

# ANCIENT CEYLON

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# A RE-READING OF PAST HUMAN EXPERIENCE OF THE RELATIONSHIP BETWEEN THE MONKS OF SRI LANKA AND THE IRRIGATION ACTIVITIES

Dr. Dharshana Bandara

*“Sanghassa Pakawattatthan Rattan Dathvalisarathan  
Sakalan Than Niwasihhi Nethikehi Sahewa Cha ”*

*(King Vijayabahu gifted the entire Alisara area with its inhabitants and canals to the Sangha to  
provide food)*

*- Mahavamsa, Chapter 60: Stanza 14 –*

## ABSTRACT

The irrigation industry in Sri Lanka is a unique national heritage that reflects the past social and economic life of the country. According to literary sources, ancient kings pioneered the construction of irrigation industries. Archaeological evidence reveals some past information that does not appear in literary sources. Investigative sources can be used to identify the participation of the general public in the construction of tanks and the rights of non-partisans to the ownership of tanks. Buddhism has been the inspiration of many aspects of the Sri Lankan social pattern that has developed since it became the religion of Sri Lanka. This study explains the involvement of Buddhist monks in irrigation culture, a central feature of Sri Lanka's ancient civilization. The study was conducted using a library survey methodology by re-reading historical and literary sources about the past. The data identified in it are discussed through the content analysis methodology. The importance of the study is heightened by the fact that the reasons for the monks' involvement in the irrigation industry have been identified and explained through sources. With the quantitative growth of the *Bhikku Sanstha*, the kings themselves realized the difficulty of providing food and other *kappiya* items only to the laity. By the 2nd century, the practice of offering sacrifices to irrigated temples was recognized as a means of earning a living. The way in which the monks got involved in the irrigation industry for their own needs and because of the ownership and power they received is discussed here. The role of Sri Lankan monks as advisors to irrigation is illustrated by the identification of kings as instigators and advisors on the construction of irrigation industries, as well as information on irrigation education provided by *pirivenas*. Privileges granted to monks also allow for irrigation, according to sources. The involvement of the monks in the management of their own irrigation industries through lay officials was clearly observed here. Accordingly, this study shows how the Bhikku Corporation of Sri Lanka in the past had to engage in economic activities to safeguard the economic and social life of the common people of Sri Lanka as well as to protect their interests. The relationship between the irrigation industry and the monks can be identified as an important aspect that reflects the economic side of the monks in Sri Lanka.

**KEYWORDS:** Irrigation industry, Buddhist monks, temple economy,

## 1. INTRODUCTION

Sri Lankans have a history of more than two thousand five hundred years. This weave explores the relationship between irrigation, a key component of Sri Lankan culture, and the Buddhist monks. Historical sources on irrigation have favored kings over irrigation. However, since there is little in the literary sources about the people who built the irrigation industry or the monks who intervened in them, these facts were also used in the archeological sources.

There is ample evidence that after the arrival of the Aryans in Sri Lanka, their main livelihood was agriculture. Agriculture was carried out naturally, in association with water bodies that flowed through the dry zone. Later, as settlements increased and the population gradually increased, the need arose to cultivate by retaining rainwater. An examination of the history of Sri Lanka reveals that small tanks were first formed and then a large system of irrigation was created by crossing rivers and dams. It is possible that groups of people who lived in the villages built paddy tanks in the construction of tanks for agriculture. With the arrival of Buddhist philosophy in the country, it became the state religion and a large number of people became reconciled after that. As the Sasana grows, the need for monks to have a steady source of income arises. Donation to Irrigation Temples as a source of income. BC Beginning around the 2nd century (Gunawardena., 1993, p. 53). Accordingly, the monks of the temples are entitled to the subject of irrigation and it can be identified that they were involved in the irrigation industry on the basis of the special privileges they were given. Primarily, the king had the right to the irrigation system. However, examining the above factors, R. L. H. Gunawardena states that "the full power to control irrigation was not concentrated in the hands of the king and that Asian dictatorship never existed in Sri Lanka" (Gunawardena., 1993.p. 03).

## **2. OBJECTIVES OF THE STUDY**

In this study, we turn our attention to the relationship between the irrigation industry and the Buddhist monks. Water Management in Sri Lanka. History of Irrigation The correct answer to the question is that a number of problems naturally arise for many people who are researching the rare irrigation industry that has been deeply analyzed. How did such amazing irrigation work come to be built in ancient Sri Lanka? How did this irrigation system work? For what reasons did the monks intervene in the irrigation industry? The purpose of this weave is to examine the relationship between the irrigation industry and the Buddhist monks, a key component of Sri Lanka's culture. Although irrigation can be seen all over Sri Lanka, is the water management in our country at a satisfactory level today.? Why did the monks get involved in the past irrigation industry in Sri Lanka? The main objectives of this study are to bring the knowledge of past irrigation to the present day human beings by identifying the problem

## **03. RESEARCH METHODOLOGY**

This study was conducted by interpreting qualitative data based on the library survey methodology, research methods of sociology teaching of observations and conclusions. Re-

reading of ancient sources on the past of the Sri Lankan irrigation industry. Why did the researchers intervene in this research? We have adopted a methodology of identifying the literature's sources and classifying them into individual categories, and thus identifying homogenous data, categorizing and identifying the relevant fields. The history we read is based on facts, but certainly not oral history at all. This research is based on a re-reading of historical facts by the Sociological Research Methodology

#### **04. INVESTIGATION**

Bringing the knowledge of past human experience to the present and future human beings is the task of many people in connection with the teaching of history (Gunawardena. 2005.,p.01). For what reasons did the monks get involved in the irrigation industry? According to historical and archeological sources, a lot of information can be found about the relationship between the ancient SriLankan irrigation industry and the Buddhist monks

##### **4.1. Acquisition of ownership of irrigation industries**

The practice of giving land and irrigation to temples as a way of earning the income required by the monks began in Cree. BC As far back as the 2nd century. The *Duwegala* and *Naulpatha* inscriptions of King Lajjatishsa (119-109 BC) mention the donation of land and a tank to the temple (*E.Z* .Vol. I. P.148)' It is said that King Lajjatishsa built the temple and gave it to the *Abadalaka Wewa* Sangha.

According to the *Naulpotha* and *Galgamuwa* inscriptions of the Wattagamini Abaya (103-102, 89-77 BC), the offering of tanks to the monks (*E.Z* .,Vol. I. P.148)' According to the *Diyabatta* Vihara inscription, which is believed to belong to the period 136-143, mentions the offering of a tank called Punakodaka by King Nakamaharaja to the Thinakanaka Vihara, for the benefit of "Siddham, Naka Maharajabha ..... Thinakanaka Viharahi - Puna Kodaka Vavka Dini". (Ven. Amarawansa., 1969.p.89)' The *Palu makichchava* inscription is also important when talking about the involvement of monks in irrigation. It states that King *Gajabahu* donated 500 *kahawanus* to the four sides of the *Manaka Wewa* in the Upala Province for the benefit of the four *Thuparama* monks ^ *E. Z.*, Vol. 1. P. 208). Accordingly the monks are entitled to receive the proceeds of this tank to provide their needs . *Nagirikanda* inscription also gives examples of irrigation donations made by kings to the monks and states that King *Kumara Dhatusena* offered *Mahagiriya Wewa*, *Vugiriya Wewa* and *Kabumbe Wewa* to the *Bhamanagiri Vihara* ^ *E. Z.* ,Vol.4. P. 115&.

Information about canals can also be found in the inscriptions, among the irrigation works offered to the monks. *Molagitiya Welegala* inscription, which belongs to the 1st century, is important <sup>E.Z., Vol. 3. P. 15&</sup>. "King Abhaya, the eldest son of King *Kootakannatissa*, the grandson of King *Devanampiyatissa*, handed over a pot of gold to the Bhikkhu Sangha at the *Ganatakabha Ela Pilipavatha* Vihara in Atharagaga." Also, the Viharagala inscription shows the offering of King *Saba Uppala Donika Wewa* to the monks at the *Ekadwara Vihara*. Later, King Gajabahu later renovated this tank and offered it to the same temple (Ven. Amarawansa., 1969.p. 127). Even King *Vasabha* had granted the right to lease his main irrigation business, the *Alisara* Alley, to the *Muchela* Vihara, and the information that a tank which could supply water for the cultivation of a thousand *karisas* was offered to the *Galambathiththa* Vihara can be traced back to sources in the literature (Mahavamsa., ch. 35, 47).

Among those who offered irrigation to the monks, the presence of nuns was also important. We can identify a clear proof of this in the *Karandagala* Inscription (Ven. Amarawansa., 1969.p. 89)' It is clear that the *Matha Uvasiya* was offered to the *Hambuthagala* Vihara on his own Tank. Also, the mother of King *Gamini Abhaya* had spent 4,000 kahawanu of her wealth to buy a tank called *Kumbaraviya* and offer it to the temple she had built. Also, *Hakamitta*, the minister's wife of King *Gajabahuka Gamini Abhaya*, has dedicated a lake called *Deegabhaya* to his newly built Sela Chaithya (Paranawithana., 1983.pp. 98-99)'

Such offerings to the tank monks are common during the Anuradhapura period, as evidenced by the fact that the temple monks may have received the income from the *Yala*, *Maha* and *Meda* seasons and the income from the fishing in the tank. According to the famous *Thimbiriwewa* rock inscription, "Siddham Gangavi ... (son) Mithayaga Jitha, Anulabi Majibika Pathi GangaPavatha Viharahi Buku Sanga Hata Dini".Anula, the daughter of Mitta, not only earned her family income but also the income from fishing in her own lake. It is offered to the monks in the temple <sup>E.Z., Vol. 4. P. 63&</sup>

This shows that the monks need to intervene in the maintenance and upkeep of the irrigation canals and the revenue generated by the ownership of the tanks and canals by the state-sponsored ownership of the tanks and canals as well as the ownership of the irrigation canals by the monks.



#### **4.2. Intervene in the irrigation industry to fulfill their needs.**

The monks were initially able to obtain food and other necessities from the wealth donated by the people, but as the number of monks and nuns increased, their dependence on others became unsatisfactory. A temple needed a steady source of income in order to fulfill the daily needs of the temple residents and to renovate their temple buildings (Gunawardena., 1993.p. 53). If the agricultural activities in the villages and lands donated to the temples are carried out in a good manner, the economic condition of the temples will improve. Therefore, in order to increase their income, they had to develop agriculture. Buddhist literature also reveals that the people of the villages who offered sacrifices to their temples were encouraged to build tanks or engage in agricultural activities using existing irrigation systems. This can be seen from the coming *Udake* section of *Samantha Prasadika*. This is proved by the fact that the farmers who cultivated the temple lands were given a portion of the harvest and had to serve the temple (Gunawardena. ,1993:.p.53).

It was found that agriculture thus contributed to the acquisition of wealth for the temples, and that irrigation was an essential factor, and that the monks' involvement in the irrigation system was due to the fact that they had to develop irrigation systems which were a necessary factor for the monks to develop the economy of their areas according to the urgent need.

#### **4.3. Gaining the necessary authority to engage in irrigation industry**

According to *Samantha Pasadika*, the Sangha is prohibited from accepting property. But the monks had the right to take over any property if it was offered to pay for the purchase of consecrated items or to repair the temple buildings. Accordingly, the monks had the right to take advantage of the large irrigated lands and the lands connected to them, as mentioned before for the maintenance of the temple as well as for the urgent need (Gunawardena., 1993.p.78). Therefore, it is clear that it is not untrue to say that the monk was involved in the irrigation work. According to Ranaweera Gunawardena, the monk has performed the following functions in the field of irrigation. that,

1. Construction of Irrigation
2. Development of Irrigation
3. Involvement in irrigation tax work (Gunawardena.,1993.p.137).

According to the *Mihintale* Inscriptions, "It was stipulated that those who were fined for misconduct in a village belonging to the temple should be deployed to remove mud from

the tanks if they failed to pay the fine." The same inscription also mention a donation made to the temple to cover the cost of building a dam (Gunawardena.,1993.p.137).The fact that the monks had the power to construct irrigation canals and that the authority to carry out the task of repairing the tanks was vested in the monks of the temple shows that the monks enjoyed the rights regarding irrigation. Mudslides in lakes occur during periods of low water. But this is still a difficult task today. So if there was water in the tank when the previous offender had not paid the fine, we can guess that the monks would have got him to do other things needed for irrigation. Accordingly, it is very clear that the monks had the power to irrigate, so it gives us important evidence about the involvement of the monks in irrigation.

The monks also had the right to receive labor and services from the residents of the lands on which the temples belonged. Many of the privileges bestowed on temples by special *Attani* offerings stated that royal officials should not remove *Varians* or servants from temple lands. The *Nochchipothana* Inscription clearly states that servants should not be removed for irrigation work ^ *E.Z.,Vol.2.P.7&*. Also, the *Dorabawila* inscription stipulates that even if the twelve main tanks are destroyed, no temple buffaloes or Servant should be forcibly taken away for irrigation work ^*EZ.,Vol.5. P. 295&'*. Accordingly, we can be sure that the royal officials were not able to obtain the labor of the temples as required. Thus, we can conclude that by granting *Attani* the exemption from the service to be rendered to the king, it was implied that the right to obtain such services had been vested in the temples. In fact, we can argue that irrigation is a major function of the government and that the temples were freed from it so that the irrigation systems needed for their maintenance could be constructed by the temples on their temple lands. Accordingly, it is said that the monks have been directed or persuaded by the government for irrigation. Considering these factors, it is very clear to us that the temple had the power to carry out irrigation work. Therefore, it must be said that the monks were clearly involved in the irrigation work required for the maintenance of their temple and became vigilant.

#### **4.4. Receiving special privileges for the irrigation industry**

The relationship between the monks and the cultivators in the “*Rajasikka Pada vannawa*” at *Samantha Pasadika* is important when discussing the monks involvement in the irrigation industry.

“If the people, with the intention of helping the Sangha, build a tank to obtain water for farming on the land belonging to the Sangha and then supply the Sangha with vials from the crops grown from the water of that tank, they are permitted to accept the burden of the

king ..... Once the oppressed people have left the land, other people who come to live on those lands are allowed to stop supplying water if they do not give anything to the monks. But it should be done at the time of plowing, not at harvest time. Then the people said, "Lord, in the past too, people used to get water from this tank and cultivate crops." Then they helped us a lot. They should be told that the Sangha had been supplied with various goods. If they say, 'We will do the same,' then it is appropriate to accept what they offer. A similar practice has been followed in recovering ownership from canals, paddy fields and forests belonging to the Sangha "(Samantha Pasadika., Vol.2.1930.p. 679).

From the above, it is clear that the monks had the right to build tanks for cultivation on their land. Therefore, we can argue that the monks, as the owner of the land, also acted as supervisors, advisors or patrons in such irrigation industry. Moreover, the monks no doubt enjoyed the privileges of actively controlling the water of the tank and irrigating it when it was of no use to the people who used the water of the tank on their land. Furthermore, in the second part of *Samantha Pasadika's Parajika*, the word "*Udake*" indicates various faults related to the enjoyment of tank water. Ranaweera Gunawardena (1993) states that it is evident that the temples were engaged in irrigation industry. These facts also show the relationship between the monks and the irrigation industry.

We have previously inquired about the involvement of monks in irrigation industry through the transfer of the right to benefit from irrigation to the monks. The Mahavamsa mentions such a special privilege bestowed on monks by King *Mahinda IV*.

“Raja Sonagathe Bhogan Rajano Sanghabhoge

Na Ganabha Thuni Pasena Likha sethva Nidhapai” (Mahavamsa., Chapter 54: 28).

This is a request to the future kings not to charge crops from the Sangha. Accordingly, the lands and irrigation industries owned by the Sangha temples have been exempted from government taxes. Therefore, we can assume that the monks engaged in irrigation, improved it and developed the economy of their temples.

It appears that the monks also had special privileges for cultivation. "Isurumuniya Raja Maha Viharaya has given its verdict in favor of the king Mahinda iv .Isurumuniya Raja Maha Viharaya in resolving a dispute between the royal officials and the employees of the Isurumuni Vihara regarding the extraction of water from the Tissa Lake.Accordingly, he also established a decree to guide his officers in the future. It was also stipulated that the paddy fields belonging to the temple should be given priority in providing water from the

tank. The stone pillar, which was planted four feet deep in front of the sluice gate, was to continue to supply water to the temple paddies until it began to rise above the water level ^E.Z., Vol. i. P.29-38&' Accordingly, it is implied that the monks had a prominent place in irrigation. Accordingly, we can speculate that the monks were involved in irrigation and that such conflicts may have arisen when their traditional rights were violated or when government officials tried to gain more power over the Sangha. The fact that the Sangha was in conflict makes it clear to us that the Bhikkhu was conscious of his right to irrigation. Thus, it can be said that the kings gave special patronage to the monks for irrigation and due to the power given to it, the monk actively intervened in the irrigation work. It helps to understand the relationship between monks and the irrigation industry.

#### **4.5. The protection of the power that the kings had traditionally held for the monks**

The kings also guaranteed the monk's right to the temples to take advantage of the surrounding irrigation systems. " Vijayabahu (1070-1110) offered the entire Elahera district, including the canals, to a temple as the Elahera canal was a communal property but its ownership was shaken during the Chola rule" (Mahavamsa., chap. 60.14). In an existing inscription ^Ez., Vol. iv. 246-52& from the Colombo Museum, arrangements have been made to grant land to the monks and to provide a continuous supply of water from a nearby stream. It is also mentioned in the *Viharagala* inscription that the '*Upala Donika Wewa*' which was offered by King Saba to the temple called *Ekadwara* was later renovated by King Gajabahu and offered to that temple (Ven. Amarawansa, 1969.P. 127).

