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INSIGHTS INTO ANCIENT ELEPHANT SCIENCE WITH SPECIAL REFERENCE TO MATHANGALEELA GAJARAKSHANASHASTRA: A CRITICAL REVIEW OF AN AYURVEDIC CLASSICAL TEXT

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ABSTRACT

Background: Ayurveda is traditionally recognized as a comprehensive science of life, encompassing not only human health but also the health and management of animals and plants. Among its lesser-explored branches is Gaja Ayurveda, which deals with the science of elephants, including their anatomy, characteristics, behaviour, nutrition, healthcare and management. Mathangaleela, a Sanskrit treatise attributed to Tirumangalat Nilakanthan Mussat, represents an important contribution to this traditional knowledge system. **Aim:** To critically review the contents and significance of *Mathangaleela Gajarakshanashastra*, with special reference to the Malayalam commentary *Arthavedi* by Cheruvalli Narayanan Namboothiri. **Materials and Methods:** The present work is a narrative review based on the book-review presentation of *Sri Nilakanthavirachitha Mathangaleela – Arthavedi Bhashavyakhyana Sahitham* (2008). The contents were examined thematically, with emphasis on the twelve Adhikaras and their descriptions of elephant characteristics, behaviour, nutrition, seasonal regimens, healthcare and mahout management. **Results:** The text provides a comprehensive account of traditional elephant science. Its twelve chapters discuss the origin, favourable and unfavourable characteristics, longevity, age classification, measurements, valuation, psychological characteristics, musth, capture techniques, daily and seasonal care, disease management and the qualities of elephant handlers. Particular importance is given to Gajaraksha, Dinacharya and Ritucharya, highlighting the relationship

between the elephant's physical and mental well-being and its environment. **Conclusion:** Mathangaleela Gajarakshanashastra represents an important source of traditional Indian knowledge concerning elephant management and welfare. Its systematic descriptions provide opportunities for further interdisciplinary research involving Ayurveda, veterinary science, animal behaviour and wildlife conservation. Critical evaluation and scientific validation of its principles are essential before considering their contemporary application.

KEYWORDS: Gaja Ayurveda, Mathangaleela, Gajarakshanashastra, Palakapya, Gajaraksha, Dinacharya, Ritucharya, Elephant welfare.

1. INTRODUCTION

Ayurveda, the traditional Indian system of medicine, is a comprehensive science concerned with the maintenance of health and the management of diseases. Although commonly associated with human healthcare, the Ayurvedic knowledge tradition also encompasses the health and management of animals and plants. Classical literature describes specialised branches such as Ashwayurveda, Gajayurveda and Vrikshayurveda, dealing with horses, elephants and plants respectively.

Elephants have occupied an important position in Indian history, culture, religion and administration. For centuries, they were associated with royal processions, religious ceremonies, transportation and warfare. The traditional Indian military system, known as Chathuranga Sena, consisted of four divisions: elephants, chariots, cavalry and infantry. The strategic importance of elephants necessitated specialised knowledge regarding their selection, capture, training, nutrition and healthcare.

This requirement contributed to the development of an extensive body of Sanskrit literature concerning elephant science. Among the important works are Gajashastra and Hastyayurveda, traditionally associated with Sage Palakapya. While Hastyayurveda deals extensively with elephant health and treatment, other classical works describe their physical characteristics, behaviour and management.

Mathangaleela, attributed to Tirumangalat Nilakanthan Mussat, is an important Sanskrit treatise dealing with the science of elephants. The text discusses various aspects of elephant life, including physical characteristics, behavioural patterns, methods of capture, management and maintenance.

The Malayalam commentary *Mathangaleela Gajarakshanashastra*, prepared by Cheruvalli Narayanan Namboothiri, provides an interpretation of the original Sanskrit text. Through its explanatory approach, the commentary attempts to make the classical knowledge accessible to Malayalam readers.

The present review explores this work, highlighting its literary background, chapter-wise contents, distinctive features and relevance to contemporary understanding of elephant welfare.

2. AIM AND OBJECTIVES

Aim

To critically review *Mathangaleela Gajarakshanashastra* by Cheruvalli Narayanan Namboothiri, highlighting its contribution to traditional elephant science.

Objectives

1. To explore the historical background of Gaja Ayurveda and Mathangaleela.
2. To describe the literary contributions of Tirumangalat Nilakanthan Mussat.
3. To review the structure and contents of the Malayalam commentary.
4. To analyse the important concepts discussed in its twelve chapters.
5. To identify the distinctive features of the commentary.
6. To explore its relevance to contemporary elephant welfare and conservation research.

