International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

Classification of Weapons and Military Technology in Kautilya's Arthashastra: A Textual Analysis

Umakant Yogeshrao Salunkhe
Asst. Professor, Vasantrao Naik Arts, Science and Commerce College, Shahada, Dist. Nandurbar
E-mail - usalunkhepatil2222@gmail.com

Abstract

The Arthashastra of Kautilya is widely recognized as a foundational text for understanding ancient Indian statecraft, administration, and political strategy. While modern historical studies have thoroughly examined its diplomatic and organizational theories, the text's highly technical documentation of physical warfare and military engineering has received much less attention. This paper explores the systematic classification of military equipment detailed in Book II, Chapter 18 of the Arthashastra, which describes the duties of the Superintendent of the Armory. By synthesizing the translations of Vachaspati Gairola and L.N. Rangarajan, and contextualizing them against the historical military frameworks provided by P.C. Chakravarti and V.R. Ramachandra Dikshitar, this study decodes ancient mechanical engines, archery mechanics, piercing weapons, and metallurgical armor. The findings indicate that the Mauryan state operated a highly organized military complex rooted in practical material science, labor management, and mechanical engineering. This technical analysis provides an evidence-based contribution to the broader study of Indian Knowledge Systems.

Keywords: Indian Knowledge Systems, Kautilya, Arthashastra, Military Engineering, Yantra, Ancient Indian Weapons, Metallurgy.

1. Introduction

The Mauryan Empire (c. 322–185 B.C.E.) represents one of the most formidable political and military consolidations in ancient history. Sustaining such a vast territory required an exceptionally equipped and systematically administered standing army. The blueprint for this military

International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

architecture is preserved in the Arthashastra, authored by Kautilya, the chief strategist to Emperor Chandragupta Maurya. Within Kautilyan political philosophy, the army is categorized as one of the seven indispensable elements of a sovereign state.

When analyzing ancient Indian warfare, mainstream historical narratives frequently rely on epic literature. Texts like the Mahabharata often present warfare through mythological allegories and divine weapons. The Arthashastra, in stark contrast, removes mythology from the battlefield and replaces it with practical administration, metallurgical science, and mechanical engineering.

Book II, Chapter 18 of the text serves as a technical manual for military production by detailing the office of the Superintendent of the Armory. It illustrates the Mauryan state's monopoly over the manufacturing, categorization, and environmental preservation of all military equipment. By examining the precise mechanics and materials outlined in this chapter, this paper aims to reconstruct the physical and technological realities of the ancient Indian arsenal.

2. Objectives of the Study

The primary objective of this study is to systematically classify the physical weapons and mechanical siege engines detailed in the Arthashastra. Another major goal is to analyze the specific metallurgical, botanical, and biological raw materials used in ancient Indian arms manufacturing. The study also aims to conduct a comparative textual analysis using the translations of Vachaspati Gairola and L.N. Rangarajan to accurately understand ancient military terminology. Finally, the research seeks to highlight the role of practical military engineering as a core component of Indian Knowledge Systems.

3. Significance of the Study

This research shifts the academic focus away from abstract political theory and moves toward the history of science and technology. By defining the precise mechanics, labor structures, and material compositions of ancient weaponry, this study shows that early Indian military supremacy was not just a product of strategic brilliance. Instead, it was built on advanced logistical planning, standardized mass production, and applied engineering.

4. Review of Literature

International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

Contemporary scholarship on the Arthashastra has mostly approached the text through the lenses of political realism, diplomacy, and organizational ethics. Roger Boesche (2003) provides a deep analysis of Kautilya's diplomatic doctrines, focusing heavily on strategies like silent war, the deployment of secret agents, and the systematic spread of disinformation. While Boesche effectively explains the psychological and intelligence-based aspects of ancient warfare, his scope leaves the actual military hardware unexamined.

Building on the organizational aspects of Kautilya's theories, Dutta, Dutta, and Bhuyan (2023) use the Arthashastra to evaluate modern Indian military reforms. Their framework contrasts Kautilyan concepts of righteousness and intelligence-driven administration with contemporary international relations. Although they acknowledge Kautilya's emphasis on disciplined armies and firepower, their analysis remains focused on ethical policies, geopolitical strategy, and organizational design.