Accordingly, the king has traditionally protected the ownership of the irrigation industries to which the monks belonged. There are examples that when the lineage that gave tanks to the monks was broken, the newly appointed lineages often accepted that right and offered it back to the tank monks. According to *Samantha Pasadika*, it has been observed that the queen King *Alanda naga* had re-sacrificed the tanks enjoyed by the monks at the Chittala Pabbata Vihara on the above requirement (Gunawardena., 1993.p. 66). We can argue, however, that even a newly elected dynasty will not seize the property of the Sangha while trying to assert its power and anger them. Accordingly, the monks may have interfered in the irrigation work as they continued to protect their ownership of the irrigation canals. From this we can understand the relationship between the monks and the irrigation industry.

#### **4.6. Involvement of monks in irrigation industry on personal needs**

It is said that later monks had to assert individual rights to property. "An inscription in a place called *Muruthange* in the North Western Province records the donation of three

hundred *damba kahavanus* by a monk named *Sanghatissa*" (Gunawardena., 1993.p.82). It is clear that the monks were wealthy. This is clear from the donations made by the monks themselves. Thus, it is clear from the individual wealth of the monks that they earned wealth from the lands they owned. In order to cultivate the lands, water has to be provided. We could argue that "therefore, the monks must be involved in the irrigation industry." And the irrigation industry for the monks,

1. Must have belonged before entering the priesthood
2. Inheritance
3. By sacrificing by someone

It has been suggested that the right may have been obtained (Gunawardena., 1993.p.85). Therefore, the relationship between the monks and the irrigation system is formed through the right itself. Also, since there were tank owners called '*Vapihamika*', they did not delegate it to anyone at the time of ordination and could own it even after being ordained. We could argue that the monks who had only one child were likely to receive the irrigation system, and that the monks might have done the work in their own tanks.

Accordingly, the monks may have been engaged in irrigation industry for their wealth or income and to obtain the water facilities they needed on a daily basis. In this way, the link between the monks and the irrigation industry is well established.

#### **4.7. Advising kings to build irrigation schemes**

The chronicles of Sri Lanka mention instances where monks instructed kings on the construction of irrigation canals. The Rajaguru has persuaded the monks to build tanks for the economic development of the people as well as the self-sufficiency of the country. Ven. Mahavamsa's view of Prince Dhatusena, Accordingly, the king was instructed to build a tank in the future by crossing the river that had blocked their journey. "you will also build a lake here"(Mahavamsa., chapters.38., 25-28). This statement shows the knowledge of the monks on how to build the installments and it can be seen that the monks also gave advice to the kings. Thus it is well established that the monks clearly intervened in the irrigation work and instructed the king to build irrigation schemes.

#### **4.8. Involvement of monks in irrigation industry through lay officials**

The monks owned vast tracts of land as well as irrigation systems. It said, "Property offered for the maintenance of the Sangha should be received and controlled by a monk through a layman." The service of this vase or layman becomes important as property such as money,

land and irrigation systems, which were not considered consecrated, began to belong to the Sangha. "Some of them were in charge of tanks belonging to temples. It was their job to collect water taxes "(Gunawardena., 1993.p. 100). It is also clear that the monks had the right to receive the labor of the inhabitants of the 'villages' offered to the temples free of charge. Therefore, the monks have taken over the duties assigned to them by the lay officials and have taken steps to construct and conserve the irrigation works by the labor of the people residing in their lands. In addition, it is said that even the revenue from the irrigation industry could have been collected by the 'kappiyakaras' and added to the income of the temples and therefore the monk had indirectly interfered in the irrigation industry there as well.

#### **4.9. Involvement of monks in irrigation systems according to the Buddhist culture of Sri Lanka.**

Agriculture was the basis of the Sri Lankan economy. It is believed that Sinhala and Buddhist culture were formed by joining the category of "Village, Lake, Dagoba" (Hettiarachchi., 2002. P.253). Accordingly, the monks inquire about the victim of the monastery where they live. If the economy of those villages is bad, it will affect the monks. Therefore, the monks intervene to start irrigation industry in the lands belonging to their temple. Also, there is a connection between the construction of the 'Chaitya' of the temple and the construction of the tank. Accordingly, the dagoba was built from the soil dug to make tanks as a prominent feature of Sinhala culture (Hettiarachchi, 2002: 254). Accordingly, it appears that "the monks were even involved in the construction of the dagoba, which was a religious activity." Through this intervention, the direct connection of the monks to the irrigation industry is well illustrated.

#### **4.10. Teaching of Irrigation Technology in Pirivenas**

The above idea is put forward by S.B. Hettiarachchi. In his view, the Pirivenas taught "not only Pali Sanskrit and other linguistics, but also subjects such as irrigation technology, architecture and metallurgy" (Hettiarachchi, 2002: 252). Archaeological excavations carried out on the four corners of the Abhayagiri Vihara have revealed the use of industrial equipment. He also states that the knowledge of irrigation technology required for the development of agriculture was obtained from the temples. This is illustrated by the example of King Dhatusena, who was discussed earlier, receiving advice on irrigation from Ven. Mahanama Thera. Accordingly, there is evidence that the monks who taught in the Pirivenas were more likely to be involved in the premiums. It can be said that the authors of the *Mahavamsa*, *Samantha Prasadika* and *Sarathdhapani* had a good understanding of

irrigation technology and the above opinion is confirmed accordingly. There are examples of kings sacrificing even technicians to temples. Accordingly, it is clear to us that the monks had a very important power over irrigation and that the monks were directly and indirectly involved in irrigation.

## 5. CONCLUSION

The impact on the culture of Sri Lanka with the post-Mahinda gamanaya ,cultural transformation is immense. From the birth to the death of the Buddhist people, Buddhist monks have been actively involved in their great endeavors. In order to show their devotion, kings as well as the common people have handed over the ownership of temple lands as well as irrigation works to the monks. It is clear from the above facts that the monks were involved in irrigation to obtain water, especially for agricultural purposes. Among the *Attani* offerings made by the kings, it seems that the monks were persuaded to irrigate the lands belonging to the temples by giving gifts such as *Nochchipothana*. It has been suggested that if the economic condition of the people in their victim villages was good, it would also affect the economy of the temples, so that the monks would have irrigated their own lands and built *dagobas* with their soil. It has also been suggested that the monks at the *Abhayagiri Uththara Mula* Vihara have taught a method of irrigation technology that is second to none in the world of advanced irrigation technology. It is clear that the ancient monks of Sri Lanka, as the owners and advisors of the irrigation system, were actively involved in the irrigation work by constructing the irrigation system, exercising their right to receive it and conserving it. Accordingly, according to archeological sources and literary sources, it can be reasonably concluded that there was an interrelationship between the monks and the irrigation industry. Therefore, it can be said that the kings as well as the monks deserve the respect of the irrigation industry.

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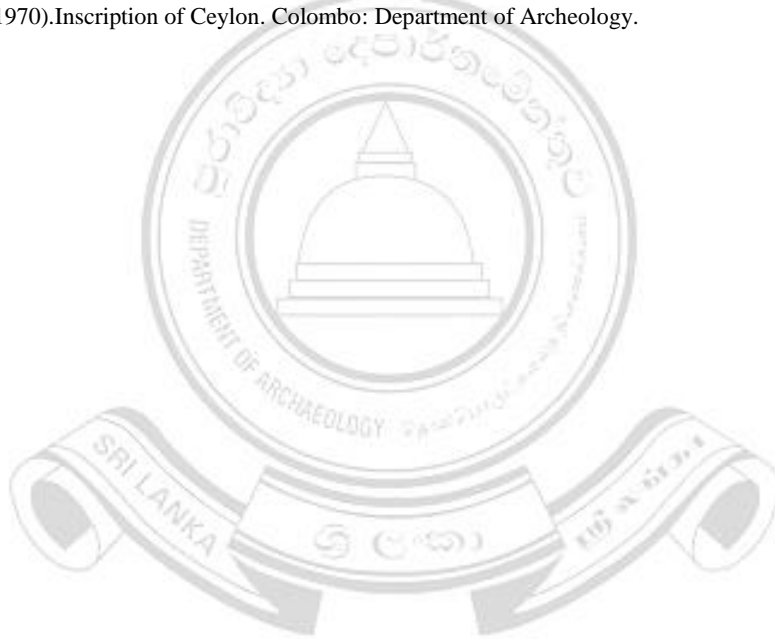
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# AN ANALYTICAL STUDY BASED ON OLDEST ARCHAEOLOGICAL FACTORS REGARDING THE BIRTH OF THE BRAHMI SCRIPT

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## ABSTRACT

Inter-communication is an essential factor to create coexistence among cultures. The letters have emerged as a result of the effort to represent human language using symbols. The very first records on a script found in Asia are connected with the Brahmi script. James Prinsep in the nineteenth century found the method of reading the Indian Brahmi inscriptions. There are various opinions regarding the origin of the Brahmi script. However, it is still controversial that in which period, and in which place this script was used. With the emergence of oldest Brahmi letters of South Asia from Sri Lanka, the controversy among the archaeologists regarding the origin of the Brahmi script seems to be settled to a certain extent.

The objective of this research is to provide a description on the origin of the Brahmi script, after analysing the views that are currently accepted. Opinions regarding the evolution of Brahmi letters and the pioneering evidence of intellectuals in the relevant field and printed sources such as publications and related articles on inscriptions were used as research sources. The research method was to analyse the origin of Brahmi script based on primary and secondary data collected from sources. The basic aim of this research is to analyse whether the Brahmi script originated in Sri Lanka or in India.

**KEYWORDS:** Asoka-Brahmi, Sinhala-Brahmi, Non-Brahmi, Sri Lanka, India, Inscriptions

## 1. INTRODUCTION

### 1.1 Brahmi Script

The Brahmi script was named Brahmi as per the citation found in *LalithaVistharaya*, which is considered to be written in the third century ACE (Rajendra, 1877, p. 182). Hence, they were the oldest letters found in India at that time, after James Prinsep recognized the letters to read the Asoka inscriptions. Those letters were named as Brahmi as per the description found in the book *LalithaVistharaya*. Letters found in inscriptions in Sri Lanka from third century BCE to seventh century ACE, were identified as Sinhala Brahmi letters (Karunaratna, 1984, p. 5); (Wijesekera, 1990, p. 7). “The Buddhist text *LalithaVistharaya*, written in around third century ACE, is a proof to provide that there was a script called Brahmi in the past. However, there are also records on the Brahmi script in the Jain books such as *Vyakyapragnapthi*, *PragnapanaSuthra*, and *SamavayangaSuthra*, which were written in the first century ACE. *LalithaVistharaya* depicts 64 types of scripts while the said Jain texts have named 18 types of scripts and the name Brahmi is among them” (Goyal, 1979, pp. 22-24).

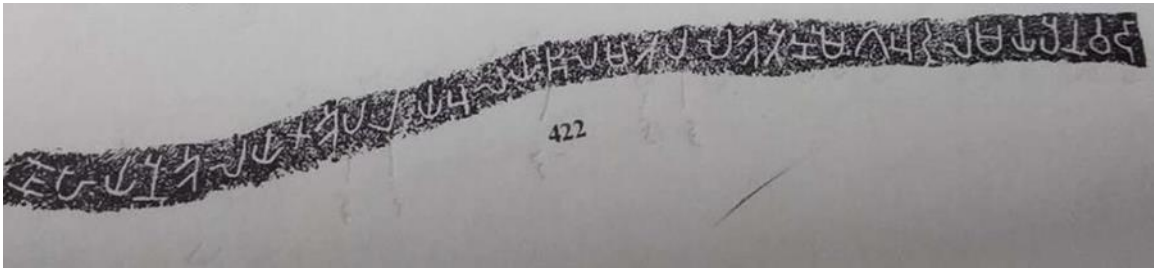


Figure 1: Illustration of Brahmi script at Rajagala Inscription in third c BCE  
(Paranavitana, 1970, p. XLII)

## 1.2. Opinion on the origin of the Brahmi script

Nandasena Mudiyanse pointing out that the name Brahmi was given to the script by Brahmins, comments that intellectuals opine that Indo Aryans created this alphabet with the view of protecting the Brahma or the Veda (Mudiyanse, 1942, 3. 7). According to books like *Mahabharatha*, Brahmi script is said to be a creation of Sarasvathi, who is considered as the strength of Brahma. According to Hindu teachings, Sarasvathi dominates all the arts, education, and knowledge (Senanayake, 2018, p. 17). There are various opinions on the origin of Brahmi letters by various intellectuals, and among them Buhler and Hunter point out that “it was after the reveal of symbols marked on seals found at Mohenjo-Daro and Harappa of Indus valley civilization, it was affirmed that the Brahmi script originated in India. Although, the interpretation of the said symbols is not definitely clear, the scientist Langdon thinks that these symbols show the origin of the Brahmi script. According to the palaeographer Buhler, the script used by Phoenicians was the source of Brahmi script. As mentioned by Buhler, Hunter assumes that the similarities in Brahmi and Phoenician scripts emerged, since the Phoenician letters originated with the influence of some symbols used in the Indus valley civilization (Disanayaka, 2006, p. 78). “Pande, Sirkar, Chatterji, and Raghawan are among those who believe that the origin of Brahmi letters was based on hieroglyphs of the Indus valley” (Pandey, 1957, p. 51).

Some hold the opinion that it has evolved from old hieroglyphs of the Indus valley. That is because of the similarities between Brahmi script and letters in the Indus valley (Gunathilake, 2013, p. 26). R. Nagaswami accepted that Dravidian Brahmi script used in Tamil-Nadu was developed from symbols of the Harappa civilization and to prove his argument he used the symbols found in clay pottery found during the excavations done in South India by the archaeologist B.B. Lal. By evolution of Dravidian Brahmi letters, Vatteluthu letters (Vada+eluththu letters of the South) were formed, and it is said that the Dravidian Brahmi was also the foundation of Pallava Grantha letters” (Nagaswamy, 1980) (Velupillai, 1980, p. 2). Bandusena Gunasekara commenting on the origin of the Brahmi

script had said that it is believed that it had developed through the Indus valley civilization. Commenting further on the spread of the Indus valley civilization, he has accepted that the Indus valley civilization had spread in a vast area in and around India. Archaeological factors confirm that it has spread to Afghanistan from the north, Sri Lanka from the south, Cyprus and Crete islands from the west and Easter Island from the east (Gunasekara, 1996, p. 26).

## **2. LITERATURE REVIEW**

The research done by many scholars and archaeologists on the origin of Brahmi script is summarized in the literature review. Existing archaeological evidence also helps to find the origin of Brahmi.

### **2.1. There is no common agreement among intellectuals regarding the origin of the Brahmi script.**

N. Wijesekara and Nandasena Mudiyanse point out that the period of the origin of Brahmi script cannot be determined since there are evidences to prove that Brahmi letters have been used before the 5<sup>th</sup> century BCE. When and where did the Brahmi script originated is a problem still to be solved. It is clear through inscriptions of King Asoka that by the third century BCE, it had spread all over North India (Wijesekera, 1990, p. 85). A conclusion cannot be reached since a record with Brahmi letters has not been found before the fifth century BCE. There are many controversies in this regard among intellectuals (Mudiyanse, 1942, p. 7). The following idea was expressed by F.R. Allchin of the University of Cambridge, a renowned archaeologist regarding the South Asian region. Although it has been over a century and a half since Asoka inscriptions are being read by James Prinsep, no evidence has been found to prove that this script had existed before the reign of Asoka (It is accepted that Emperor Asoka reigned between 274-232 BCE) (Kodithuwakku, [www.archaeology.lk/sinhala](http://www.archaeology.lk/sinhala), 2018).

### **2.2. Literary factors on the history of writing in Sri Lanka**

There is evidence in Mahavamsa to prove that there was a writing system even before the arrival of Mahinda Thera (Mudiyanse, 1942, p. 7). According to Mahavamsa and Dipavamsa, the chronicles of Sri Lanka, it is believed that there was a writing system before the third century BCE. Chronicles include information regarding writing activities in this country from the sixth century BCE (Lagamuwa, 2006, p. 60). Since, archaeological evidence was found recently regarding the use of letters before the arrival of Mahinda Thera, we can assume that Brahmi letters were used from 6-5 centuries BCE.

The chronicles mention about King Vijaya's arrival and establishment of settlements in Sri Lanka in the sixth century BCE. Mahavamsa says that a document and presents were sent to King Pandi at Madurapura, requesting him to send a suitable princess for King Vijaya. When the King Pandi sending his daughter to Ceylon he had sent a letter to King Vijaya and there may have been a knowledge in citizens of this country regarding some kind of a writing system)Pannasara, 2005, 3(3-2 .:;)Polgahawatte, (1959.

According to the Mahavamsa, King Vijayasent a letter to his brother, Prince Sumitta asking him to send a suitable person to become the ruler of this country after his demise. Brahmin Pandula who was the teacher of Prince Pandukabhaya, who ruled Sri Lanka in the fourth century BCE, may have known about writing. When Mahindathera said that in the future a king called Dutugemunu will build a dagoba called Ruvanveliseya that news was written by King DevanampiyaTissaon a stone pillar. Thus Mahavamsa gives a hint that this is the very first inscription written on a stone. Although this inscription is still unrevealed, it is believed that this is the oldest inscription written in Brahmi letters. According to the Mahavamsa, King Dutugemunu had written on a gold plate to say that Lovamahapaya would be built by King Dutugemunu. Based on these factors it can be said that Brahmi script was used in Sri Lanka in or before the third century BCE. (Polgahawatte, 1959); (Helogama, 2003, pp. 1-2).

### **3. RESEARCH METHODOLOGY**

Opinion regarding the evolution of the Brahmi letters and their oldest archaeological evidence by intellectuals in the relevant field, and printed sources such as books and articles were used as research sources. The research method used was analysing the origin of Brahmi script based on primary and secondary data collected from sources.

### **4. RESULTS AND FINDINGS**

The results and findings are categorised under the four subtopics as 'archaeological findings on oldest syllabic symbols in Sri Lanka,' 'revealing Brahmi letters in India before the fifth century BCE,' 'evidence on early settlements in Sri Lanka and 'early Brahmi letters in the fifth century BCE.'