3. MATERIALS AND METHODS

The present study was designed as a narrative literary review of *Sri Nilakanthavirachitha Mathangaleela - Arthavedi Bhashavyakhyana Sahitham*, a Malayalam commentary authored by Cheruvalli Narayanan Namboothiri.

The review was organised under the following thematic headings.

- Historical background of elephant science.
- Literary background of Mathangaleela.
- Details of the Malayalam commentary and its author.
- Chapter-wise analysis of the text.
- Special features of the commentary.
- Contemporary relevance of the classical knowledge.

The twelve Adhikaras were examined according to their respective subject matter, with particular attention to Gaja Lakshana, Satwa Lakshana, Madabheda, Gajaraksha, Dinacharya, Ritucharya and Adhoranadi Vichara.

The findings presented here are based on the supplied academic presentation. Further verification against the complete original text and commentary is necessary for a definitive textual analysis.

4. HISTORICAL BACKGROUND OF GAJA AYURVEDA

The importance of elephants in ancient Indian society contributed to the development of specialised knowledge concerning their care and management.

The traditional literature of animal science includes.

- **Ashwayurveda:** Science concerning horses.
- **Gajayurveda:** Science concerning elephants.
- **Vrikshayurveda:** Science concerning plants.

Hastyayurveda, traditionally attributed to Sage Palakapya, is an important work in elephant medicine. The presentation describes it as containing approximately 160 chapters and 12,000 shlokas.

The traditional literature attributed to Palakapya deals with different aspects of elephant life and healthcare. Gajashastra is described as addressing elephant care and management, whereas Hastyayurveda deals particularly with diseases and their treatment.

These works demonstrate the breadth of traditional Indian knowledge concerning animal health and management.

5. MATHANGALEELA: AN OVERVIEW

Mathangaleela, literally translated as the sport or activities of elephants, is a Sanskrit treatise dealing with elephantology. It covers various aspects of elephant life, including anatomy, physical characteristics, behaviour, training and management.

The original text is attributed to Nilakantha, identified in the presentation as Tirumangalat Nilakanthan Mussat. The work is divided into twelve chapters and is considered by Franklin Edgerton to represent the codification of orally transmitted practical knowledge.

The subject matter draws upon earlier traditions such as Gajalakshana Shastra and Palakapyam (Hastyayurveda). However, its primary emphasis is on Gaja Vidya, particularly elephant characteristics, behaviour and management rather than exclusively on Chikitsa.

6. DETAILS OF THE REVIEWED BOOK

The book selected for the present review is.

Title: Sri Nilakanthavirachitha Mathangaleela - Arthavedi Bhashavyakhyana Sahitham

Commentator: Cheruvalli Narayanan Namboothiri

Language: Malayalam

Edition: 2008

Publisher: Devi Bookstall, Kodungallur

Total pages: 167

Commentary: Arthavedi

The commentary was prepared in response to the need for a more accessible interpretation of Mathangaleela. The preface was written by Brahmashri Madambu KunjuKuttan, who gave the commentary the name "Cheruvallippacha".

6.1 About the Commentator

Cheruvalli Narayanan Namboothiri was born in 1959 at Cheruvalli Illam near Payyannur, Kannur district. He received traditional training in Sanskrit, astrology and architecture under several eminent teachers.

His literary contributions include works and commentaries on Vastuvidya, Manushyalayachandrika, Shilparatnam, Phaladeepika and other traditional texts. His contribution to Mathangaleela is particularly significant because it provides a Malayalam interpretation of a specialised Sanskrit work dealing with elephant science.

6.2 About the Original Author

The original author of Mathangaleela is identified as Tirumangalat Nilakanthan Mussat, who is believed to have lived in Vettathunadu, in present-day Malappuram district, around the eighth century CE.

His other literary works include Manushyalayachandrika and Kavyollasam.

The commentary discusses the author's probable period and geographical association based on internal textual references, concluding verses and references to Rajarajamangalam temple. These details represent the commentator's historical interpretation and warrant further historical and textual verification.

7. CHAPTER WISE REVIEW OF MATHANGALEELA GAJARAKSHANASHASTRA

The book is organised into twelve Adhikaras, each dealing with a specific aspect of elephant science.

7.1 First Adhikara - Nagotpatti

The first chapter deals with the origin of elephants and Sage Palakapya. It includes traditional accounts of elephant creation, the relationship between King Romapada and Sage Palakapya, and the development of Gaja Shastra.

