit and dealing with royal life, administration, arts, and science. One of the important texts of the scripture is devoted to elephants, reflecting the crucial role played by elephants in medieval Indian polity and warfare (Sadhale & Nene, 2004a). A modern but regional text, written by Sukumar Barkaith in Assamese around the 18th century AD, namely *Hastividyarnava*, adds value to Indian elephantology by applying knowledge described with illustrations.

(i) Gajasastra: The elephantology

Traditionally attributed to Palakapya Muni, *Gajasastra*, one of the earliest known treatises devoted to elephants, is in many ways a field manual. It describes elephants in careful detail, including body proportions, posture, skin texture, tusk shape, eye movement, gait and vocalisation. These physical traits were not catalogued for aesthetic interest. They were used to predict temperament, learning ability and behaviour under stress. Many body features were associated with calmness and reliability, while others were linked to volatility or resistance to training. Trainers were warned which elephants required patience and which were best avoided altogether. Like many premodern technical works, *Gaja-sastra* is a blend of cosmological and mythical frameworks with practical facts. In addition to providing comprehensive explanations of elephant morphology and behaviour and management, the literature also includes a classification of elephants, which is based on more general Indian religious and cultural traditions. It is more appropriate to consider this book as a product of an intellectual framework where metaphorical perspectives and practical knowledge co-exist. The text's observational and experience-based aspects have contributed to the advancement of elephant management, behavioural understanding and veterinary practice. The logic is familiar to anyone who studies animal behaviour today, *viz.*, observe consistently, identify correlations, and adjust practice accordingly.

(ii) Hastyayurveda: Health and medicinal system of elephants

During the same period, circa 5-6th century BC, the Palakapya Muni composed another important classical text, *Hastyayurveda*, on the subject of elephant health and the medicinal system for elephants, while describing the elephant's behaviour and ethological aspects. The scripture is among the world's earliest veterinary traditions and is devoted entirely to elephant health. It describes elephant anatomy in detail, classifies diseases by observable symptoms, and prescribes treatments derived from plants, minerals, and carefully regulated diets.

In this text, the illness is not attributed to divine punishment or malevolent spirits, but is diagnosed through signs such as appetite loss, changes in gait, discharge, swelling, or behavioural shifts. Preventive care receives as much attention as treatment in the scripture, and cleanliness, exercise, diet, seasonal adjustment, and rest are emphasised repeatedly as part of the health management system. In effect, elephants were treated as patients, and the medical theory reflects premodern ideas about the body, while the methods adopted for treatment were empirical. Further, treatments are evaluated by whether they work or not, and therefore, the knowledge persists because of its effectiveness and not because it is a sacred scripture.

(iii) Matangalia: Understanding elephant minds

By the medieval period in India, elephantology had expanded beyond the body to include the minds of elephants. The *Matangalila*, written by Nilakantha in the 12th century AD, devotes significant attention to the behaviour and emotional states of elephants, which is unique in many respects. It describes how elephants signal fear, stress, fatigue, illness, or impending aggression through changes in posture, movement, sound, and interaction with handlers. Some of these signs are framed as omens, a reminder that empirical observation coexisted with premodern interpretive frameworks. But many function as practical warnings. An elephant behaving in a particular way is not foretelling fate but signalling distress, and modern ethology also rests on the same insight that behaviour is information. The emphasis on long-term temperament is especially notable. It is important to understand that elephants are essentially wild animals and their welfare is closely linked to their natural , social and ecological environments. In the dialogue between Palakapya Muni and King Romapada, elephants are depicted as suffering when taken away from their natural habitat and deprived of their natural freedom. The narrative suggests that captivity and separation from natural conditions can produce distress and disease. This observation, despite being expressed within the cultural and philosophical language of its time, resonates with modern understandings of animal welfare, which acknowledge limitations on natural behaviour, movement, and social interaction as major stressors in captive elephants (Sukumar, 2011; Locke & Buckingham, 2016). These texts recognise that trauma has consequences, which is a significant knowledge for handling elephants in captivity.