#### **4.1. Archaeological findings on oldest syllabic symbols in Sri Lanka**

Another significant feature in early inscriptions of Sri Lanka is that they consist of many non-Brahmi symbols. These symbols are sometimes similar to hieroglyphs of Indus valley civilization of India, sometimes to hieroglyphs in clay pots belonging to early historic period

of Sri Lanka and India (1000-3000 ACE), and sometimes to Brahmi letters. Parānavitana read letters in the Indus valley civilization according to these non-Brahmi letters. The *svastika* symbol is commonly used among them (Lagamuwa, 2009, p. 31). There were six symbols on a bronze ring at Anaikottei and on a stone lid at Ibbankatuwa. The most important thing that should be focussed is that these hieroglyphs are similar to hieroglyphs in Indus valley civilization and to non-Brahmi symbols of cave inscriptions belonging to early and later Brahmi periods in Sri Lanka (Lagamuwa, 2006).

There are similarities and differences between Asoka Brahmi and Sri Lankan Brahmi letters. The reason is that they were influenced by both North Indian and South Indian scripts. Before the introduction of Asoka Brahmi letters, a Brahmi alphabet may have been introduced to Sri Lanka through South India, which had a source of South Indian or other origin (Buhler, 1904). Ariya Lagamuwa shows with evidence that Sri Lankan Brahmi script has evolved from Indus valley letters. There are hieroglyphs found in black and red ware of Megalithic period and stone lids and other antiquities belonging to early Iron Age from 900 to 400-300 c. BCE, similar to letters in Indus valley. The system of writing from right to left can be seen in several inscriptions belonging to early Brahmi age including Gurugallena inscription in Kegalle, inscription at Erupothana, inscription in Mahakachchakodi, and inscription, at Duwegala showing the influence of Indus valley letters (Lagamuwa, 2006, p. 26).



Figure 2: Non-Brahmi symbols (Parānavitana, 1970, p. xxvi).

#### 4.2. Revealing of Brahmi letters in India before fifth century BCE

The oldest Brahmi letters in India were found at archaeological excavations done around Korkei harbour. It is said that they can be dated back to 8<sup>th</sup> century BCE. Although the Brahmi letters on clay pots found at the above excavations done by the archaeologist K.S. Shanmugam of the Department of Archaeology of Tamil Nadu are dated back to 8<sup>th</sup> century BCE as per the Carbon 14 dating (Nagaswamy, 1980, pp. 455-465), most of the South Indian epigraphers believe that it cannot be accepted since the excavation layers were not founded (Nagaswamy, 1980, pp. 72-82). Deraniyagala points out that Brahmi letters found in Arikamedu in India date back to 900-600 BCE. K. Rajan of Department of History of the University of Pondicherry in South India and his team has done excavations in two cemeteries of the megalithic tradition called Kodumanal and Poranthal situated at Kongu area. At the Kodumanal excavations the team has found a number of records with Brahmi letters that revealed personal names, and they have received two radiocarbon dating as 408 and 330 BCE in two clay pot demonstrations (Kodithuwakku, Evolution of Sinhala Alphabet in Sri Lanka, 2019).



Figure 3: Unearthing of clay pots with Brahmi letters in the excavations done at Kodumanal (<https://www.frontline.in/sinhala.archaeology.lk/දකුණු-ආසියාතික-ඉතිහාසය-හ/>)

These dates are not calibrated and after the calibration these dates may be older than this says Chandima Ambanwala. He further comments that two clay pots with letters engraved on them, revealed at excavations done at megalithic cemetery at Porunthal village, situated 12 km southwest from the city of Palani in the Dindigul District of Tamil Nadu. This place is a cemetery covered by a stone circle and the excavation was done by a team led by K. Rajan in 2009-2010. A part of a clay piece found at this place was dated as 490



BCE by the radio carbon dating. The date received for this is earlier than of the Kodumanal (Ambanwala, 2020).



*Figure 4: A piece of clay pot with Brahmi letters unearthed at Porunthal excavations (Rajan, 2014, p. 60).*

#### **4.3. Evidence on early settlements in Sri Lanka**

Siran Deraniyagala points out that he could reveal significant information regarding the origin of early settlements in Anuradhapura by excavations done about 30 feet from the ground level at the inner city of Anuradhapura. The settlement that seems to be in extent of about 35-65 acres has been dated back to 900 BC. He further commented that cultural aspects such as use of iron, paddy cultivation, use of high-quality clay items and animal husbandry with animals such as cattle and horses revealed this (Deraniyagala, Evolution of Sinhala Alphabet in Sri Lanka, 2019).

In 700 BCE, the inner city of Anuradhapura has spread over 125 acres and this has expanded to around 180 acres by 500 BCE, as pointed out by Deraniyagala. He further commented that the maximum stage of this development can be seen in 2nd century BCE, which is the period that Emperor Asoka ruled India while King Devanampiyatissa ruled Sri Lanka, and the extent of inner city in this period can be about 250 acres. When considered regionally, Anuradhapura had become the largest city situated at the south of the Ujjaini city in North India (Allchin, 1995, p. 208)

#### 4.4. Early Brahmi letters in the fifth century BCE

If the Asoka Brahmi script was introduced by MahindaThera for the first time during the reign of King DevanampiyaTissa, it would not be practical to say that Brahmi inscriptions were written in Sri Lanka immediately after the introduction of Buddhism. Moreover, if at least a certain amount of people were unable to read letters at that time, it would be a useless act to inscribe inscriptions, since the key aim of writing inscriptions is to raise the awareness of the public. Hence, it is clear that general public was aware of the Brahmi script at that time. It could happen only if Brahmi script was known by the public before the third century BCE. (Lagamuwa, 2006, p. 20). Since archaeological evidence found recently claim that letters were used in this country before the arrival of MahindaThera, there is an opinion that there were Brahmi letters in Sri Lanka from about 6-5 centuries BCE (Deraniyagala, 1972, pp. 48-196); (Coperahewa, 2018, p. 18). There are differences in Brahmi records in Sri Lanka that are not found in Asoka Brahmi writing. According to these differences, we can assume that Brahmi script had been introduced to this country before the arrival of Mahinda Thera. (Gunasekara, 1996, p. 40).

Expressing a new opinion regarding the Brahmi writings in Sri Lanka, it is said that it has been confirmed through radio carbon dating that Brahmi script was used in Sri Lanka since 600-500 BCE. (Deraniyagala, 1990, pp. 742-747). Later the British archaeologist Robin Conningham further affirmed this opinion according to information found at excavations done at Salgahawatta, Anuradhapura. (Coningham & Batt, The British Sri Lankan Excavation at Anuradhapura Salgahawatta -2, 1999, pp. 125-132). A piece of clay pot with Brahmi letters, found at the above-mentioned excavation, provides evidence to prove that the Brahmi script had been in use since the sixth or at least the fifth century BCE. Accordingly, these evidences are the oldest evidences found in South Asia, and it is significant that such evidence has still not been found even in India. (Dias, 2019). There are also many records of Brahmi writings engraved on clay pots that have been found at Anuradhapura, Tissamaharamaya and Kantharodaya, were lands used for settlements in the early historic age of Sri Lanka. (Deraniyagala, 1972, pp. 129-130). Deraniyagala points out that Brahmi letters have been found in several pieces of clay pots found at the location named AMP88 near the Mahapali alms hall at the inner city of Anuradhapura. (Deraniyagala 1992: 743 – 747)



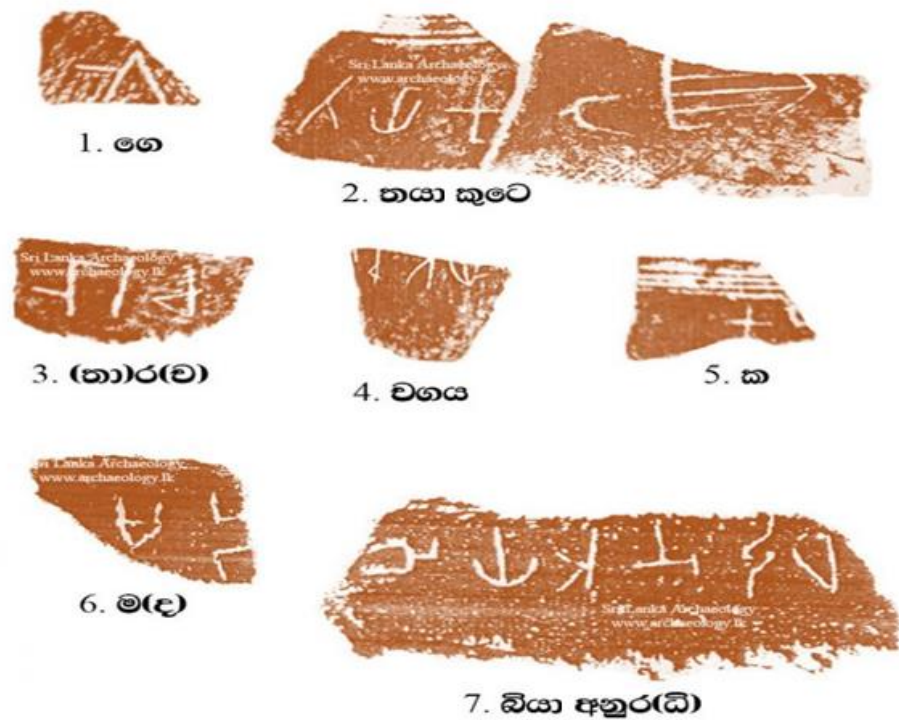


Figure 5: The pieces of clay pots with letters unearthed at the excavation done in 1988 at Salgahawatta, inner city of Anuradhapura—(Deraniyagala 1992: 743 - 747)

He further pointed out that a stylus made of animal bones was found that had been used to write Brahmi letters (Deraniyagala, 1990, p. 744). Moreover, similar styluses have been found in Alamgirpur, Chirand, Hasthinapur, and Ujjain in India and it suggests that they were used in Sri Lanka and India in contemporary periods (Deraniyagala, 1990, p. 742). The controversial piece of clay pot with Dravidian Brahmi letters and non-Brahmi symbols was found by German archaeologists in addition to pieces with normal Brahmi letters during the excavations done at Tissamaharamaya (Mahadevan, 2010); (Senanayake, 2018, p. 29). According to recent archaeological excavations and researches in India and Sri Lanka, it has been confirmed that Brahmi letters in Pandya area and in Sri Lanka belong to 600-500 BCE. According to the view of Deraniyagala, the word ‘anuradhapura’ found at the excavations in the inner city belongs to Prakrit Language. Ariya Lagamuwa says that there are some hints to find that this language has been used in the inscriptions of the 3<sup>rd</sup> century BCE (Lagamuwa, 2006, p. 31).

Malini Dias when editing the Brahmi writing found on the potsherds from the citadel in Anuradhapura mentions that the language of these inscriptions with long vowels and aspirated consonants is a Prakrit similar to Magadhi, a regional associate of the Middle

Indian Prakrits that has been used during the time of the Buddha. It had been deciphered and edited by her as .....tayākuṭe meaning the vessel of .....tayā filled with Sujā in front of tayā and giving the meaning as belonging to Sujātā with the possessive case ending yā. The next is the inscription deciphered and edited by her as biyāAnura (dhi) meaning Princess Anurā (dhi).

**Texts and translations:**

1. (Sujā) tayā kuṭe

The inscription deciphered as Sujātayākuṭe is translated as belonging to Sujātā. (Dias 2020: 15)

2. Biyā Anura (dhi)

The inscription deciphered as Biyā Anura (dhi) is translated as Princess Anurā (dhi). (Dias 2020: 15)

Findings of the excavations done at the Megalithic Cemetery at Andarawewa are more significant among the findings so far available regarding the Brahmi script. The clay pot would not shift and would not be affected with animal activities, when it is deposited within a casket that is made with four stone slabs, and covered with a stone lid. Therefore, finding these evidences from a location where the context is not confounded is a massive transition in archaeology. Moreover, these pieces of clay pots and parts of bones have been sent to Beta Analytic Institute in America and they were dated back to 491-366 BCE. This dating with a confidence of (2440-2315 Cal Bp) 94.4% and with a calibration of 1.0% the Beta Analytic institute has further informed that these belong to 507-501 BCE (2456-2449) (Beta 482665). Accordingly, this finding has provided another opportunity to rethink about the origin of the writing in Sri Lanka (Kodithuwakku, 2019).

An archaeological excavation was done by the Department of Archaeology and Heritage Management, of the Rajarata University of Sri Lanka under the location name RUSL EX 01 2017 related to the Megalithic Cemetery at Andarawewa near Galgamuwa of Anamaduwa Divisional Secretariat Division. Three Brahmi letters have been identified in three pieces of a clay pot that was deposited inside the cemetery. Those letters are identified as two 'th (𑀮)' letters and a palatal letter 'śa (𑀭)'. In excavations that have been done related to megalithic cemeteries in Sri Lanka of the early historic period so far, many non-Brahmi symbols were found on their stone lids (Senanayake, 2002, p. 72). "Deraniyagala opines that according to information in chronicles, the foreign trade (especially with the West Asia) has influenced the birth of writing system in Sri Lanka. It can be believed that

Brahmi script was introduced to this country from India through the sea route. Even before the use of Brahmi script, with the purpose of affirming the ownership, non-scriptural graffiti was used to a certain extent. It can be seen that for this purpose initially the non-scriptural graffiti and then Brahmi script was used.” (Coningham, Allchin, Batt, & Lucy, 1996, p. 92). When focusing on the series of writings that have started and developed with the establishment of Buddhism in Sri Lanka, we can see that Brahmi letters, similar to the letters used in Asoka inscriptions in India, were also used in Ceylon. (Balagalle, 1996, p. 7). Paranavitana points out that Brahmi script may have been used for exchange of goods before the Buddhist missionaries arrived in Ceylon (Paranavitana, 1970, p. xviii).

## 5. CONCLUSION

After James Prinsep had read several ancient inscriptions in India in the nineteenth century, the script used for writing those inscriptions was named Brahmi. There is no unanimous description among intellectuals regarding the origin of Brahmi letters. Indian archaeologists tried to make a relationship between letters of the Indus valley civilization and the origin of Brahmi letters since they have found hieroglyphs among the Brahmi letters in the early historic period that are similar to the hieroglyphs found in the Indus valley civilization (Mohenjo-Daro – Harappa). However, there are non-Brahmi symbols found on clay pot pieces in the early historic period of Sri Lanka that are similar to the hieroglyphs found in the Indus valley civilization, and it is said that once S. Paranavitana has read hieroglyphs of Indus valley civilization based on these non-Brahmi symbols. It is no wonder that these symbols share similarities since Sri Lanka is situated south to the Indus valley civilization.

Brahmi letters on clay pots unearthed during the archaeological excavations done around Korkei harbour in South India were dated back to the eighth century BCE according to carbon 14 dating, but later many epigraphers in South India hesitated to accept that dating due to a complication in its excavation layers. In 1988, Siran Deraniyagala discovered pieces of four different clay pots with early Brahmi letters from the inner city of Anuradhapura. These clay pot pieces found in different excavation premises were dated back to 600-500 BCE by the radio carbon dating, and the Brahmi letters written on them are considered as the oldest Brahmi letters found in South Asian region. Hence, these Brahmi letters found by Siran Deraniyagala from the inner city of Anuradhapura, stand the oldest Brahmi letters found in South Asia. Then the early Brahmi epigraphs written on clay pots were found beyond the age of Emperor Asoka from Porunthal and Kodumanal cemeteries in the excavations done by K. Rajan of India. These letters are two hundred years older than

the Asoka period, and this discovery has raised inspiration on rethinking about the origin of the Brahmi script.

Two Brahmi letters were identified on two pieces of a broken clay pot, which was deposited within a cemetery, during the archaeological excavations done at the cemetery of the early historic Iron Age, which was situated in Andarawewa village in Anamaduwa Divisional Secretariat Division. After the clay pot is deposited within a stone casket made of four stone slabs and covered with a large stone lid, it will not be shifted ever, and it will not be moved even by animal activities. Intellectuals say that it is a great transition of the archaeology that clay pots for the first time are found in a place where the context is not confounded.

According to archaeological dating done so far, Brahmi writings have begun as symbolic letters in the proto-historic Iron Age of Sri Lanka from 900-600 BC, and developed to Sinhala Brahmi letters with the time. Brahmi letters created in this manner may be shifted to citizens of the Indus valley as well as to India as Brahmi letters through trade, political, religious, and foreign relations that took place in the past. It can be affirmed through pieces of clay pots with Brahmi letters that are dated back to 600-500 BCE, revealed by Siran Deraniyagala by archaeological excavations in 1988, and through non-Brahmi symbols found in Sri Lanka that are similar to Indus valley hieroglyphs. Moreover, this can be clearly visible from the clay pots with Brahmi letters taken for the first time from a place, where the context is not confounded, in a cemetery in Andarawewa that belonged to the proto-historic Iron Age.

According to the conclusion of this study, the opinion of Indian origin of Brahmi letters that existed hitherto cannot be accepted undoubtedly. An exact conclusion cannot be made according to the studies done so far, whether the origin of Brahmi script took place in India, Sri Lanka, or an adjacent region. We should come to an exact conclusion after conducting further scientific studies and researches in this regard.

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# ART OF A HERITAGE: AN ANALYSIS OF THE ORNAMENTATION AND THE FOREIGN ARTISTIC INFLUENCES ON THE COFFEE PLANTERS' FOUNTAIN IN KANDY

Ayeshi Biyanwila

## ABSTRACT

The studies of colonial architecture are not much popular within Sri Lanka. Among the architectural remains owing to the colonial periods the least discussed are the ornamental fountains. The ornamental fountain at Kandy, which is popularly known as *Nuwara Wathura Mala*, has been open to the commoners since its installation at the place in the 19<sup>th</sup> century but has received a minimum attention of the scholars and the lay alike. Hence, this study identifies the importance that is attributable to this ornamental fountain where the author has identified several similar structures from Europe. Hence, this could be one of the best remains of metal ornamental fountains which belong to the colonial era. The author identified that despite its location amidst Buddhist cultural atmosphere, the fountain bears resemblance and has directly used western artistic elements in beautifying the fountain. This paper will discuss these artistic motifs in detail which will conclude that this fountain should be valued and cherished for the ages to come.