The chapter also explains various synonyms of elephants, including.

- Naga
- Gaja
- Hasti
- Vaarana
- Mathanga
- Kunjaram
- Padmi

The traditional classification of elephants into Bhadra, Manda, Mriga and Sankirna is also discussed.

This chapter provides the mythological and conceptual foundation for the subsequent discussion of elephant science.

7.2 Second Adhikara - Subhalakshana

This chapter describes the favourable characteristics of elephants.

Different physical and behavioural features are considered in assessing the suitability and quality of elephants. These include colour, height, length, body structure, sensitivity, gait and sounds.

The text also describes different sounds produced by elephants, such as Phenayita, Pothayita, Garjita and Hasita.

These descriptions reflect the importance given to observation and interpretation of animal behaviour in traditional elephant science.

7.3 Third Adhikara - Ashubhalakshana

This chapter deals with unfavourable characteristics of elephants.

It describes undesirable features associated with different body parts, including the trunk, tail, genital region and nails.

An important observation in this chapter is the instruction against capturing pregnant elephants and elephants accompanied by calves.

This aspect is particularly noteworthy from the perspective of animal welfare, as it recognises the vulnerability of pregnant and young animals.

7.4 Fourth Adhikara - Ayurlakshana

Ayurlakshana deals with the physical characteristics associated with longevity in elephants.

The chapter describes certain body measurements and characteristics that are traditionally considered indicators of lifespan.

The concept of twelve Angas, referred to as Kshetra, is explained. These include the head, trunk, mouth, ears, eyes, neck, tusks, chest and other bodily regions as described in the commentary.

According to the traditional explanation, the completeness of these characteristics is associated with longevity. The text describes maximum lifespans of 40 years for Mriga Jati, 80 years for Manda Jati and 120 years for Bhadra Jati.

These statements represent classical descriptions and should not be interpreted as scientifically established lifespan measurements.

7.5 Fifth Adhikara - Vayolakshana

This chapter describes the different age-related stages of elephants.

The elephants are classified into three broad groups:

- Adhaman - up to 12 years.
- Madhyaman - 12 - 24 years.
- Uttaman - 24 - 60 years.

The text also describes different names and characteristics associated with successive stages of growth, beginning with Balan during infancy.

This systematic description highlights the importance of age assessment in elephant management.

7.6 Sixth Adhikara - Manalakshana

Manalakshana deals with the measurement and physical dimensions of elephants.

The text describes traditional measurement procedures using Kolalavu as a unit.

The major measurements include:

- Length: From the eyes to the tip of the tail.
- Height: From the base of the toenails to the point where the tusks grow.
- Girth: Measured around the abdominal region.

The chapter also explains various anatomical terms used to identify different body parts, such as Kumbha, Vidu, Pechaka and Pushkara.

An important feature of the Malayalam commentary is its provision of corresponding Malayalam terms for these anatomical structures, helping readers understand the traditional terminology.

7.7 Seventh Adhikara - Mulyanirnaya

This chapter deals with the valuation of elephants.

The price of an elephant is determined based on its physical characteristics and defects. The text describes how certain defects influence the value of an animal.

An interesting principle discussed is that a fair price is one mutually accepted by both the buyer and the seller.

This chapter reflects the practical and economic dimensions of traditional elephant management.

7.8 Eighth Adhikara - Satwalakshana

Satwalakshana is one of the important chapters dealing with the physical and psychological characteristics of elephants.

The text describes eight categories of Satwa.

1. Deva Satwa
2. Asura Satwa
3. Gandharva Satwa
4. Yaksha Satwa
5. Rakshasa Satwa

6. Manushya Satwa
7. Pishacha Satwa
8. Sarpa Satwa

The Manushya Satwa category is further divided into Brahmana, Kshatriya, Vaishya and Shudra classifications.

The chapter also discusses different colours, physical characteristics and seven varieties of Vedana, relating to the elephant's ability to perceive and respond to instructions.

This section demonstrates the importance attributed to individual temperament and behavioural differences.

7.9 Ninth Adhikara - Madabheda Nirupanam

This chapter provides an elaborate discussion of Mada, commonly associated with the musth condition in male elephants.

It describes the causes, characteristics, stages and behavioural changes associated with Mada.

The chapter discusses Ashtamada Gunas, including Praharsha, Sheegrata, Madagandha, Dehagati, Kanthata, Krodha, Veerya and Abheeruthwa.

The text also describes excessive Mada and its associated behavioural manifestations.