In *Matanglila* (Edgerton, 1985), elephants are classified based on their behavioural traits, such as *Deva* (god/king), *Danava* (antigods), *Gandharva* (celestial spirit), *Yaksha* (demigod), *Rakshasa* (demons), *Manava* (humans), *Pishacha* (malevolent spirit) and *Uraga* (serpent), according to the qualities they possess. Another classification, based on physical features, dividing elephants into four categories - *Bhadra* (prosperous), *Manda* (slow), *Mrga* (wild), and *Sankirna* (hybrid), which is similar to *Brihat Samhita*, is also mentioned here. Here, *Bhadra* and *Manda* are considered superior breeds, while *Mrga* is inferior. *Sankirna* is a mixture of both superior and inferior breeds. Similarly, elephants are also classified based on their sensitivity into seven groups, such as *Atyarthvedi* (over-sensitive), *Uttanvedi* (expressive), *Gambhirvedi* (less reactive), *Manda*vedi (slow to respond), *Mriduvedi* (gentle), *Tikshnavedi* (highly alert and perceptive) and *Chanchalvedi* (restless). In addition to these classifications, elephants were also identified based on their three fundamental regulatory principles that govern physiology, health and disease, or *Tridosha* (*Vata*, *Kapha* and *Pitta*), as per Ayurveda (Zimmerman, 1988), for their treatments (Wujastyk, 2003). *Vata* or wind (air principle) drives movement and kinetic force; *Pitta* or bile (fire principle) drives metabolic energy; and *Kapha* or phelgm (water/earth principle) drives structural energy and cohesive force. Regarding elephant health science, the *Bhadra*s were considered to have all the principles balanced in them, and hence these elephants were healthy. It was considered that phlegm (*Kapha*) is high in *Manda*, therefore, they were slow and dull. Elephants with high bile (*Pitta*) in *Mrga* made them angry and agile easily. Such knowledge helped in treating and caring for elephants in a scientific way during those days.

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There is a specific verse in Nilkantha's *Matanglila*, particularly from the conservation perspective, which states a prohibition against the capture of a pregnant she-elephant (*Garbhini*) or accompanied by a calf (*Dhenuka*) (Edgerton, 1985; Geetha, 2013). The text suggests that capture of such elephants can bring ruin to the royal treasury, and that such elephants, if captured, should be released in a sacred grove or forest or a temple. This statement expresses a practical prohibition of the capture of pregnant females and calves from the population and a theological backing to justify it. Given that the gestation period of elephants is 20-22 months and the inter-birth interval is about 4-5 years (de Silva, 2013), removal of pregnant or lactating females will carry a large demographic cost. Capture of lactating females will also cause the death of dependent calves. This provision in *Matanglila* is directly related to modern elephant population biology. This clause implies that ancient Indian elephantological methods adopted ecological protection measures within their standard and practical frameworks, even when the stated justifications were religious or omenological in nature, when read alongside *Kautilya's* broader framework of elephant forest reserves and wildlife protection in Arthshastra (Tisdell, 2005).

(iv) Manasollasa: Importance of Gaja in Indian polity and warfare

During the period of Western Chalukya king Somesvara III in the 12th century AD, another encyclopaedic work was written in Sanskrit, which is known as *Manasollasa* or the 'Delight of mind'. It is also known as *Abhilashitartha Chintamani* (Wish-fulfilling Gem). The text is not solely focused on elephants. However, one of the important sections of the text is completely and elaborately devoted to *Gaja*, which is an example of the critical role played by the elephants during the medieval Indian polity and warfare (Shamashastry, 1926).

Referring to the edition of *Manasollasa* (Shrigaonkar, 1925; Shrigaonkar, 1961), the elephant section discusses the classification of elephants based on their physical features, temperament, and regional origin. Elephants are categorised according to auspicious and inauspicious marks or *laksanas*, helping kings select suitable animals for war, ceremonial processions, and royal service. The text also describes methods of capturing, taming, and training elephants, emphasising patience, proper diet, and humane handling. Detailed attention is given to the care and management of elephants, including feeding practices, daily routines, and stable maintenance. Another significant aspect is elephant diseases and their treatment, where traditional veterinary knowledge is presented using herbs, oils, and rituals.