**KEYWORDS:** Colonial Architecture, Foreign Influences, Kandy, Fountains

## 1. BACKGROUND TO THE STUDY

This fountain which is located in the *Dewa Veediya* near the main entrance to the Temple of the Tooth in Kandy is referred as the Coffee Flower Fountain or the Fountain of Prince of Wales. It has been called the “*Nuwara Wathura Mala*” commonly. An inscription plaque to the front of the fountain itself, says that it has been erected by the coffee planters of Ceylon in 1875 in commemoration of the visit of the Prince of Wales (Figure 1). This time period had been a decisive period in the Ceylon coffee plantations because in 1870, the coffee plantations marked its highest peak but was soon devastated by the fungal disease called *Hemileiavastatrix*. It marked the complete downfall of coffee and was replaced by tea. Thus, it is not difficult to understand the historical background that lead the Ceylonese coffee planters to erect a Victorian fountain in Kandy which they thought would amaze the King – to-be. Behind this fountain could be political propaganda which was exercised to achieve the favor of the British Royals. This paper will only focus in finding the artistic motifs and foreign artistic influences that have been used to beatify the fountain. The fountain being a rare masterpiece of its own kind, and a colonial heritage which has been discussed rarely paved the way to such a study.



## 2. GEORGE SMITH & CO. AND SUN FOUNDRY OF GLASGOW

The fountain carries another plaque with the name” George Smith &co. and Sun Foundry of Glasgow”which was a very famous foundry in Scotland (Figure 2). Hence, it gives clear evidence that the fountain is made up of steel in Glasgow. It is necessary to understand that, this time period marks a great revival of steel being used in architectural enterprises. Thus, it is clear that the fountain would have been constructed in Glasgow and was shipped to Ceylon to be assembled. George Smith &co. in Glasgow was also known as the Sun Foundry and advertised themselves as “Art Metal Workers, Iron Founders and Sanitary Engineers”and were popular for their drinking fountains throughout Great Britain. According to Gary Nesbit, this company also contributed its steel statues to Stewart Memorial Fountain in Kelvingrove Park. Most of the company’s sculptures were designed by Collin Stewart and Allen Cameron Harley. Thus,they could be the designers of these sculptures that are to be found in the Coffee Planters’ Fountain in Kandy. The Sun Foundry’s finest work is known to be the fountain in Fountain Gardens, Paisley (2010). And the sculptures of this great monument are very much similar or rather the same as of the Coffee Planters’ Fountain. And this company was so proud of themselves that they inscribed each of these statues with their brand name.



Figure 1: Commemorative Plaque on the Fountain



Figure 2: Manufacture’s seal, Source: Author



### 3. ORNAMENTATION

It is very difficult to comment upon the architectural plan of the Coffee Planter's fountain without stating anything upon its ornamentation for the fountain is as a collection of ornamentation. And this ornamentation is symbolic in various ways. Thus, the ornamentation and the symbolic significance of each of these ornaments will be discussed under this topic.

#### 3.1 Cherubs

There are two types of cherubs that are associated with the fountain.

- The cherubs with the urn and paddle (found in the outer octagonal pool) (Figure 3)
- The cherubs with the crocodiles (found at the centre of the octagonal pool) (Figure 4)



Figure 3: A cherub with the urn and paddle (Author)



Figure 4: A cherub with a crocodile (Author)

The focus will be first laid upon in analyzing the sculpture of the first cherub. This cherub is known as the pattern 8 in the Sun Foundry catalogue and has named as “Boy with a paddle and urn”. It is significant thus that this sculpture was a unique design of the Smith and co. The sculptures have been done using so that the same kind of sculptures could be found in various other ornamental fountains that were undertaken by this cooperation. The cupid with the paddle and urn could be found at Tobermory harbor in Mull, Aitken memorial fountain in Govancross and at Stewart memorial fountain in Kelvin grove park in England (Figures 5 and 6).

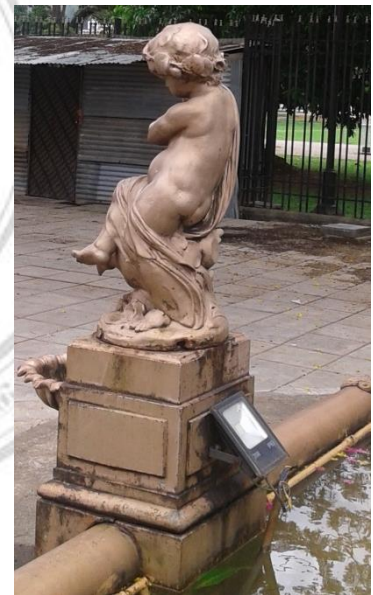


*Figure 5: The cupid with the paddle and urn, at Tobermory harbor in Mull (<https://memorialdrinkingfountains.wordpress.com/2013/08/04/>)*



*Figure 6: The cupid with the paddle and urn, Stewart memorial fountain, Kelvin grove park, England. (<https://memorialdrinkingfountains.wordpress.com/2013/08/04/>)*

The cherub is leaning on to the paddle in his right side and he holds it with both of his hands. And he looks downward as if in a somber mood. He is sitting on an urn which has its mouth towards the front of the statue. The mouth of the urn is in a leafy form and is made with a hole in it to flow water that is pumped to it. The urn is a flat bottomed one with a round shape and it is positioned on a grove like place with leaves and vegetation around it. The cherub or the boy is half nude with curly short hair. His tunic is placed on his thighs and a corner of the tunic is held by the boy in his hands. The tunic is used here only to cover up the genitals of the cherub. The body is depicted with the delicacy of a little boy and this delicacy is heightened with the use of a floral band around the head of the cherub. This band is not very clearly visible except that you very closely examined it. The playful posture of the cherub is attractive but the facial expressions are somber and lifeless. Thus, it shows some deficiency in the artistic tradition of this era. And it is necessary to understand that these sculptures were done with a mercantile motive (Figures 7,8 and 9)



*Figures 7,8, and 9: Details of the cupid with the paddle and urn, Coffee Planters' Fountain, Kandy (Author)*

The sculpture of the second cherub is much larger and masculine. Like the cherubs with the paddle and urn, these are also four in number (Figure 10). Being more masculine, they appear as young men with masculinity. The maturity from the childhood to youth is depicted through the use of two types of cherub sculptures. The first cherub is associated with the things such as flowers, paddles and urns which signifies the innocence of life. But this

second cherub handles a crocodile which signifies the masculine strength and the evils of human life. The hair of the cherub is divided midway and the tresses are tied with a band around the head. The tresses fall over the forehead. Similar to the cherub discussed before, this one also looks downward with a lifeless mood. The cherub wears a necklace around the neck which hangs towards the nude upper body. The cherub sits on a rock like figure with his left leg bended. On his left thigh is a crocodile; probably a baby crocodile with its mouth opened up. The cherub holds the crocodile with its two hands. The water is pumped through the mouth of the crocodile.



*Figure 10: Figure 4: The cherubs with crocodiles, Coffee Planters' Fountain, Kandy (Author)*

### **3.2 Dolphins**

There are four figures of fish in the fountain. In western colonial art, these fish are called the Dolphins (Figure 11). The Dolphins are winged and this adds to the heavenly nature of the ornaments used at the fountain. The mouths of the Dolphins are made with holes to pump out water down the fountain. The scaly bodies and the upturned fins of the Dolphins make these images very lively and also create a surrounding that suits a water fountain.

### **3.3 Herons**

There are three sculptures of herons on the topmost part of the fountain (Figure 12). Their plumed bodies and the long necks add life to the fountain. These birds are very common in Sri Lanka unlike the Dolphins described before. Two herons are looking towards the sky and only one looks down.





*Figure 11: Dolphins at Coffee Planters' Fountain, Kandy (Author)*



*Figure 12: Herons at Coffee Planters' Fountain, Kandy (Author)*

#### **4. SUBSIDIARY ORNAMENTATION**

The subsidiary ornamentation of the fountain fills up the gaps between the larger statues described before. Most of the subsidiary ornaments are from the western designs and among them are two ancient ornamental patterns.

- Honey Suckle
- Rosette
- Acanthus Leaf

##### **4.1 Honeysuckle**

Honeysuckle is an ornamental motif of Greek origin. It found its way to the Indian art through Persians and Graeco-Romans during the period following the conquests of Alexander the Great. This motif can be found on the corners of the octagonal pool at the bottom of the fountain (Figure 13). There are eight of these around the Octagon. And following this is a large water basin on which can be found this motif again and finally around the Doric column (Figure 14 and 15 respectively).



*Figure 13: Honeysuckle on the corners of the octagonal pool, at Coffee Planters' Fountain, Kandy (Author)*



*Figure 14: Honey suckle around the water basin at Coffee Planters' Fountain, Kandy (Author)*



*Figure 15: Honeysuckle around the base of the ionic column at Coffee Planters' Fountain, Kandy (Author)*

#### **4.2 Rosettes**

This is an ancient floral design with eight petals each. These are to be found at the octagonal bases of the pedestals where the cherubs with the crocodiles (Figure 16). There are four rosettes in each pedestal of the four cherubs.



*Figure 16: Rosettes around the pedestals at Coffee Planters' Fountain, Kandy (Author)*

#### **4.3 Acanthus Leaf**

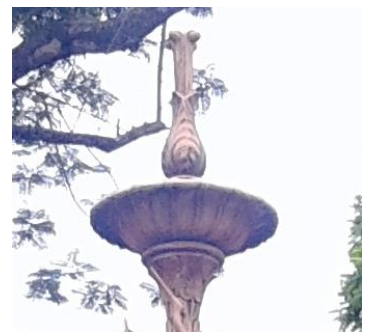
Acanthus is a broad-leaved plant was found admirably adapted for floral decorative work in ancient Greece. And were made use of in the foliage of the Corinthian capital and in the great finial which forms the summit of the Choragic Monument of Lysicrates. In the fountain, this motif can be found around the main pillar in the middle. It is not difficult to understand that this motif would have appeared foreign to the eyes of the local visitor which would have helped to create a superficial form.



*Figure 17: Acanthus leaf at Coffee Planters' Fountain, Kandy (Author)*

#### **4.4 Prince of Wales' Feathers**

As stated in the section of the historical background to the fountain, the fountain was erected in order to commemorate the arrival of Prince of Wales in Ceylon in 1875. The fountain is full of imagery that allude to the Royal sovereignty, so that the fountain is marked with the heraldic badge of Prince of Wales. Apart from this depiction in a plaque, the artists have taken measures to depict the coronet with the ostrich feathers in every possible place of the fountain (Figures 18,19 and 20).



*Figures 18,19 and 20: Prince of Wales' Feathers at Coffee Planters' Fountain, Kandy (Author)*



#### 4.5 Doric column

This is a Doric column with a very short shaft (Figure 21). Thus, it shows the Greek architectural influences over the later European architectural traditions. The column base is composed of several mouldings and the base is adorned with several Palmettos. And the column capital is adorned with designs from the badge of Prince of Wales. This column bears the superstructure of the fountain.



Figure 21: Doric Column at Coffee Planters' Fountain, Kandy (Author)

### 5. INFLUENCES

#### 5.1 Cherubs

Cherubs are angelic beings, with small plump human bodies. These figures are often used in Christian art and architecture as attendants of God (Figure 22). And these little heavenly beings are often referred to as the guardian of the Garden of Eden. The idea of the cherubs must have evolved from the image of Cupid/Eros in Greek and Roman religion. In the Renaissance they became an element in Christian art. Cherubs are generally decorative rather than symbolic of anything in particular. After this revival of the image of cherubs, again they were used in great numbers in the Victorian times until the end of the World War I.



Figure 22: Cherubs from Electra House, London (<http://www.speel.me.uk/gp/cherubs.htm>)



## 5.2 Honeysuckle

It is significant that the use of Honeysuckle has come such a long way from the lands of Greece to Ceylon in the Victorian era. The British were very well influenced by the Greek and Roman art and architecture (Figure 23,a&b). And the Coffee Planters' Fountain depicts these influences from the Greek and Roman Architecture.

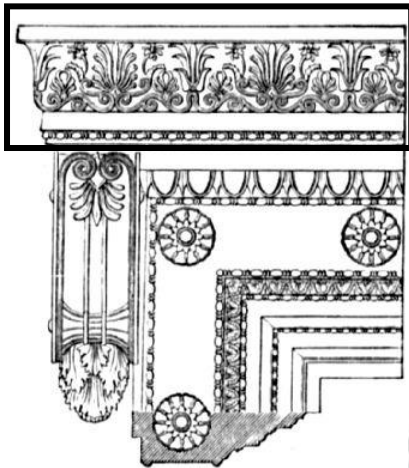


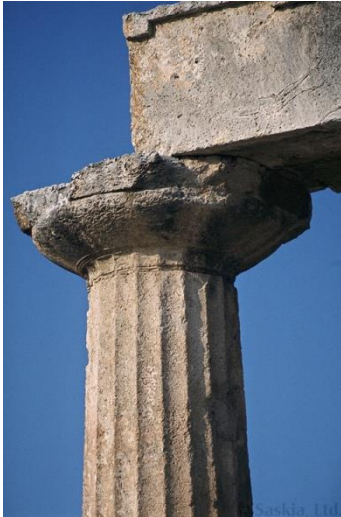
Figure 23-a: A Greek Doorway, Front View.(From the Erechtheium.)  
([https://www.mirror-service.org/site/gutenberg.org/2/9/7/5/29759/29759-h/29759-h.htm#Page\\_117](https://www.mirror-service.org/site/gutenberg.org/2/9/7/5/29759/29759-h/29759-h.htm#Page_117))



Figure 23-a: Honeysuckle from the Coffee Planters' Fountain, Kandy (Author)

## 5.3 The Doric Column

The difference between the original Doric column and the column at the Victorian Coffee Planters' fountain is that this column is a combination of various architectural designs. The Doric column at the Parthenon is very simple and plain while this column bears honeysuckle leaves at its base and also the ostrich feathers of the badge of the Prince of Wales (Figure 24). Thus, it shows how architecture adds designs from various traditions.



*Figure 24: A Doric Column from the Parthenon*  
(<http://www.reed.edu/humanities/110Tech/Parthenon.html>)

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## **THE SOUTH INDIAN ASCENDANCY DEPICTED IN THE TAMIL INSCRIPTIONS IN SRI LANKA FROM THE 3<sup>RD</sup> CENTURY BCE TO 12<sup>TH</sup> CENTURY ACE**

**Dr. Malini Dias**

The Department of Archaeology has discovered about ninety five Tamil inscriptions from many parts of Sri Lanka and mechanical impressions have been produced for research and recording purposes. A few of them have been edited and published by S. Paranavitana, A. Velupillai, K. Kanapatipillai, S. Pathmanathan and K. Indrapala in the journals such as *Epigraphia Zeylanica* and *University of Ceylon Review*.

Tamil belongs to the *Pancha Drāviḍa* family of languages of south India, which includes Telugu, Kannaḍa, Malayālam and Tulu. (Ray 1959: 41) Apart from the fact that the Tamil language has flourished in the island for several centuries, we have to bear in mind that its influence has been quite significant during the Cola occupation in the eleventh century. This was the time, the most powerful force in the Tamil land under the Cola king Rājārāja I invaded Sri Lanka and occupied the northern part of the island. It was continued by his son Rājendra I and in 1017 Mahinda V (981-1017 AC), the king of Sri Lanka was taken to captivity in the thirty sixth year of his reign. Colas aiming at the conquest and ruling the whole of Sri Lanka made Polonnaru, known as Kandavuru Nuvara, the seat of the government and renamed it as Jananāthapuram. It was better suited than Anurādhapura to control the whole island.

The armies of the Cola king Rājārāja I captured Mahinda V along with his queen, the regalia and was taken to the Cola court, where he spent the rest of his life as a captive. The Cola army was driven away by King Vijayabāhu I (1055-1110 AC) but there was a period of interregnum, where the Colas were reigning in Polonnaruva under the rule of Rājārāja I in south India.

### **THE POTSDHERDS FROM THE CITADEL AT TISSAMAHĀRĀMA**

A team from the Commission for Archaeology of Non- European Cultures of the German Institute of Archaeology (KAAG), discovered the citadel of the Ruhuna kingdom ( Tissamahārāma) in the course of the archaeological excavations done in the south of Sri Lanka. (Weisshaar 2016: 459) The excavation at the citadel at Tissamahārāma was done at a site locally known as Akurugoḍa or Akurugoḍālla, a hillock bordering the eastern bank

of the Tissa Vāva of the Ruhuṇa region. The excavation done by the team headed by Hans Joachim Weisshaar for over 20 years from 1992 to 2010 has exposed a hitherto an undisturbed site through all phases down to the virgin soil.

**Plate 1**



*Citadel at Tissamahārāma in the south of Sri Lanka*

Harry Falk, a German scholar had published a collection of 125 potsherds that was discovered near the citadel at Tissamahārāma. He had deciphered some of the potsherds with some legends and mentions thus:

“Some twenty years of excavation at Tissamaharama in southern Sri Lanka have produced an immense number of pottery sherds. More than hundred carry comprehensible legends in Brahmi letters dating back to centuries before and after Christ. They allow for the first time to accompany the Buddhist monks and nuns in their numerical development over centuries and their interaction with their sponsors and supporters.” (Falk 1914: 45) He comments that Tamil speaking components of society are noticeable but few during the foundation phase. (Falk 2014: 46-95)

The names of monks, nuns, laywomen and laymen can be identified on the broken pieces of the dinning plates and water vessels. Though there is no evidence of a settlement for monks, there is evidence of a hospital in the vicinity, where a large number of saddle querns have been used to grind the medicinal herbs were discovered. ( Boussac, Salles, Baptiste Yon 2016: 459-478)

**Plates 2 (A) and (B)**



(A)



(B)

*The Hospital Site in the Citadel at Tissamahārāma*

The hospital was built on a higher elevation and several small structures belonging to the hospital and the main building of the hospital had a clay floor that was preserved at several places. ( Boussac, Salles, Baptiste Yon 2016: 459-478) Three saddle querns and four mullers, arranged on top of a small vessel have been discovered.