From a historical perspective, P.C. Chakravarti (1941) and V.R. Ramachandra Dikshitar (1944) offer crucial reviews of ancient military administration. Chakravarti outlines the six-fold composition of the army and provides a broad catalog of Kautilyan arms. Dikshitar expands upon this by comparing Kautilya's arsenal with the categorizations found in earlier texts, distinguishing weapons into thrown, not-thrown, and machine-thrown classifications.

While these scholars successfully catalog the weapons historically, a closer reading of the literature reveals a distinct gap. There is currently no dedicated, micro-level analysis of the Arthashastra as a manual of mechanical engineering and material science. The proto-industrial labor management, the precise mechanics of the siege engines, and the metallurgical details of the armor have yet to be synthesized into a cohesive study of ancient Indian technological capabilities. This paper addresses this gap by blending linguistic translations with mechanical realities.

5. Methodology

This study uses a qualitative, comparative textual methodology. It compares the descriptive Hindi-Sanskrit translations by Vachaspati Gairola with the structural English classifications by L.N. Rangarajan. These primary textual insights are then placed in context using the military historiography and comparative Vedic literature provided by P.C. Chakravarti and V.R.

International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

Ramachandra Dikshitar. This approach makes it possible to accurately deduce the functional mechanics of the weapons.

6. Main Research Data and Analysis

6.1 Administration of the Armory

The translation by Vachaspati Gairola shows that the Superintendent of the Armory operated as a scientific industrial manager rather than a mere storekeeper. The state employed specialized artisans for the mass production of defensive and offensive equipment. A critical insight into Mauryan economics is the strict labor policy attached to arms production. Gairola's text mandates that the Superintendent had to determine the exact wages, required manufacturing time, and expected output of the artisans before any work started. This points to a highly structured labor system.

Furthermore, environmental preservation was taken very seriously. Weapons were protected from excessive heat, dampness, and wood-destroying insects. The mandate to frequently expose weapons to sunlight and wind to prevent oxidation and biological decay demonstrates a highly developed understanding of material degradation.

6.2 Mechanical Engines of War (Yantras)

In ancient Indian military science, machine-driven weapons fell under a specific category. Dikshitar notes that while earlier texts catalogued numerous machines, the Arthashastra specifically lists ten immovable machines and several movable ones, indicating a major leap in military architecture during Kautilya's era.

Fixed machines were installed permanently on fort ramparts, utilizing torsion, leverage, and kinetic force. The Sarvatobhadra was a rapidly rotating machine used to hurl stones in all directions. The Jamadagnya was a heavy ballista designed to shoot massive arrows and spherical projectiles through central openings. The Bahumukha served as a defensive tower with multiple firing holes, providing archers with elevation and shielding. The Parjanyaka was a specialized water-machine designed to extinguish siege fires. Additionally, Kautilya describes the Samghati, a long pole used to set fire to enemy structures, and the Yanaka, a wheel-mounted rod for launching heavy

International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

projectiles. The texts also detail heavy defensive pillars released by mechanisms to crush intruders, which were categorized by size as the Bahu, Urdhvabahu, and Ardhabahu.

Mobile machines operated as portable battlefield obstacles and siege tools. The Sukarika acted as ancient reactive armor; it was a buffer made of cotton-filled leather and bamboo draped over walls to absorb projectile impacts. The Sataghni was a massive movable wooden pillar studded with iron spikes, designed to be rolled down to crush massed infantry. Other mobile machines included the Devadanda, a heavy defensive pole with nails, the Hastivaraka, a multi-pointed pike deployed against war elephants, and the Talavrinta, a rotating machine used to raise blinding wind and dust. For dismantling enemy defenses, the Utpatima and Udhghatima were mechanical devices engineered specifically to pull down pillars and towers.

6.3 Archery Equipment (Dhanus and Ishu)

Bows and arrows were the principal weapons of the projectile group. Kautilya classified bows rigorously by their botanical and biological compositions. The texts identify four primary types of bows. The Karmuka was made of palmyra wood, the Kodanda was made of bamboo, the Druna was made of hardwood, and the Dhanus or Shringa was crafted from animal horn. Dikshitar elaborates that horns were sourced from buffalo and rhinoceros, and that advanced bows could also be forged from steel, featuring small grips inlaid with gold. Chakravarti emphasizes that the existence of composite horn bows proves the presence of highly lethal military technology in pre-Christian India.

Bowstrings were engineered for extreme tension using natural fibers like hemp, bamboo bark, and resilient animal sinews. While standard arrows were crafted from bamboo or wood, Kautilya details the Naracha. This was an arrow forged entirely of solid iron, specifically designed to pierce heavy metallic armor.