Perhaps the most striking feature of *Manasollasa* is its insistence on compassion. It encourages keeping elephants free from stress, otherwise their power and capabilities become counterproductive and render them unstable. The scripture highlights that elephants are intelligent animals and that maintaining their mental health is equally important. It underlines that calm handling, patience and respect are prerequisites for effective training and the long-term reliability of elephants. Compassion is not presented as moral ornamentation. It is framed as a technique.

However, an honest evaluation of *Manasollasa*'s treatment of elephants must also take into account a section that directly contradicts its compassion-centred husbandry principles. Section IV of Chapter 3 of the main text is *Gaja*vahyali or sports with elephants in the arena consists of 256 verses dedicated entirely to preparing elephants for arena sports and combat as royal entertainment (Sadhale & Nene, 2004b). This section prescribes detailed pharmacological protocols for inducing musth before arena events. This is deeply problematic from a modern animal welfare perspective as musth is a physiologically and psychologically extreme state and altering it in captive elephants through pharmaceutical manipulations can cause extreme stress in animals with no capacity to respond through behaviour that naturally resolves it (Doyle *et al.*, 2024). Thus, *Manasollasa* reflects the structural ambiguity of the human-elephant relationship in ancient India. A document concerning animal welfare and conservation must acknowledge both aspects without favouring one over another. The compassion discussion in *Manasollasa*'s husbandry sections is real and historically significant, and so is the harm prescribed in *Gaja*vahyali chapter of it. In order to understand appropriately what ancient Indian elephantology can or cannot provide to modern conservation and welfare frameworks, it is more suitable in scientific discourse to deal truthfully with this dilemma rather than selectively highlighting the former.

The treatise also highlights the strategic importance of war elephants, noting their psychological impact on enemy forces and their role in breaking military formations.

The elephant section of the text, in general, serves as a valuable historical source for understanding ancient Indian animal science, military organisation, and royal culture, demonstrating the high status and symbolic power of elephants in medieval India.

(v) Hastividyarnava: Pictorial pedagogy with regional knowledge

By the early modern period, elephantology had become increasingly applied and region-specific. The *Hastividyarṇava* (Ocean of Elephant Knowledge), another scripture on elephant science, was composed in 1734 CE under the patronage of the Ahom Kings of Assam. This pictorial guide, composed in the Brahmaputra Valley, was written by Sukumar Barkaith and elaborated on elephant care, diseases, and training, incorporating regional knowledge and practices of Assam during the Ahom kingdom.

Interestingly, the illustrations in the *Hastividyarnava* are not decorative but serve a pedagogical function, making knowledge easier to transmit and standardise. This also supports the reproducibility of knowledge and makes it accessible to those who are not even literate, a hallmark of mature scientific traditions. Another notable aspect of the treatise is that it integrates classical knowledge from *Gajasastra* and *Hastyayurveda* with local ecological practices, including forest-based capture techniques, riverine management, and region-specific medicinal plants. Detailed illustrations depict elephant anatomy, diseases, surgical instruments, harnesses, and stable layouts, making the text uniquely valuable for historians of science. The scripture also recognises that elephants, forests, and climates differ across regions and therefore requires differential treatment based on local resources and traditions. No one-size-fits-all methods of elephant capture, care, and coexistence apply. Its descriptions of elephant habitat, capture techniques, and seasonal movement reflect thorough knowledge of floodplain dynamics, marshy grasslands, and shifting river channels of the Brahmaputra river, though the Brahmaputra is not named explicitly.

The training section of the scripture emphasises non-violent methods and long-term bonding between mahout and elephant. The texts also reflect early conservationist sensibilities, warning against over-capture and neglect of breeding populations. Its production within a living elephant management culture makes it an invaluable ethno-scientific document.