The potsherds of Black and Red ware, Rouletted ware have been unearthed near the hospital. All pottery pieces carry the names of individuals or the names of a group of people inscribed in Brāhmī characters. So many potsherds from Tissamahārāma presuppose a Buddhist clergy with the word *Bikuśa* (belonging to monks) on some of the vessels. A water vessel bearing the legend *Mitadata Teraśa*.....(belonging to Thera Mittadatta) was displaying the ownership of a monk bearing the name Mittadatta.

A few pieces with legends in Tamil written in Brāhmī characters are found among them as well. The potsherds displaying the Tamil names such as Utaran point to Tamil people as an ethnic group living at Tissamahārāma. Names such as Cātan, Utaran Kālaveḷa presuppose some individuals of Tamil origin and the script they have used is Brāhmī to



inscribe on the potsherds. A legend in Tamil written in Brāhmī characters has been deciphered by late Iravadam Mahadevan, the veteran Epigraphist of south India in 2010. It is included within the 125 pottery pieces presented in the publication by Falk sans the translation. (Falk 2014: 53)

Mahadevan mentions thus:

“A pottery inscription was discovered from an excavation conducted at Tissamaharama on the southeastern coast of Sri Lanka. A fragment of a high quality black and red ware flat dish inscribed in Tamil in the Tamil-Brahmi script was found in the earliest layer. It was provisionally dated to around 200 BCE by German scholars who undertook the excavation. The inscription reads: *tiraLi muRi*, which means “written agreement of the assembly” The inscription bears testimony to the presence in southern Sri Lanka of a local Tamil mercantile community organized in a guild to conduct inland and maritime trade as at the close of the 3<sup>rd</sup> century BCE.” (Mahadevan 2010: *The Hindu*).

It is impossible to believe that a statement about a “written agreement of the assembly” being inscribed on a clay pot. Assuming that a mercantile guild engaged in trading activities was staying in the vicinity, he deciphers the inscription as *tiraLi muRi* (written agreement of the assembly) giving the meaning ‘assembly’ for the trading company. He has adopted this questionable interpretation by reading the inscription from right to left when it should have been read from left to right, the customary way. He has identified the script as Brāhmī.

P. Raghupathy of the Jaffna University reads it as indicating a vessel specified for the purpose of serving rice portions. He postulates that it indicates the presence of common people. (Tamil Net 2010:} K. Indrapala also observes that it could be a measure.

The present writer while deciphering the inscription stipulates that the reading is different from the above translations and the reading is given below.

**Text:** *Porati* (two symbols) *mudri*

**Translation:** One *mudri* of baked beans

**Figure 1**



*Tamil-Brahmī Potsherd from Tissamahārāma*

*Porati* means baked beans and the vessel was a measure of one *mudri*. 96 *mudris* make a *yava* according to the measurements used in ancient India. The Brāhmī letters of the inscription could belong to the 2<sup>nd</sup> century BCE. The letter *pa* is somewhat different from the normal *pa* found in other Brāhmī inscriptions of the period in Sri Lanka. It has a horizontal line starting from the middle and turning to the left, which is not found in other early Brāhmī inscriptions in Sri Lanka. The other exception is the conjoint consonant *dri*, a combination of *da* and *ri*. This is not found in any other early Brāhmī inscriptions in Sri Lanka. In the event of taking the reading as *porati mudri*, Mahadevan's reading and translation cannot be accepted.

#### **THE SEAL WITH BRĀHMĪ LETTERS FROM MEGALITHIC BURIAL SITE AT ANAIKODDAI IN THE JAFFNA PENINSULA**

The excavation at Anaikodḍai Megalithic burial site near Point Pedro in the Jaffna Peninsula was done by a team headed by K. Indrapala, former Head of the Department of History of the University of Jaffna. A seal inscribed with Brāhmī letters was discovered by K. Krishnaraja of the same department after the excavation program. The Brāhmī-inscribed seal from Anaikodḍai in Jaffna appears to be assignable to the Mid-early historic period. (250 BCE-100 CE) (Deraniyagala, 1992:747). The word *Kovitham* written in the Brāhmī script appears to stand for a name of a Tamil who was the owner of the seal.

## THE STONE-SEAT INSCRIPTION OF THE TAMIL HOUSE-HOLDERS

An inscription found on a stone-seat in the precincts of the Abhayagiri Stūpa in Anurādhapura belonging to the second century BCE written in early Brāhmī script mentions of a donation to the *sangha* by a group of people of an ethnicity referred to by the word *Dameḍa*, probably who lived near the stūpa. (Dias, Bandara, Kalpa 2016: 165) Parānavitana defines the word *Dameḍa* with its affinity to Pali *Damila*, Sanskrit *Dramila* or *Draviḍa*, which are the names in the respective languages of the Tamil people. The inscription records that the *Pasade* or the terrace belonged to *Dameḍa gahaptīs* or the Tamil house-holders and that it was made by *Śamana* or the monk from Ilubarata. (Parānavitana 1970: No. 94) The Tamil house-holders as a group possessing a distinctive ethnicity have been instrumental in engraving short sentences in early Sinhala on a forward sloping boulder that had been used as a seat. The stone seats carved on the vertical face of the boulder would have been for the monks of the Abhayagiri Vihāra.

The inscription is as follows:

- (a) Ilubaratahi Dameḍa Samane karite Dameḍa-gahapatikana paśade Śagaśa
- (b) Kubi.... aśane
- (c) Naśataśa aśane
- (d) Ka .. .. Tiśaha aśane
- (e) .. .. aśane
- (f) Kubira Śujhataha
- (g) Navika Kāravaha aśane (Parānavitana 1970: 94)

The mansion of the Tamil house-holders caused to be made by the Tamil monk of Ilubarata is [given to the] [monks]. .... The seat of Kubi...., the seat of Naśata, the seat of Ka .. .. Tissa, the seat of.. .. , of Kubira Śujāta, the seat of Kārava, the mariner. (The translation is by the writer)

The record mentions that the *paśade* (mansion), constructed for the Tamil-householders by the Tamil Śramana (monk) of Ilubarata probably have been donated to the monks. The donation of the stone seats for the monks has been made by several Tamil house-holders named Kubi, Naśata, Tiśa, Kubira Sujāta and the Mariner Kārava.

## SRI LANKA AS A PROVINCE OF THE COLA EMPIRE

Some inscriptions dated in the period under the rule of the Cola king Rajendra I, Sri Lanka was named as the province under the name of Mummuḍicolamanḍalam of the Cola Empire.



There had been regular supplies from the villages in Sri Lanka for the upkeep of the great Rājarājeśvara Temple in Tanjāvur in south India as well. The chronicle Mahāvaṃsa confirms the Cola rule in Sri Lanka with the following statement. ‘With Pulatthinagara as base, the Colas held sway over Rājaratṭha, the northern part of the island’. It was a turning point in the history of Sri Lanka, during which period it was considered a province of the Tamil land.

A fragmentary Tamil inscription written in the Tamil script of the 11<sup>th</sup> century discovered from the building of the Dutch fort in Hammaenhiel off Kayts in the Northern Province records the conquest of Sri Lanka by the Army Commander named Jayankonta Mūventavelar. (Paranavitana 1973: 28-30) He held the office of *Adhikāra* or Commissioner and *Tanḍanāyaka* or the Army Commander and had captured the whole of Īlām (Sri Lanka) and King Mintal of Īlām, together with his consort and his treasures. The king referred to in this is Mahinda V and this fragmentary inscription proves the narration made in the Mahāvaṃsa mentioning that he was captured with his queen and regalia.

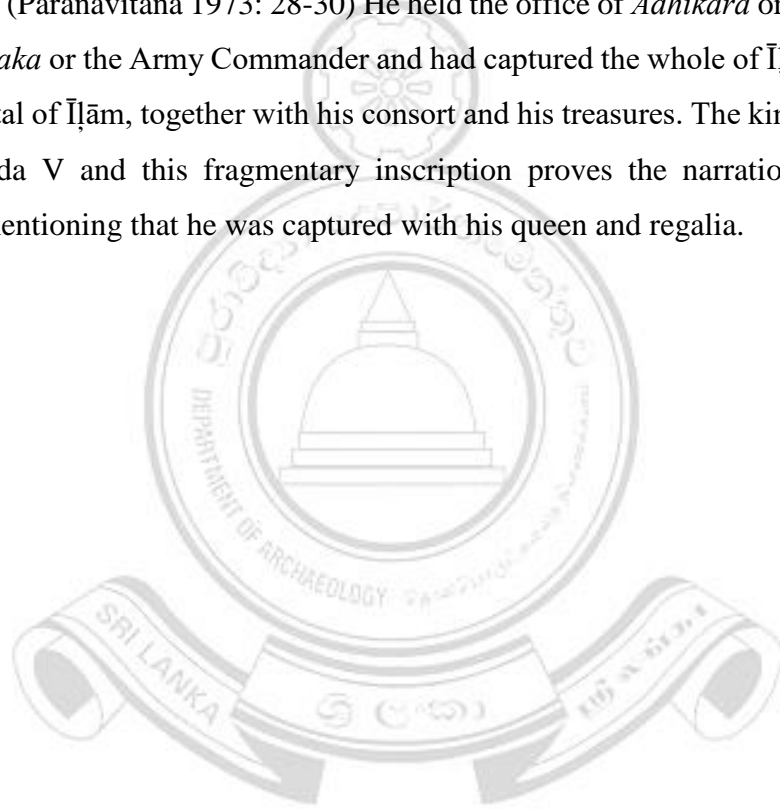
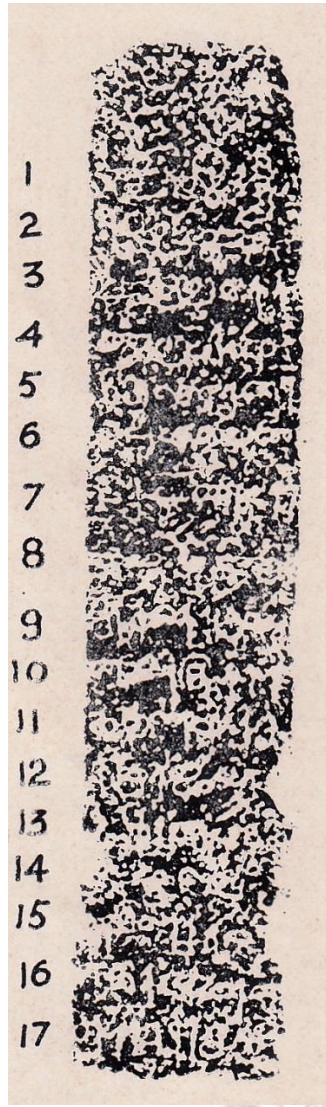


Figure II



Fort Hammenhiel Tamil Inscription

Text

- |                    |                   |
|--------------------|-------------------|
| 1. Svasti Śrī [*]  | 10. -na-Atikāra-  |
| 2. Īla-muḷu-       | 11.-t-taṇṇā[ya]-  |
| 3. vatun ko-       | 12.-kaṇār Jayañ-  |
| 4. -ṇṭu Īla-[M]ī-  | 13.-koṇṭānā-      |
| 5. -ntaḷ-aracanaḷ- | 14.-ṇa Mūven-     |
| 6. -yum peṇ-       | 15.-ta-velār Mā-  |
| 7. ṭir paṇṭāra-    | 16.tōṭṭam-āṇa     |
| 8. -mum piṭic-     | 17.Īrācarācapura- |
| 9. -eūk-koṭucca-   | * * * * *         |

**THE TRANSLATION OF THE INSCRIPTION IS AS FOLLOWS:**

Hail Prosperity! Jayankōṭāṇ *alias* Mūventavēlār, the Commissioner (*adhikāra*) and Commander-in-Chief of the Army, who having captured the whole of Īḷam (Sri Lanka), captured also King Mintal of Īḷām, his consort and his treasures and presented them (to his Sovereign) .....Irācarāca(pura) *alias* Mātoṭṭam. (Paranavitana 1973: 28- 30)

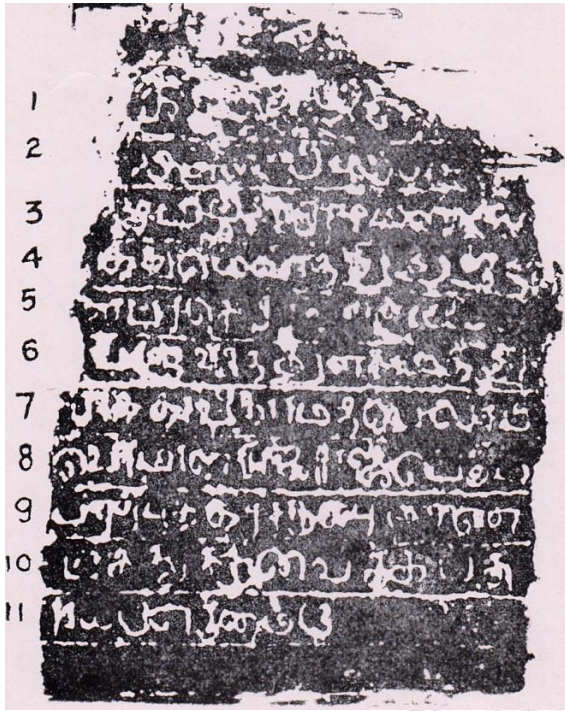
The reference to the general with the titles of *adhikāra* and *daṇḍanāyaka* indicates that he commanded the Cola armies in the island and was entrusted with the administration as well.

**DONATIONS MADE TO THE BUDDHA**

Some of the Tamil inscriptions from places in the eastern Province contain donations made by the people who patronized the Buddhist temples. Some of the names mentioned in the inscriptions suggest that the donors were Siṃhala Buddhists, Tamil Buddhists and Tamil Hindūs. The Buddhist temples were named as *Pallīs*, a term used for Buddhist shrines in mediaeval Tamil. The script of these inscriptions is mediaeval Tamil with an admixture of Grantha characters that have been used to write words of Sanskrit origin. Beginning of the inscriptions with the invocations is written in the Sanskrit language using Grantha-Tamil characters.

The donations mentioned in some inscriptions at Velgam Vehera in the Trincomalee district of the Eastern Province have been made to the Buddha. A slab inscription written in Tamil from Velgam Vehera mentions the name *Mummuṭicolamaṇṭalam* and it describes a donation to the Buddha to gain (merit.) Five oxen and thirty five cows have been endowed to Velgam Vihāra.

Figure III



*Donation to the Buddha at Velgam Vehera*

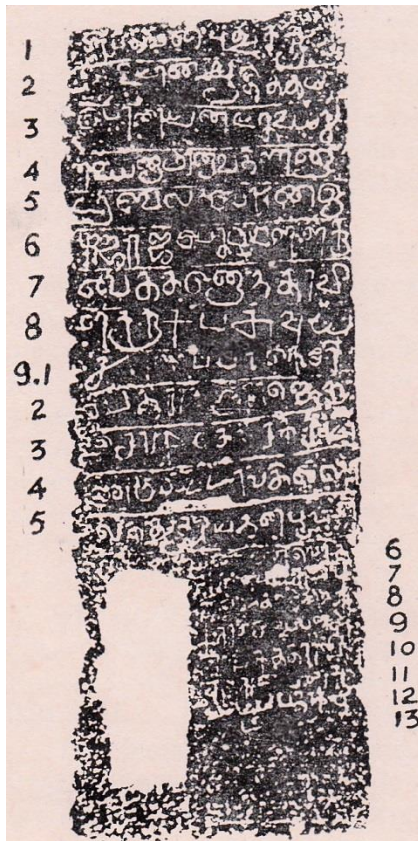
### Text

1. Śrī ..la..
2. r aṇṇal mañcāṇ
3. mummuṭicōḷamaṇṭala-
4. ttu melaitturu śrī yata-
5. ṇ Parakēcari valaṇaṭṭu
6. pañca cantuḷakkāmattu
7. satta vikāram ana Velkam
8. veram āṇa Rārāja perum
9. paḷḷi puttarakku ppuṇṇi-
10. yattukku vaitta pacu
11. 35 erumai 5

### Translation

(The first two lines are not clear.) Five oxen and thirty five cows were endowed for merit, to Lord Buddha of Saddha Vihāra *alias* Rājarājapperumpaḷḷi of Pancacantuḷagama of Melaitturu Sriyatanṇ Parakēcari Valaṇaṭu in Mummuṭicōḷamaṇṭalam. ( Velupillai 1973: 91 )

Figure IV



*Two Tamil Inscriptions on a Guard-stone at Velgam Vehera*

Two Tamil inscriptions from Velgam Vehera are inscribed on a slab that can be identified as a guard stone. The first inscription mentions that the donation was made in the 12<sup>th</sup> regnal year of King Rajendra Cola. (Velupillai 1973: 65-91)

**Text 1**

1. Śrī pakavaṇ Putukku-
2. tiyān ātittap-
3. pēraraiyaṇ Stavayca-
4. ramyaṇāmānāvatiṇaṇā-
5. tṭu Velga veka(r)ai i-
6. Rājarāpperumpaḷlikku
7. Vaitta ṇontā vi-
8. ḷakku+pacu 80