6.4 Close Combat and Specialized Weapons

Handheld weapons intended for close-quarters combat are classified primarily by their blade geometry. Piercing weapons featured sharp, ploughshare-like edges. This category includes the Sakti, a leaf-shaped metallic spear, the Kunta, a standardized cavalry lance, the Hataka, a three-pointed weapon, and the Trasika, a two-handed weapon with a tail. Heavy darts and javelins like

International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

the Bhindipala, the Tomara, the Karpana, and the Kanaya were utilized for medium-range engagements.

Swords were categorized by curvature. This included the crooked Nistrimsa, the leaf-tipped Mandalagra, and the straight Asiyashti. For extreme close-quarters fighting, warriors utilized the Asidhenu, a one-cubit dagger, and the Maustika, a fist-sword or knuckle-knife.

Blunt-force and specialized cutting weapons formed a crucial sub-category. The Mudgara and Musala were dense wooden hammers and pestle-like clubs crafted from hard wood. The Gada was a heavy iron mace featuring up to one hundred spikes, while the Drughana was a wooden mace headed with a spiked iron ball. Cutting implements included the Pattisa, a battle-axe with two keen blades, the Lavitra, a sharp sickle, and the Gosiras, a spear shaped like a cow-horn. Furthermore, historical literature notes the regional use of the Astra or Valaitadi, an indigenous boomerang utilized for whirling and rending.

6.5 Defensive Armour and Shields

The Mauryan military doctrine placed immense emphasis on troop survivability, cataloging an extensive array of protective gear that highlights advanced metallurgy and leather-working. For body armor, Kautilya's commentators identify specific varieties of iron protection. Loha-jala refers to flexible full-body chainmail made of interlocking iron rings, while Patta denotes solid sheet metal plates. For lighter gear, Kautilya details the Sutrakankata, a thick fabric armor densely stuffed with cotton, wool, and hair to absorb blunt force trauma. Beyond iron and fabric, dense animal hides were heavily utilized. Gairola and Dikshitar note the extraction of hides and horns from tortoises, dolphins, rhinoceroses, bison, and elephants to forge heavy leather cuirasses. The armory also issued specialized gear for different body parts, including helmets, neck guards, chest cuirasses, and heavy gauntlets.

Shields were engineered according to specific combat roles. The Peti was a lightweight shield woven from creepers for skirmishers, while the Talamula was carved from heavy palmyra wood. The texts also record highly innovative shields such as the Valahakanta, which combined leather or bamboo with protective iron fringes. Another notable invention was the Dhamanika, which was

International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

constructed from blown-up animal bladders or reeds to pneumatically absorb heavy blunt-force trauma from maces.

7. Conclusion

The Arthashastra is much more than a theoretical guide to statecraft and diplomacy. A careful reading of Book II, Chapter 18 reveals an ancient Indian military apparatus sustained by a scientifically managed industrial ecosystem. By classifying weapons strictly on their physical materials and functional mechanics, Kautilya recorded a military reality grounded in empirical engineering and resource management. This ranges from the kinetic force of the Sarvatobhadra and the iron-piercing metallurgy of the Naracha to the pneumatic shock-absorption of the Dhamanika shields. By shifting the academic focus toward the physical technology of warfare, this study reconstructs a more accurate picture of ancient Indian military strength. It shows that the success of the Mauryan army was not a product of mythological weaponry, but of strict labor administration, material science, and advanced mechanical engineering. This stands as a profound testament to the practical brilliance embedded within Indian Knowledge Systems.

8. Bibliography

1. Boesche, R. (2003). Kautilya's Arthasastra on War and Diplomacy in Ancient India. The Journal of Military History, 67(1), 9-37.
2. Chakravarti, P. C. (1941). The Art of War in Ancient India. University of Dacca.
3. Dikshitar, V. R. R. (1944). War in Ancient India. Macmillan and Co. Limited.
4. Dutta, R., Dutta, K., & Bhuyan, H. (2023). Kautilya’s Arthashastra and Indian Military Reforms. Pak Heart Journal, 56(03), 45-48.
5. Gairola, V. (1984). Arthashastra of Kautilya and the Canakya Sutra (3rd ed.). Chaukhamba Vidyabhawan.
6. Rangarajan, L. N. (1992). Kautilya: The Arthashastra. Penguin Books.