Madajala, the fluid discharge associated with this condition, is discussed in detail. The author differentiates the physiological condition from the complications that may arise due to excessive loss of body fluids and depletion of Dhatus.

Traditional medicinal formulations and management procedures are also described, including monthly treatment approaches.

This chapter is particularly significant because it documents the traditional understanding of elephant behaviour during musth.

7.10 Tenth Adhikara - Gajagraha Vichara

This chapter discusses traditional techniques used for capturing elephants.

Five methods are described:

1. Varikarma
2. Vashavilobhanam
3. Anugati
4. Apaata
5. Avapata

The methods involve different traditional approaches to capturing elephants, including the use of enclosures, trained female elephants and other trapping techniques.

Some of the described methods involve pits and procedures capable of causing serious injury to elephants.

These descriptions are important for historical documentation but must not be considered recommendations for present-day wildlife management. Contemporary elephant capture and handling must follow applicable wildlife laws, veterinary supervision and animal welfare standards.

7.11 Eleventh Adhikara - Gajarakshadi Vichara

This is the longest chapter of the text and contains 51 shlokas according to the chapter-wise presentation.

It deals with the care, protection, feeding and maintenance of elephants.

Important topics include:

A. Dinacharya

The daily regimen of elephants includes:

- Adequate rest.
- Bathing and water activities.
- Walking and physical exercise.
- Administration of medicines when required.
- Feeding with appropriate food.
- Application of oil and other external preparations.
- Adequate drinking water.
- Proper sleeping arrangements.

B. Ritucharya

The chapter explains seasonal management according to different Ritus.

It highlights the importance of modifying food, shelter, bathing practices and other management procedures according to seasonal changes.

The commentary also explains specific procedures such as Kavala, Kabala and Vasti in relation to seasonal care.

C. Ahara

The chapter gives considerable importance to nutrition.

Different food materials, including rice, pulses, grains, sugarcane, fruits, roots and medicinal plants, are described.

It emphasises appropriate feeding according to the elephant's strength, digestive capacity and physical condition.

D. Dosha-Dushya Concept

An interesting aspect is the description of similarities between human beings and elephants concerning Dosha and Dushya.

The text explains Vata, Pitta and Kapha Prakriti and discusses how unsuitable food, inadequate rest and environmental disturbances may contribute to Dosha imbalance.

E. Roga and Oushadha

The chapter describes certain disease conditions, including Kosopacyuti, Trishna, Krimi and Karalajwara.

Traditional medicines and management measures are also mentioned.

The description of daily care, seasonal adaptation, nutrition and disease management makes this chapter especially valuable for understanding the traditional concept of Gajaraksha.

7.12 Twelfth Adhikara - Adhoranadi Vichara

The final chapter deals with elephant handlers, trainers and mahouts.

It explains the qualities expected of an Adhorana, including kindness, truthfulness, discipline, knowledge, courage, enthusiasm and practical experience in elephant care.

Three types of handlers are described.

- Rekhavan
- Yuktiman
- Balavan

The text gives importance to the relationship between the elephant and its handler.

It also explains different methods of communication and instructions given to elephants through speech, physical signals and other means.

Examples of verbal commands include.

- Grihna - to pick up.
- Upari - to raise the trunk.

- Tishtha - to stand.
- Ehi - to come.
- Gaccha - to walk.

The chapter also discusses different forms of Pranidhi and the traditional use of Ankush.

The emphasis on the qualities of a good mahout highlights the importance of knowledge, patience and understanding in elephant management.

8. SPECIAL FEATURES OF THE COMMENTARY

The Malayalam commentary *Arthavedi* has several noteworthy features.

8.1 Accessible Malayalam interpretation

The commentary provides Malayalam explanations of Sanskrit verses, making the classical text more accessible to readers who are not proficient in Sanskrit.

8.2 Explanation of technical terminology

Different technical terms relating to elephant anatomy, behaviour and management are explained with Malayalam equivalents.

8.3 Detailed interpretation of classical concepts

The commentator attempts to explain complex concepts through traditional knowledge and contextual interpretation.

8.4 Clarification through references

The commentary draws upon other classical works, particularly Palakapyam, to clarify certain concepts and procedures.

For example, the interpretation of Vasti in the context of seasonal management is explained with reference to Palakapyam.

8.5 Integration of practical knowledge

The book deals with several practical aspects of elephant management, including measurements, feeding, daily activities, seasonal care and the responsibilities of mahouts.

These features make the commentary a valuable resource for students and researchers interested in traditional elephant science.