**Text 2**

1. Kō-pparakēsari
2. Patmar-āna Śrī Rājendra-



3. Coḷadēvarkku yā-
4. nṭu 12-ṭavatil ko-
5. lattu tūynaṇ pū āṇa
6. . . . yaṇ **Velka vekara**
7. . . . ttu tēvarkku vai-
8. . . . ccaṇantāviḷakku
9. . . . + kācu 4 ippaṭiku
10. . . . bakat tarā viḷa-
11. . . . kkeṇṇai ā
12. . . . yappat-ākavu-
13. . . . m

### Translation

1. Worship O Lord Buddha. Atittapperaraiyan, an inhabitant of Putukuṭi, granted 84 cows for a perpetual lamp to Rājarājapperumpalli alias Velkam Vihāre situated in Stavayca Ramyana Manavatina Nāṭu.
2. In the twelfth year of King Śrī Rājendra Cola Teva *alias* Parakesarī Varma endowed to the Lord of Velgam Vihāre, the perpetual lamp.....four kācus.....thus .....bronze lamp, lamp oil..... (Velupillai 1973: 65)

The names of some of the villages in the east have been mentioned as Caturvedi Mangalam. An inscription registering a donation to God Siva by a Brahmin woman in memory of her husband has been discovered from Pālamottai near Kantale in the Eastern Province. The epigraph denotes that the shrine had the name of Vijayarāja Īśvaram and Kantale was called Vijayarāja Caturvedi Mangalam. The term *Caturvedi Mangalam* was appended to the names of villages inhabited by Brahmins. Probably this area may have been a centre of Hindu influence during the period of Cola occupation in the 11<sup>th</sup> century and the Siṃhala kings who succeeded Colas maintained Brahmins and patronized their shrines as well. (Paranavitana 1943: 195)

A Tamil inscription from Polonnaruwa displays a contract entrusting the entire custody of the Sacred Tooth-relic Temple to the Velaikkara community under the orders of King Vijayabahu I (1058-1114 AC). While undertaking the control of the shrine, the Velaikkara army called it ‘the great temple of the Tooth-relic, belonging

to the illustrious Velaikkara (army) of the three divisions'. (Wickramesinghe 1928: 247)

By a pillar inscription from Mānkanai in Trincomalee district, a grant of land had been made by Jayabāhu Deva to a chief of the palanquin bearers. It was granted in the forty third regnal year of King Jayabāhu and had registered the confirmation by Mānābharāṇa. When editing the inscription S. Paranavitana speculates that it could have been posthumously dated. (Paranavitana 1973: 7-11) The Nainativu inscription of King Parakramabahu I (1153-1186 AC) was found at the entrance to the famous Nāgapūṣanī Ammān Kovil in Nāgadīpa in the Jaffna district, well protected with the other artifacts and ancient coins discovered in the premises. (Dias, Koralage, Kalpa 2016: 175)

The slab inscription with the lower portion defaced and inscribed on both sides in mediaeval Tamil and Grantha characters is an edict of King Parākramabāhu I (. The language is mediaeval Tamil and as the Supreme Lord of the whole island, King Parākramabāhu I had issued the edict promulgating customs regulations.

**Figure V**



*Nainativu Tamil Inscription of King Parākramabāhu I*

**Text**

1. ....mankal
2. ...c.....Uratturai
3. (yil) paratecikal. .vantu
4. irukka venumenrum
5. avarkal raksaippata

6. venumenrum pala tu-
7. raikalil paratecical vantu nantu
8. raiyi(l)e kuta venumenru
9. (m) nam anai kutirai mel sneha
10. (mu)ntatalal nimakku anai kutiarai
11. kotu vanta marakkalan kettatu
12. ntakil nalattonru panta
13. (ra) trukuk kontu munru kurum
14. (u)taiyavanukku vitak katavatakavu
15. (m) vaniya marakkalan kettatun
16. takil cem pakam utaiya
17. (ku)k kontu cem pakamutaiya
18. (va)nukku vitak katavatakavum iv
19. (va)vastai candradityaru(I)lanaiyum ka
20. Hilum cempilum elluttu ve
21. (t)ti vittu ivvavastai ceatum ku
22. tutu deva(h)parakramabhujō ripuraja va
23. (msa) davanala(s)sakala Simhala cakrava
24. (rtti). . .

### Translation

We.... that foreigners should come and stay in Ūratturai, that they should be protected and foreigners from many ports should come and gather in our port as we like elephants and horses. If the vessels, which bring elephants and horses unto get wrecked, a fourth (share of the cargo) should be taken by the Treasury and the other three parts should be left to the owner and if vessels (laden) with merchandise get wrecked, an exact half should be taken by the Treasury and the other exact half should be left to the owner. This regulation should be (enforced) as long as the Sun and the Moon last. (This regulation was) caused to be inscribed on stone as well as copper. Issued (by) Deva Parākramabhujō (who is like) a wild conflagration unto the dynasty of enemy kings, the Overlord of all Simhalas .....framed and issued this regulation. (Indrapala 1963: 68-70)

The edict had been written in Tamil for the benefit of the traders from south India, the officers handling the customs duties and the labourers handling the cargo.

### COMMERCIAL ACTIVITIES CARRIED OUT BY THE MERCHANT GUILDS

An important fact revealed by some of the Tamil inscriptions is the commercial activities carried out under the banner of merchant guilds during the period between 10<sup>th</sup> and 12<sup>th</sup> centuries. A point that can be found in some of the inscriptions is the activities of the merchant guilds known as the *Nānādesīs*, *Ainūrruvar*, *Vīravaḷaṇḱhiyars* and their associates. These communities of Tamil



merchants coming from the southern parts of India had established themselves in Anurādhapura and had secured a dominant place in the internal and external trade. Some of their settlements developed into market towns called *Nakaram* during the early period of the 12<sup>th</sup> century. (Pathmanathan 1987: 122-63)

When the Colas occupied the northern part of the island under the rule of Rājaraṣa I, the *Nānādesīs* had established themselves in Anurādhapura according to the inscription of Queen Līlāvati, the consort of Parakramabahu I (Wickremasinghe, 1912: 177-182)

This inscription gives an indication of the settlement of the *Nānādesīs* at a locality in Anurādhapura and their close interactions with the royal court of Polonnaruwa. For the purpose of giving alms for the poor people coming to Anurādhapura from various quarters, an alms house with the title of *Pala-balavi-mēdhāvi*, was established on the initiative of the Queen. It was built in the neighbourhood of the almshouse built and maintained by the *Nānādesī* merchant community. Most probably the *Nānādesīs* would have been the suppliers of commodities to the monastic establishments at Anurādhapura.

Some inscriptions reveal the activities of the merchant guild known as *Ainūruvar* or the five hundred members. 'A Tamil inscription from Budumuttava in the Kurunāgala district refers to *Ainūrruvanpaḷḷi*, a Buddhist temple founded or restored and maintained by the mercantile community called *Ainūruvar*. In Tamil usage the word *paḷḷi* is generally applied to Jaina or Buddhist monasteries and temples. In Sri Lanka, however, the use of this word seems to have been confined exclusively to Buddhist institutions, according to the available evidence.' (Pathmanathan 2002: 67)

## CONCLUSION

An important fact revealed by some of these inscriptions is that these merchant guilds of south Indian origin had established themselves in Anurādhapura and had secured a dominant position. They seem to have close links with the monarchy and the monastic institutions in Sri Lanka.

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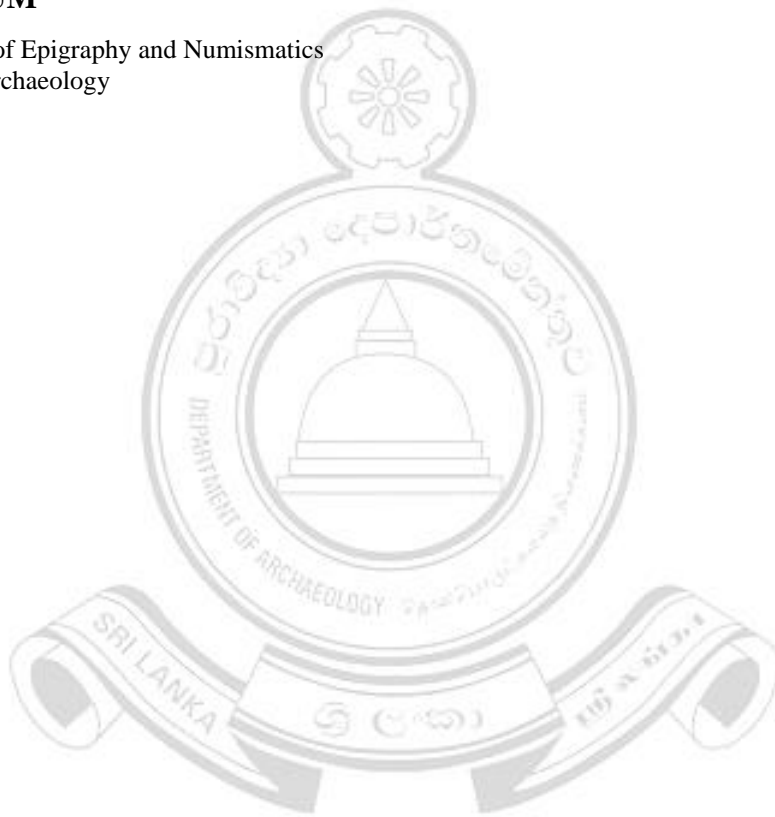
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## CURRICULUM

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## HEAVY ARTILLERY AND *KODITUAKKOO* IN SRI LANKA

H.M.S.B. Herath

### ABSTRACT

The Artillery, which belongs to the family of Guns, have been used for various purposes by Sri Lanka's monarchy during the European invasions. This paper aims to reveal the historical evidence on heavy Artillery and *Kodituakkoo* used by Sri Lankans against the Europeans. Artillery can be categorised as heavy Artillery and light Artillery. *Kodituakkoo*, Grasshopper, *Palapetta*, *Jingle* and *Ginjal* were some other names used for Light Artillery. The study found that the artilleries were positioned in seven types of places: high places of each entrance to the *Kandyan* kingdom, on the tall trees, on the roadsides, on flat grounds, at the beginning of the mountains, near the waterways and in front of the *Kandyan* palace. Heavy Artillery and *Kodituakkoo* were used for purposes such as securing the country, greeting the *Kandyan* court's foreign officials, ensuring the safety of the *Adikaram* (prime minister of the *Kandyan* court), respecting the ritual ceremonies, and notifying auspicious times to the public. Therefore, Heavy Artillery and *Kodituakkoo* were identified as two of the most used guns both in wars and the cultural affairs in Sri Lanka.

**KEYWORDS:** Artillery, *Kodituakkoo*, *Kandyan* Kingdom, Sri Lanka

### INTRODUCTION

The Cambridge dictionary defines Artillery as "very [large guns](#) that are [moved](#) on [wheels](#) or [metal tracks](#), or the [part](#) of the [army](#) that uses these" (Cambridge dictionary, 2021); "weapons (such as bows, slings, and catapults) for discharging missiles"; "large bore mounted firearms (such as guns, howitzers, and rockets)"; "such ordnance that is capable of long-range indirect fire at a target too distant to be seen"; "a branch of an army armed with artillery" (Merriam-Webster Dictionary, 2021).

The cannon may have possibly appeared in China as early as the 12th century (Lu, Gwei-Djen, 1988, pp. 594–605). The cannon was likely a parallel development or evolution of the [fire-lance](#), created using bamboo (Figure 1), a 12th-century gunpowder weapon that combined a gunpowder tube with a polearm weapon ([Needham, Joseph](#), 1986). But this early fire lance is not considered a proper gun because it did not include projectiles, whereas a gun by definition uses "the explosive force of the gunpowder to propel a projectile from a tube: cannon, muskets, and pistols are typical examples" (Chase, Kenneth., 2003).

The earliest known depiction of a cannon is a sculpture from the [Dazu Rock Carvings](#) in [Sichuan](#), dated to 1128 (Lu, Gwei-Djen, 1988, pp.594–605), and the oldest surviving Gun bearing a date of production is the Xanadu gun, dated to 1298 (Andrade, Tonio, 2016).

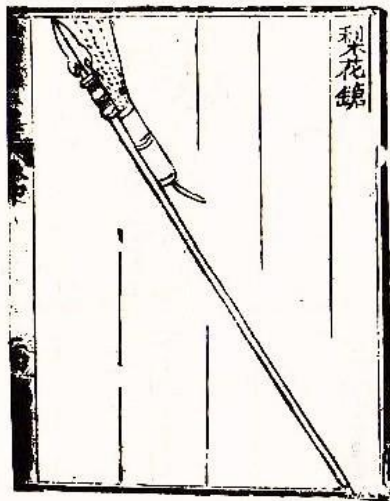


Figure 1: A fire lance as depicted in the *Huolongjing*

Sources : <https://en.wikipedia.org/wiki/File:jpg>

The widespread use of firearms as a military tool dates to the mid-fifteenth century. Historians in modern Europe described this global expansion of firearms as the "gunpowder revolution" or "military revolution" (Ágoston, 2014, p. 85). By the sixteenth century, Asia was influenced by the firearms revolution due to Europeans' firearms-based power struggle interests (Ágoston, 2014, p. 85). Lorge (2008) suggested that European firearms' introduction and training brought the European military revolution to South Asia, which took place after 1750 (Lorge, 2008, pp. 133-153). Although Europeans dominated the technology of gunpowder by the 1700s, there is a perception that it originated in China and spread throughout Eurasia (Hoffman, 2012, p.601). According to Laichen (2003), China's involvement in the spread of firearms and ammunition technology has been seen in many countries in the Asian region. From the late fourteenth to the early fifteenth century, the Vietnamese gained gunpowder technology access through China. After the perfection of the cast-bronze Artillery in the 16th century, several improvements were made to the artillery pieces or their projections over three centuries; and the second half of the 19th century saw a series of brilliant advances in the use of Artillery (Britannica, 2021). Peter A. Lorge (2008) shows that the infantry and Artillery's strength produced profound political changes that laid the foundations for the modern Indian state and advanced Artillery to significantly influence the field siege (Lorge, 2008, pp. 133-153).

The European invaders who came to Sri Lanka used guns mostly in combat. There is considerable literary evidence suggesting that by the 16th century, the firearm concept could have come to Sri Lanka (Rājāvaliya, 1997, p.223). Referring to 1515 Sinhala guns

and *Kodituakkoo*<sup>1</sup> (Figure 2), Captain João Ribeiro points out that he feels that Sri Lankan guns are an unfamiliar type (Daraniyagala, 1942, p.127). There is evidence that Sri Lankans living in Kandy used the Gun against the invading European nations (Powell, 1984, p 96; Ingresi Hatana, 2011, p.180). After the 16<sup>th</sup> century, Sri Lankans became increasingly concerned about Gun as a significant weapon. The variety of guns used by Sri Lankans were revealed after this era. But the classification of the Gun's various variants is hardly revealed in historical sources. Information on various types of guns used by the Sri Lankan fighters such as long steel guns, *Bondikkula*, *Kodituakkoo*, *Bogamu* and muskets were found in sources written by the English researchers rather than the Sri Lankans (Diary of the Mr. John D'Oyly, 1917, 25; Davy, 1821, p.150). Archaeological and literary sources hint at Sri Lankans' expertise in guns. In Sri Lanka, guns were manufactured by blacksmiths in factories under royal orders (Diary of the Mr. John D'Oyly, 1917: 60-61). According to the *Mandaram Pura Puwatha*, about 170 iron and metalworking blacksmiths were employed with thousands of people from Hambantota, *Girivaya*, *Uva*, *De-Dumbara*, and *Saparagamuwa* in the period of King *Vimaladarmasuriya* (Mandram Pura Puwatha, 1958, p. 20) and made thousands of craft factories in Sri Lanka's various areas (Mandram Pura Puwatha, 1958, p. 19). According to a note dated 17<sup>th</sup> September 1810 by D'Oyly, the authorities had commissioned a blacksmith near *Batugedara* rest house and the manufacture of tusks and other weapons (Diary of the Mr John D'Oyly, 1917, p. 05). Thus, it can be argued that Sri Lankan blacksmiths have continued with arms production. Among the various types of guns in Sri Lanka, this research paper discusses only the guns called Artillery and *Kodituakkoo* in Sri Lanka.



Figure 2: A Kodiatuakkoo  
Source: National Museum, Colombo

<sup>1</sup> The word "*Kodituakkoo*" is written according to John Davy's (1821) source. John Davy use the word *Codittuakka* and *Koodituakkoo* instead of the word *Kodituakkoo* (Davy, 1821, p, 171).

## METHODOLOGY

The purpose of this paper is to reveal the historical evidence related to the guns called heavy Artillery and Kodiatuwakkoo used by Sri Lankans against the Europeans. Historical research methodology has been used, and the facts of this article have been confirmed by comparing the findings of historical literature with the archaeological sources. As primary literature *Rājāvaliya*, *Ingreesi Hatana*, *Diary of the John D'oyly*, *An Account of the Interior of Ceylon and of Its Inhabitants with Travels in That Island, Ceylon*, *Mandaram Pura Puwatha*, *The Grate Rebellion of 1818*, *Jhon pybusge duta mehewara*, and as secondary sources *Sihala Weapons and Armour*, *Why Was It Europeans Who Conquered the World?*, *Tri Sinhala*, *Kandy fights the Portuguese: a Military History of Kandyan Resistance*, *The Kandyan War*, *Sinhala Anduwa*, *Matchlock Gun*, *Firearms and Military Adaptation: The Ottomans and the European Military Revolution*, *The Military Revolution in South Asia*, *History of Greek Fire and Gunpowder*, and *Chinese Military Technology and Dai Viet: c.1390-1497*. Viet Nam was consulted.