These five important scriptures are a testament to the level of specialisation in Indian culture regarding elephants in the past. No other animal, except elephants in India, in the premodern world generated such a sustained, technical and varied literature across the centuries. Nowhere in the world did such a knowledge system on elephants exist as it did in the Indian subcontinent.

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Neither truly a modern science, nor a mere myth

Recognising *Gaja-sastra* as a proto-scientific document does not mean claiming that ancient India practised modern science in any straightforward sense. These traditions existed alongside cosmology, astrology and customary beliefs and practices. Elephants were often deeply entangled with kingdoms, political power and stability (Trautmann, 2019). Yet modern science itself emerged from similar mixtures of observation, belief and correction over time. In India, elephantology, through its various texts, shows disciplined observation, functional verification, cumulative knowledge and ethical reflections. These are not incidental features but the foundations of scientific thinking.

Why this matters today

Elephants are once again at the centre of public debate. Human–elephant conflict is intensifying across India and in Asian elephant range states (Roy *et al.*, 2025). Captive elephants remain the focus of ongoing concern about care, husbandry and welfare (Brown *et al.*, 2020). Habitat fragmentation and climate stress continue to threaten wild populations as land use changes rapidly across elephant landscapes (de Silva *et al.*, 2023). Conservation science now places increasing emphasis on behavioural understanding, stress reduction, long-term care and ethical coexistence (Van de Wat *et al.*, 2024), precisely the principles that elephantology articulated centuries ago. These ideas are not borrowed but are based on deep-rooted Indian knowledge systems and natural history. Recognising this does not mean romanticising the past or rejecting modern science. It means understanding that scientific rationality has many histories and that care for the living world has always been central to serious knowledge. India did not merely worship elephants; they were well studied and taken care of, even for their mental well-being. At a moment when we are struggling to live alongside these giants without destroying them, recalling the forgotten science may be no less relevant than ever.

The elephantological literature also contains ethical insights that remain relevant today, particularly the recognition that elephants are sentient beings whose welfare is closely linked to freedom of movement, social bonds and their environment. Palakapya's observation that elephants experience distress when removed from their habitat anticipates current concerns about captivity, behavioural stress and consequences of restricting natural behaviour. This perspective offers a useful historical foundation for present discussions on elephant management, rehabilitation and welfare-oriented conservation.

One of the most important lessons from ancient Indian elephantology is the need to take elephant behaviour and cognition seriously (Mumby & Plotnik, 2018). Elephants are highly intelligent and social animals (Daniel, 1998; Sukumar, 2011), and they therefore require care and sensitivity when handled (Bates *et al.*, 2025; Veasey *et al.*, 2006). At the same time, these classic texts should not be read uncritically through a modern conservation lens. Most of these texts were produced in royal and administrative contexts, and elephants were valued as assets for warfare, transport, ceremonial functions and statecraft. Much of the knowledge they contain was therefore developed to support training, capture, maintenance and effective use of elephants in captivity. Their objectives fundamentally differ from the modern idea of wildlife conservation, which prioritises the persistence of free-ranging populations. Nevertheless, these texts also contain detailed observations on elephant behaviour, stress, health, social relationships and their environmental requirement. While the historical text must be acknowledged, the noted observations provide valuable insights into human-elephant engagement, and these may contribute to present discussions on elephant welfare, captive management and human- elephant interactions.

Studies indicate that the intensity of human-elephant conflict varies not only because of anthropogenic actions, including mitigation measures, but also because of moves taken by elephant herds to avoid or confront situations (Guarnieri *et al.*, 2024). Further, the depth of elephant studies in ancient times indicates the need to recalibrate research on elephant ethology and ecology at present, especially the aspects of dealing with the human-elephant conflict in human-dominated landscapes.

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CONFLICT OF INTEREST

The author declare no competing interests.

DATA AVAILABILITY

No additional data is used in this commentary.

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