9. CONTEMPORARY RELEVANCE OF MATHANGALEELA GAJARAKSHANASHASTRA

The importance of Mathangaleela extends beyond its historical and literary significance.

Several themes discussed in the text have relevance to contemporary research and animal welfare.

9.1 Elephant Behaviour and Temperament

The descriptions of Satwalakshana and Mada provide an opportunity to explore traditional observations concerning elephant temperament and behavioural changes.

These concepts may be studied comparatively with contemporary animal behaviour research.

9.2 Nutrition and Seasonal Management

The emphasis on appropriate feeding, adequate water and seasonal care highlights the importance of environmental and nutritional factors in elephant health.

These observations may serve as historical material for comparative studies in veterinary nutrition and captive elephant management.

9.3 Importance of Natural Habitat

The text recognises the natural preference of elephants for forest environments and discusses the disturbances associated with unsuitable food and living conditions.

This provides an important perspective for discussions on habitat requirements and captive elephant welfare.

9.4 Role of the Mahout

The emphasis on the personal qualities, knowledge and skills of an elephant handler remains an important subject for contemporary research.

The traditional emphasis on understanding the animal, patience and appropriate communication can be examined in relation to modern animal welfare principles.

9.5 Preservation of Traditional Knowledge

Many traditional texts concerning animal science remain relatively unexplored.

Critical documentation, translation and scientific evaluation of these works can contribute to preserving valuable historical knowledge.

However, traditional practices should not automatically be considered scientifically validated. Their applicability requires careful assessment through modern veterinary, behavioural and conservation research.

10. RESULT AND DISCUSSION

Mathangaleela Gajarakshanashastra provides a broad and systematic description of traditional elephant science. Unlike texts that focus predominantly on disease management, Mathangaleela covers several interconnected dimensions of elephant life.

The twelve chapters collectively address physical characteristics, age assessment, measurements, temperament, musth, capture, nutrition, daily care, seasonal management and the responsibilities of elephant handlers.

One of the most important contributions of the text is its emphasis on Gajaraksha. The detailed discussion of Dinacharya and Ritucharya indicates an understanding that animal health is influenced by daily activities, food, environmental conditions and seasonal variations.

The description of Satwalakshana is another noteworthy aspect. It reflects the traditional effort to classify elephants based on their behavioural and psychological characteristics. Such descriptions provide an opportunity for comparative investigation with contemporary animal behaviour studies.

Similarly, the discussion of Dosha-Dushya concepts in elephants demonstrates the application of Ayurvedic principles beyond human healthcare. This aspect deserves further academic attention to understand the historical development of Ayurvedic veterinary knowledge.

The final chapter, Adhoranadi Vichara, is also significant because it recognises the importance of the handler in maintaining the physical and behavioural well-being of elephants. The emphasis on the handler's character, knowledge and understanding of the animal is an important aspect of the text.

The Malayalam commentary by Cheruvalli Narayanan Namboothiri adds value by providing explanations of Sanskrit terminology and contextual interpretations. Its use of Malayalam anatomical terminology and references to related classical works facilitates a better understanding of the original text.

Nevertheless, the work also presents opportunities for critical investigation. Traditional classifications, medicinal formulations, lifespan descriptions and elephant capture procedures require examination through contemporary scientific methods. Historical documentation and modern application should therefore be clearly distinguished.

Overall, Mathangaleela Gajarakshanashastra represents an important literary resource for the study of traditional elephant science and provides a foundation for interdisciplinary research.

11. CONCLUSION

Mathangaleela Gajarakshanashastra is a valuable contribution to the traditional Indian literature of elephant science. Through its twelve Adhikaras, it presents a comprehensive account of elephant characteristics, behaviour, age, measurements, temperament, musth, nutrition, healthcare and management.

The Malayalam commentary *Arthavedi* by Cheruvalli Narayanan Namboothiri makes this specialised Sanskrit knowledge more accessible through translation and detailed explanation.

The emphasis on Gajaraksha, Dinacharya, Ritucharya, Ahara and the qualities of Adhoranas reflects the comprehensive approach of the text towards elephant care and management.

In the present context, where elephant welfare, habitat conservation and human-elephant interactions are important concerns, revisiting such classical literature may provide valuable historical perspectives. However, the principles described in the text require critical examination and scientific validation before contemporary application.

Thus, Mathangaleela Gajarakshanashastra deserves greater academic attention as an important source of traditional knowledge, with considerable scope for further research in Ayurveda, veterinary science, animal behaviour and wildlife conservation.

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