## RESULTS

The most extensive Artillery in Sri Lanka was categorised into two; Heavy Artillery and Light Artillery (*Kodituakkoo*). A Sinhala dictionary defines "artillery" as "*mahuttukkuwa*" (Sri Sumangala Dictionary, 2006, p. 261). King Kotte Dharma Parakramabahu heard from the Sinhalese about the arrival of the Portuguese, and Artillery were referred to as "thunder boots" (*Rājāvaliya*, 1976, P. 223). The *Rājāvaliya* states of the term '*Kāl-Gun*', which was regarded as a particular type of foot-operated Gun (*Rājāvaliya*, 1976, pp. 223; 283). It also appears that the name iron gun was referred to as Artillery (Vimalakitti, 2001, p. 154). King *Rajasinghe* used 150 artillery to besiege Colombo Fort (Barros and Couto, 1993: 289-290). According to the *Rājāvaliya* text, the Artillery was aimed at the height of a cutting-down point of the bank, similar to the river's water level. Sri Lankans used to hold down Artillery and attack the enemy forces along the rivers (*Rājāvaliya*, 1976, P. 238). These facts suggest that the Sri Lankans understood artillery fire techniques and the environment in which they were used. Further, it is also revealed that the Sri Lankan Armed Forces have had the experience of handling Artillery in the *Seetawaka* period. According to a description of Schweitzer (1676), Paul E. Peiris stated that Artillery is only a short Muskets, which stand upon a frame with three Feet, of which the hindmost is broad and shorter than the two foremost; having no lead, they shoot with Iron Bullets. (Peiris, 1939, p., 121).

John Pybus, the first white person who departed from the Trincomalee to the hill country on May 5, 1762, states that the Adikaram and his troops brought in a small when he arrived cannon that could fire a half-pound bullet (Pybus, 2011, p. 19). These small cannons could be light Artillery. The diary of Pybus, dated May 16, 1762, shows that he had encountered about seventy or eighty men, including the Kandy commander, with 8 or 10 artillery (Pybus, 2011, p. 38). John Pybus was escorted to Kandy by a force of 200 armed men, and when he delivered his epistle to the King, eleven bullets were fired (Pybus, 2011, p. 42). Pybus states that after visiting the royal palace, two artillery shells mounted on the vehicle in front of the barracks, which were probably placed on the same day as the palace was built (Pybus, 2011, p. 19). Ambassador McDowell, on his way to Kandy in 1800 at Pilimatalawa Adhikaram, his entourage carried Artillery (Powell, 1984, p.71). Accordingly, Artillery has been used to welcome, guard and salute foreign envoys during the Kandy Kingdom.

The *Kanday* Kingdom surrounded by forest and mountains. A security post was mostly fixed on tall trees, rocks, or other high places at each Kingdom entrance. During the battle of 1815, King *Sri Wickrema Raja Singhe* arranged an artillery force on the side of the river at *Gatambe* to set up the Artillery (Diary of the Mr John D'Oyly, 1917, p. 198). Eight Artillery was mounted at the aisle in the period of king *Sri Wickreme Raja Singha* (Diary of the Mr John D'Oyly, 1917, p. 65). John Doyle's letter to the governor on January 20, 1815, states that Laithan Pok Swan was shot at by 300 Sri Lankan fighters on his way to *Iddamalpana* and fired at an artillery station at *Atugoda Hinna* Hill, a short distance away (Diary of the Mr John D'Oyly, 1917, p. 183). These shelters, in particular, were placed in such a way that they could be warned in advance of the enemy's arrival. If it is unable to set up a checkpoint sufficiently far from the highest point to the nearest other highest point, Sri Lankan soldiers set up Artillery at such places. Sri Lankans kept guns in *Balana Kadawatha*, there were six flags, and six artillery pieces in Kadawatha (Diary of the Mr John D'Oyly, 1917, pp. 22; 30). Artillery units were deployed to prevent hostile troops from entering each of these entrances. These artillery teams were stationed on the roadside, on flat grounds, at the beginning of a mountain, or near a waterway; means that people in the Kandyan kingdom who used the artillery weapon knew the controlling of Artillery with the environment. During the Battle of 1815, the King organised an artillery force on the Getambe River's side and installed an Artillery (Diary of the Mr. John D'Oyly, 1917, p.198). The fighters used heavy and large Artillery to attack the enemy on the battlefields. Artillery



was positioned on the roads near a waterway to strike the enemy with great noise and terror. According to D'Oyly's diary dated January 9, 1812, it is known that King *Sri Wickrema Raja Singhe* had ordered to build up an artillery station at *Weauda Polatu Siyambala* (Diary of the Mr. John D'Oyly, 1917, p. 77). *Ehelepola Adikam* handed over the gunpowder house and four *Kodituakkoo* to the *Wariyagama Nilame* (Diary of the Mr. John D'Oyly, 1917, pp 148-149). The terms "artillery station" and "gunpowder house" indicated an organised system to maintain the artillery gun and gunpowder protection.

Not only on the battlefields, but Artillery was also heavily used during auspicious times. This was ignited to make the King feel auspicious. Cannon were fired by King Sri Wickreme Raja Singha's order just at *Hiti Piyawara* for the *Neyakata*. (Diary of the Mr John D'Oyly, 1917, p. 25). The guns in the temple were either fitted for security or for lighting on *Pinkam* occasions. Artillery is mounted in front of the temple (Diary of the Mr. John D'Oyly, 1917, p.41). This must be special for security purpose. D'Oyly (1917) reported a trench dug before the *Maluwa* in a temple, and 25 Cannon were mounted on it (Diary of the Mr. John D'Oyly, 1917, p.28). Thus, it is evident that Sri Lankans used the Artillery during wars and during *Pinkam*. The Kandyan administration might have taken steps to provide artillery gun protection at the temples (perhaps these places were government-sponsored).

### **Kodituakkoo (Light Artillery)**

"*Kodituakkoo*" is a gun with three pillars (Sri Sumangala Dictionary, 2006, p. 299). This type of Gun was used extensively for combat in the highlands. There is a lot of evidence to confirm the use of *Kodituakkoo* as a weapon by Sri Lankans. It seems that Jingle, or Ginjle, is also a name used to refer to the *Kodituakkoo* weapon (Powell, 1984, p. 278). The *Rājāvaliya* text commentary states that this was a lightweight gun with a curved beam and had two front drains installed (Rājāvaliya, 1976, P. 284). The *Rājāvaliya* states that King Rajasinghe I sent an army with 900 *Kodituakkoo* men under the *Manamperu Mohottala* against *Dharmapala's* Portuguese army to *Oruthota* guard-post (Rājāvaliya, 1976, P. 244). They were fired against the Portuguese. During the reign of King Vijaya Rajasinghe, *Bogamuwa* (Wickremasinghe) was appointed to the position of *Kodituakkoo* (Mandaram Pura Puwatha, 1958, p. 73). The King positioned 900 *Kodituakkoo* soldiers to stop the enemy from entering the *Senkadagala* from Uva (Mandaram Pura Puwatha, 1958, p. 72). During the *Seethawaka* period and Kandy period, 900 *Kodituakkoos* were used by the battalion under the kings' guidance. Thus, the number 900 may be the exact number of



*Kodituakkoos* used in a defence battalion. It also appears that there were several specific troops in the reign of the army.

*Kodituakkoo* was kept at *Mahawasala Adhikaram's* house and *Dissawas*<sup>2</sup>. It was a custom to bring *Dissawa's* flag, *hewisi* people, and *Kodituwakkoo* holders. *Kodituakkoo* was also used as a messenger. *Kodituakkoo* was fired to salute a high ranking government official when he was entering and leaving an inn. (Diary of the Mr. John D'Oyly, 1917; 3; 25) The jingle Gun was brought along by the guards for the safety of the *Dissawa*. When the *Dissawa* entered into a district, there were jingle shots fired to inform his presence (Davy, 1821, p. 145). It is highlighted that *Kodituakkoo* was used salute for the officials in the Kandyan kingdom. The *Codituakka-Mohottala* was the district's ordnance department's in-charge and the low-caste *Paduas*, whose duty was to carry the jingalls (Davy, 1821, p. 146). According to a royal decree, one day in October 1810, when *Adikaram* summoned the district magistrates, they participated.

"...He knows not on what day of *Dissawa* of 3 *korale* came down-4 Days after the Dis. of *Tamankada* came by *Katugastoata* in a palanquin attended by 6 *Kodiatuwaku* & 1 Musquet-2 Days after, the Dis. of *Nuwara Kalawiya*, *Eyheylepola*, with 6 *Kodituwaku* & 2 Musquets-3 days after, his elder Brother Dis. of *Matale*, with 8 *Kodituwaku* & 2 Musquets & about 60 Men-3 Days after *Rakwatte Nilame* of 4 K., with an *Eyta*, an *Aliya*, a Horse, about 10 *Kodituwaku*, & 4 or 5 Musquets..." (D'Oyly, 1917: 15).

This excerpt part shows that the *Kodituakkoo* bragged at numbers 6, 8, and 10 during the districts' movement. This fact suggests that the *Kodituakkoo* was managed with a high responsibility by the King's government.

Most of the guns were permanently restored in the vicinity of gravet and inns, and near the *Ruwanwella* Rest House, there were seven *Kodituakkoo*. (Diary of the Mr John D'Oyly, 1917, p. 165). Many *Kodituakkoo* guns were permanently restored in the vicinity of the gravets and inns during wartime in the Kadyan period. There were 7 *Kodituakkoo* in *Ruwanwella*; 7 in *Batugedara* rest house; 9 in *Madduwa* situated near the *manikwala*; 7 *Kodituakkookas* in the rest house near the house of the *Alapatha Rala* (Diary of the Mr John D'Oyly, 1917, p. 165; 05; 21). The occasions of bringing *Kodituakkoo* from *Kadawatha* to the rest house can also be identified (Diary of the Mr John D'Oyly, 1917, p. 21). These guns have been fired at celebrity visits. D'Oyly notes that *Nado Vidane* was such a well-known

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<sup>2</sup> *Dissawa* was the king's in charge of a province.

figure and that when he arrived at the inn, he fired 12 shots. Descriptions related to the *Welimaluwe Mohottala, Basnayake Nilame, Kodituakkoo Nilame and Atapattu Nilame in the Ehelepola First Adikaramge Walawwawe* (house's) area in *Sabaragamuwa* Province indicates that there were *Kodituakkoo* and other gun officers in *Ehelepola's* security.

*Kodituakkoowa* was a special type of small Gun mounted on a wooden wagon with three wheels. The Lewke aristocrat's Artillery mounted on a wheeled holder is one such masterpiece in Sri Lanka (Vimalananda, 2010: 439). The Sri Lankans called it Grasshopper (*Tanakola Petta, Palapetta*) (Peiris, 1939, p.170; Powell, 1984, p. 138). "...a number of ginjalls commonly called grass-hoppers; these are small iron guns carrying a ball of six to ten ounces, and mounted on three wooden legs, exactly like a common stool. The fighters were carrying from one bush to another with great celerity as occasion requires." (Peiris, 1939, p. 170). Based on Herbert Beaver's remarks on the use of guns by Sinhalese, Powell (1984) states: "The Cingalese lie concealed till you come close upon them, then they give one regular fire, and fly; this is the general case, and I suppose I was about six yards from their grasshopper, the balls of which are about an inch in diameter, when they let them off..." (Powell, 1984, p.138). According to this explanation it is clear that Sri Lankans firing method using *Kodituakkoo*. *Kodituakkoo* is very suitable for use in mountainous areas. The Gun's trunk was mounted in the shape of a parrot wooden hammer (mould), which was sometimes made of iron front legs. Because it has three legs, it was not difficult to use on hills and slopes, as it could be broken into pieces. The Gun's trunk is varied in length and height. And some of the trunks were made to look like a few inches from the wooden fist. *Kodituakkoo* is an easy travel gun (J.C.B.R.A.S., 1942, pp. 126-127). Davy (1821) states that the jingall is a tiny and long ordnance piece, light enough to be carried with ease by a single man, and very well adapted for desultory warfare amongst mountains. It is fired on the ground, resting on a long slender butt-end, and a pair of legs (Davy, 1821, p. 128). Powell points out that these pounder and jingle iron guns are mounted on a wooden three-legged bench, which ejects six or ten iron balls, and that Kandyan fighters can move this Gun from one bunch to another (Powell, 1984, p. 278). Accordingly, the pound and jingle guns have been coined by the Sri Lankans as *Kodituakkoo* or 'grass slice'. In 1803, the McDowell Brigade also used three-legged Grasshopper to deliver easy-to-shoot, diameter trenches and lighting signals for narrow security lanes. Powell points out that the Sri Lankans were aware of the weapon at that time and that the Kandyan army has been able to get into the area with the protection of the marshes and the thickets, and it was difficult for

the invading enemy troops to reach the upcountry of the mountain due to such protection (Powell, 1984, p. 96). There were several guns of jingle models and carts used to transport them in the royal palace rooms. By the year 1803, the British used pounder 3 category guns in Sri Lankan, and most of the guns took from the British by Sinhalese seem to belong to this category. In the 1804 invasion of the army, including Arthur Johnston's, the Sri Lankan used musketry and gingal guns (Powell, 1984, p. 161).

The *Kodituakkoo* fire was also used to announce the auspicious time. The New Year event was announced to the public by the discharge of jingalls (Davy, 1821, p. 168). On this occasion, the King was surrounded by the *Nilames* and beautifully enthroned. The new rice was packed to be delivered to the temples, palace and King's stores by the *Gabada-nilames* and their officers during this occasion. The carriers started their way from different farms with a salute of jingalls (Davy, 1821, p. 175) due to the whole occasion. After the conquest of the hill country by the British in April 1815, the *Kodituakkoo* salute was announced to mark the auspicious occasion for the *Deva Perahera*, which preceded the first *Dalada Perahera*. All the weapons were taken to the four *Devalayas* under the salute of *Kodituakkoo* (Diary of the Mr John D'Oyly, 1917, p. 253). During the rituals of the *Natha Devalaya*, two guns were fired at each of the two *dissawany* (Diary of the Mr John D'Oyly, 1917, p. 259). According to the composition and order of *Dalada Perahera*, The second component was the Jingalls battalion (Davy, 1821, p.172). Based on all this information, the purposes behind the use of Artillery can be classified as follows (Table 1).

There is evidence that brass cannons were of excellent quality in Sri Lanka. The size of artillery bullets varied by gun size and was used initially for spherical stones of about six inches in diameter. Iron bullets were later used, and examples of such iron bullets and Artillery are about five to three inches in length. The Gun's barrel was attached to a handle (mould), and the barrel was giraffe-shaped. Perhaps the forelegs here were made of iron. It was not difficult to carry on difficult roads or slopes, as the *Kodituakkoo* could be removed or disassembled. The trunk was of various sizes, length and width. Some flagpoles' trunk protrudes only a few inches from the handle (Vimalananda, 2010, p.439). Commenting on the decoration of guns by Sri Lankans, Pirard (1679) of France points out: "I never thought they could be so good at making guns and other weapons with legs. They are superior to the tools made here in design and decoration." Linscoter (1592), a Dutchman, points out that Sri Lankans made beautiful guns and shone like silver (Vimalananda, 2010: 420). Although such historical sources on Artillery can be traced, *Ehelepola* reveals to John D'Oyly that

Artillery was not manufactured in Ceylon and that the Artillery currently in Kandy was obtained from *gurubavial* destroying (Peiris, 1939, pp.187-188). But the Sri Lankans used the Artillery to add other elements to it.

Table 1: Purposes of Using Artillery by Sri Lankans

| Purpose                                                      | Heavy Artillery | Kodituakkoo |
|--------------------------------------------------------------|-----------------|-------------|
| To fight against the foreign enemies                         | ✓               | -           |
| To show respect to the Kandyan Kingdom's officials           | -               | ✓           |
| To show respect to the foreign official to the Kandyan court | ✓               | ✓           |
| To protect the Royal Palace in Kandy                         | -               | ✓           |
| To protect religious places                                  | -               | ✓           |
| To announce the commencement of New Year                     | -               | ✓           |
| To respect the events such as new rice delivery and Perahera | ✓               | ✓           |
| To greet the high-ranking officials arrived at rest houses   | -               | ✓           |

Sources: Diary of the Mr John D'Oyly, 1917, Davy, 1821, Powell, 1984, Peiris, 1939

## CONCLUSION

Until the 16th century, there was hardly any evidence to confirm Guns' use by the Sri Lankans. Mainly Artillery can be categorised into two: heavy Artillery and Light Artillery (*Kodituakkoo*). This study found that heavy artillery and *Kodituakkoo* were categorised based on their using purposes. Heavy artillery was used for four purposes: nation's security, saluting, ensuring the safety of the *Adikaram*, and notifying auspicious time. According to the historical evidence in this paper, *Kodituakkoo* was used for ensuring nation's security, protecting the *Kandyan* high officials (*Adikarma* and *Dissawas*), greeting high ranking *Kandyan* kingdom officials when they are entering and leaving the rest houses, respecting the ritual ceremonies (especially the *Dalada Perahara* and *Deva Perahara* in Kandy), and announcing the New Year to the public. In terms of the nation's security, artilleryes were positioned in seven types of places: high places of each entrance to the *Kandyan* kingdom, on the tall trees, on the roadside, on flat ground, at the beginning of the mountain, near the waterway and in front of the *Kandyan* palace. Thus, this study highlights that the heavy Artillery and *Kodiatuakkoo* were substantial gun-types among the other guns used during the European invasions in Sri Lanka.

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## CURRICULUM

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## CHINESE CERAMICS TRADE IN ANCIENT SILK ROUT

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### ABSTRACT

The exports of Chinese ceramic specially made for overseas trade seem to have started from the ninth century and increased greatly from the thirteenth century. The main purpose of this research paper is to describe Chinese ceramic trade in the ancient silk route. The aims to give an initial analysis of the large scale maritime ceramic trade from the late Tang Dynasty to the Song Dynasty according to reviewing the important port sites and shipwrecks around the Indian Ocean. The archaeological recovery of the wreck and its cargo has revealed the largest and most comprehensive assemblage of Chinese ceramics found to date from the late Tang dynasty to the Song Dynasty. The port represents the most important hoard of late Tang artefacts ever discovered at a single site. As such, this find makes a unique contribution to our understanding and appreciation of late Tang material culture and its place in international trade. As such, these finds make a unique contribution to our understanding of Chinese ceramic culture and its place in international trade.

### INTRODUCTION

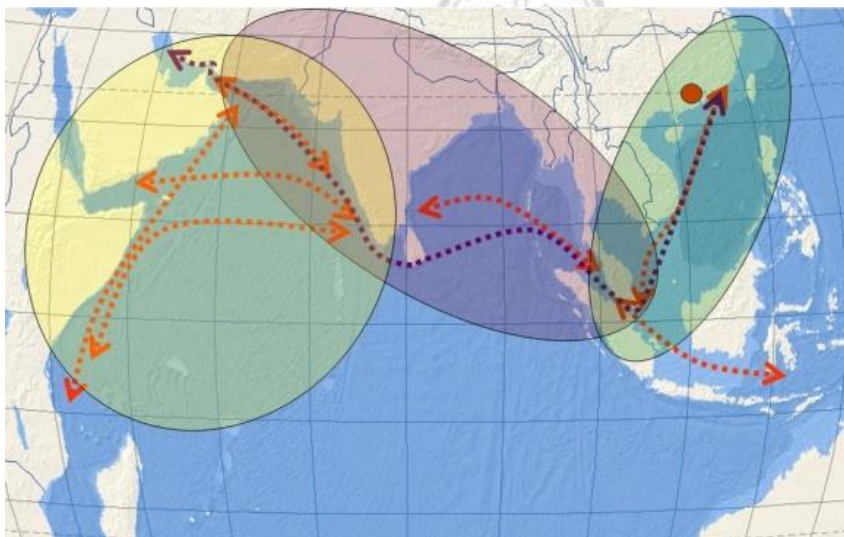
During the late Tang Dynasty to the Song Dynasty with high technical achievements, the porcelain handicraft industry is developed and spread overseas and the use of ceramic wares among the common folks was widespread. With a deluge of a great number of merchants sailing in from the Middle East to China to try their fortune and look for valuable good for trade, the Chinese ceramic wares were also exported continuously by sea to countries in South East Asia and West Asia. The opening of the maritime route from ports located in South China to the Middle East in the Tang Dynasty provided a channel for the export of the China ceramic overseas during that time. The sea route from Basra to Guangzhou was over 6000 miles in length<sup>3</sup>. It should be stressed that west Asian merchants were not alone in their commercial endeavours. From the Han into the early Tang, China's most important sea trade was with the states of Southeast Asia<sup>4</sup>. According to Wang Gungwu (王赓武), by the mid-eighth century, a transition was underway in which the Kunlun merchants were giving way to Persians and Arabs with their long-distance trade, a change that became fully apparent in the ninth century<sup>5</sup>. By the ninth century, the knowledge of how to accomplish this lengthy voyage was sufficiently widespread to result in descriptions of the route in both Chinese and Arabic. In his "One Route to Foreign Countries across the Sea from Guangzhou" (Guangzhou tong haiyi dao 廣州通海夷道) from 801, the statesman and geographer Jia

<sup>3</sup> John W. Chaffee;2018; Merchants of an Imperial Trade; The Muslim merchants of pre-modern China : the history of a maritime Asian trade diaspora, 750-1400, Cambridge University Press, p. 12-50

<sup>4</sup> John W. Chaffee;2018; Merchants of an Imperial Trade; The Muslim merchants of pre-modern China : the history of a maritime Asian trade diaspora, 750-1400, Cambridge University Press, p. 12-50

<sup>5</sup> Wang;2011; "The Nanhai Trade," Srivijaya, the dominant Southeast Asian power from the late seventh to early eleventh century, was also a favored trading partner of the Tang. See Kenneth Hall, A History of Early Southeast Asia: Maritime Trade and Societal Development, 100–1500, p. 109–120.

Dan 賈耽 (729–805) provided a highly accurate sailing itinerary from Guangzhou to Baghdad, not only with the primary route past Sumatra and Ceylon and on to the Persian Gulf, Basra and Baghdad, but also providing alternate routes through Southeast Asian waters, and a further route skirting the Arabian Peninsula and going down to the north-eastern coast of Africa.<sup>6</sup> In the Tang and Five Dynasties the exodus of Chinese ceramic wares to countries overseas reached the highest point. The export wares including the Yue ware from Yue kiln, White porcelain from Xing, Ding and Gongyi kiln, Changsha ware from Changsha kiln, Sancai ware from Gongyi kiln, green splashed ware from Xing, Gongyi kiln and Guangdong storage jar from Guangdong. This investigation marked the reputation and overwhelmingly acceptance of the Chinese ceramic wares all over the world.



*Fig.1: Map of three trading circles in the region from South China Sea to Indian Ocean.*

Source:  
<https://doi.org/10.4000/oceanindien.1379>

## CHINESE CERAMICS FOUND IN SOUTH EAST ASIA

The trade between the seventh and tenth centuries AD also saw the large-scale export of Chinese ceramics for the first time in history as well as the transition from the export of ware to that of predominantly higher-fired and glazed stoneware ceramics. Three main types of stoneware ceramics were predominantly exported from China in this period: “Changsha” (长沙), Yue, and Xing (邢) ceramics. Changsha ceramics – eponymously named after the ancient city in the southern Chinese province of Hunan (湖南) – have been found across various sites in both Mainland and Island Southeast Asia, especially at southern Thailand, the Malay Peninsula and central Java<sup>7</sup>. Changsha ceramics were produced at several major

<sup>6</sup> 【北宋】欧阳修等、《新唐书》，北京：中华书局，1975 年。

<sup>7</sup> Miksic, J.N.;2009; Research on ceramic trade, within Southeast Asia and between Southeast Asia and China, Southeast Asian Ceramic Society, Singapore, p70-99

kiln complexes about 25–30 km north of the city, and characteristically incorporated a wide variety of forms that included bowls, plates, bottles, vases, handled ewers, rounded bowls, boxes, jars, lamps, and basins; Changsha ceramics in the form of kendis were also reportedly produced and found at various central Javanese sites. Also characteristic to Changsha ceramics are the polychrome iron brown and copper green colours typically applied as stylized, pictorial, or calligraphic painted decorations as well as in combination with a variety of appliqué, impressed and stamped motifs. The quantity of Changsha ceramics exported from China in this period was so large that their fragments still “litter the beach” at the site of Laem Pho on the eastern side of the Isthmus of Kra<sup>8</sup>. Yue ceramics are similarly distributed across various archaeological sites in Southeast Asia, especially in southern China, the Philippines and Indonesia.

- ***The Belitung Shipwreck***

The well-preserved Belitung wreck (also known as the ‘Tang’ or ‘Batu Hitam’ shipwreck) was discovered by fishermen in 1998 in the Java Sea between Sumatra and Borneo. The earliest shipwreck found that carried Chinese trade ware ceramics in substantial quantities is the Belitung shipwreck. Excavations and salvage were carried out in 1998 and 1999 by a Germany private archaeological company<sup>9</sup>.

The majority of the cargo (98 percent), comprised of Chinese glazed ceramics (that represent the major types of wares produced during the ninth century): Changsha wares from Hunan province, Yue wares possibly from Zhejiang provinces, white Porcelain and green-splashed wares possibly from Northern province in China and Storage green wares from Guangdong province. Most of them are mainly the Changsha ceramics (60,000 pieces, mostly bowls). The majority of the ceramics consisted of Changsha bowls that were produced in the kilns of Tongguan, in the Hunan province. These wares were made during the latter part of the Tang Dynasty (618–906 AD), with the earliest piece bearing an inscription, ‘the third year of Kaicheng’, which is the equivalent to 838 AD. The nine Chinese characters decorating one of the Changsha bowls have been interpreted as ‘the 16th

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<sup>8</sup> Miksic, J.N; 2009; Research on ceramic trade, within Southeast Asia and between Southeast Asia and China, Southeast Asian Ceramic Society, Singapore, p70-99

<sup>9</sup> Flecker, M;2010; A ninth-century Arab shipwreck in Indonesia, The first archaeological evidence of direct trade with China, In Shipwrecked, Tang treasures and monsoon winds, ed. R. Krahl, J.S. Guy, J.K. Wilson, and J. Raby, p100–119.

day of the 7th month of the 2nd year (“宝历二年七月十六日”) of the reign of Emperor Jingzong’. Another bowl has three Chinese characters which interpret as ‘the year 826’<sup>10</sup>.

This ship provides a very strong archaeological evidence for direct trade between the western Indian Ocean and China during the latter part of the first millennium, proving early Chinese and Arabic texts that mention the direct trade between China and the East.

The copper and iron decorated Changsha ceramics were recovered and comprises of mostly bowls that were packed neatly on board in both straw containers and large green-glazed storage jars possibly from the Yue kilns; Changsha ewers, jar lets, as well as other vessel forms were also found in the cargo. Celadon round and square dishes, vases, lug handled basins, bowls were also recovered, as well as medium to large-sized jars which aside from being used as storage for Changsha bowls, were also found to contain lead ingots and star anise as well. The remaining Chinese ceramic cargo included white Xing and Gongxian ceramics, white ceramics with green splashed decorations hypothesized to be also produced by the Xing and Gongxian kilns as well as the earliest blue-and white ceramics produced by the Chinese. The discovery of the three Tang blue-and white ceramics in the Belitung cargo is significant not only because they represent the earliest production of this Chinese ceramic typology but also because they are the first complete examples of Tang blue-and-white ceramics to have been recovered.



*Fig.2: Tang Shipwreck exhibition, Asian Civilisations Museum in Singapore*

<sup>10</sup> Flecker, M; 2001; A ninth-century A.D. Arab or Indan Shipwreck in Indonesia: first evidence for direct trade with China; World Archaeology, Vol. 32(3) p 344



Fig. 3: Left: Belitung shipwreck green-splashed stoneware cups.

Middle: Belitung shipwreck stoneware jars.

Right: Belitung shipwreck Changsha bowls.



#### - *The Cirebon Shipwreck*

Chinese trade ceramics, the bulk of the surviving freight of the Cirebon ship, are a well-known import found in many sites throughout the Malay Archipelago and the Indian Ocean. The "Cirebon" shipwreck is a shipwreck with a huge cargo load. The wreck was located about 100 nautical miles from the sea off Cirebon, Indonesia. It was later than the "Black Stone" in the 10th century. In 2001, local fishermen found clues to the shipwreck and reported it to the Indonesian Heritage Department. Recorded by the National Commission, the investigation, preparation and excavation work was concentrated in 2003 - 2005<sup>11</sup>. The find is regarded as one of the most important discoveries in Southeast Asian history in recent years.

Approximately 500,000 pieces consisted mostly of Chinese ceramics dated to the Five Dynasties period, along with Near East and Indian glassware, gemstones (sapphires and rubies), a pair of gold daggers, utilitarian and ceremonial objects and other raw materials. The ceramic inventory consisted of Yue bowls, plates and dishes, white wares, porcelain jars, vases, basins, boxes and ewers. Artifacts from China not only include more than 300000 pieces of ceramics from different origins, but also a large number of silver ingots, copper coins, Southern Han Dynasty cast lead coins, bronze mirrors, lacquer ware, etc. Among them, the largest proportion is Yue



Fig.4: Five dynasties Yue and Ding ware Cirebon shipwreck Java Sea.

<sup>11</sup> 【印度尼西亚】Adi Agung Tirtamarta, M.M; 井里汶海底十世纪沉船打捞纪实; 故宫博物院院刊, 2007 年第 6 期·第 134 期, 151-154 页。

Kiln celadon and a small number of white porcelain from Anhui and Henan kilns<sup>12</sup>.

### - *Port of Laem Pho in Thailand*

Laem Pho is an archaeological site located on the east coast of the Isthmus of Thailand. Back in 1982 to 1983, the Fine Arts Department of Thailand established the first project of survey and excavation on Laem Pho after the discovery of many ceramic shards around 5 square kilometres on the beach and shallow seabed of the headland<sup>13</sup>. Many fragments of Chinese ceramics and Middle East wares were discovered<sup>14</sup>. The Chinese ceramics belong to the last century of the Tang Dynasty (800-900 A.D.), especially Changsha bowl with an Arabic character of the Islamic name of God, Allah. Middle East wares were found to be both ceramics and glass forms.

All of the Chinese ceramic shards dated to the Tang Dynasty were categorized into at least five types, consisting of unglazed, white glazed, green glazed, underglaze brown and green, and brown sprayed wares, that were produced at Xing kilns in Hebei, Changsha and Gongyi kilns in Henan, Yue kilns in Zhejiang, Fengkai, Xinhui, Meixian and other kilns in Guangdong, all produced in the first half of the 9th century. A very few Persian blue glazed wares were also found that archaeologist suggested were probably produced in the eastern region of Persia around the early 9th century<sup>15</sup>.

The port of Laem Pho was one destination of Tang ceramics supplied by maritime trade routes to which the Belitung and Phnom Surin ships used to travel before they sank. All the above evidence also supports the idea of trade relations, especially in the 9th century, between the Tang Dynasty and Srivijaya Kingdom, including the varieties of products and cultures, maritime trade routes, trans-peninsular routes and the locations of inland cities and ports for contacts with the



*Fig.5 Various types of Tang ceramics recovered from Laem Pho. Chaiya National Museum*

<sup>12</sup> 辛光灿 《9—10 世纪东南亚海洋贸易沉船研究 ——以“黑石号”沉船和“井里汶”沉船为例》 《自然与文化遗产研究》 第4卷 第10期 2019年10月, 28-32页。

<sup>13</sup> Khemchatit Thepchai:1984; Ceramic Finds from Laem Pho in Chaiya; Muang Boran Journal, vol. 10, no. 2

<sup>14</sup> Bronson, B:1996; Chinese and Middle Eastern Trade in Southern Thailand During the 9th Century A.D; Ancient Trade and Cultural Contacts in Southeast Asia, Srimuang Printing Co.,Ltd, Bangkok, p3181-200

<sup>15</sup> Dhanmanonda W, K. Won-in, S. Tancharakorn, W. Tantanuch, C.Thongleurm, T. Kamwanna and P.

Dararutana:2012; Characterization of enamelled glass excavated from Laem Pho, southern Thailand, IOP Conference Series Materials Science and Engineering 37(1), p.1-2/ Tharapong Srisuchat;2004; Ancient Ports and Trans-peninsula Routes in Upper Malay Peninsula; Malay Peninsula Archaeology Programme, p.1-11



kingdoms in the Middle East, India, China and Southeast Asia through the Malay Peninsula, which lay between the South China Sea and the Indian Ocean<sup>16</sup>.

### CHINESE CERAMICS FOUND IN WESTERN INDIAN OCEAN

The beginning from the Tang Dynasty (ca. AD 618-907), linkages between East Africa and China became more regular. The continuous occurrence of Chinese trade ceramics in dateable archaeological contexts at several key sites in East Africa from the Tang through Qing Dynasties (ca. AD 618-1912) points to a long, productive relationship between China and East Africa. Although Chinese ceramics might have sporadically reached the Middle East in earlier periods, regular trade seems to increase around the beginning of the 9th century, with ships sailing between the China Sea and the Persian Gulf.

Many Chinese ceramic fragments have survived at archaeological sites in East Africa. Mapping the itinerary through which they were distributed on the coast and entered the hinterlands may offer the most promising perspective to grasp the mechanism of exchanges in this very region. Indeed, evidence from the Kenya coast demonstrates that East Africa was one of the final destinations for the earliest Chinese ceramics traded by sea to the West. This proves that, in the balance of the earliest Indian Ocean long-distance trade, Chinese ceramics were considered among the most desirable exotic goods along with textiles and glass beads, and exchangeable for numerous East African commodities that were highly sought after in Egypt, Persia and China.

#### - *Siraf Port in Iran*

Siraf was a major port city during the early Islamic period. Previously occupied by the Sasanians, it lay at the centre of a maritime exchange network that reached most parts of the Indian Ocean world during the 8<sup>th</sup> to 10<sup>th</sup> centuries<sup>17</sup>.

Extensive excavations took place between the 1966 and 1973 under the direction of David Whitehouse on behalf of the British Institute of Persian Studies. This work produced vast quantities of finds, including over three million pieces of pottery and ceramic. All of the Chinese ceramic shards dated to the Tang Dynasty were categorized into at least five types, consisting of



Fig.6: Yue ware excavated in Iran, Siraf

<sup>16</sup> Bronson, B;1996; Chinese and Middle Eastern Trade in Southern Thailand During the 9th Century A.D; Ancient Trade and Cultural Contacts in Southeast Asia, Srimuang Printing Co.,Ltd, Bangkok, p3181-200

<sup>17</sup> Whitehouse, D and Williamson, A;1973; Sasanian Maritime Trade, Iran, p 29-49

unglazed, white glazed, green glazed, underglaze brown and green, and brown sprayed wares, that were produced at Xing kilns in Hebei, Changsha and Gongyi kilns in Henan, Yue kilns in Zhejiang, Fengkai, Xinhui, Meixian and other kilns in Guangdong, all produced in the first half of the 9th to 10<sup>th</sup> century<sup>18</sup>.

#### - Coastal region in Kenya

The East African coast also known as Swahili coast, it is a 20-200 km wide strip of land over 3000 km long, that extends from Mogadishu in Somalia to the north and south to Mozambique to the south. Population growth and economic prosperity, leading to the growth of numerous stone towns between the tenth and sixteenth centuries, was instigated by the expansion of the interregional commerce in the Indian Ocean basin, as well as the South China Sea and the Far East<sup>19</sup>. The continuous occurrence of Chinese trade ceramics in dateable archaeological contexts at these key East African archaeological sites like Manda, Shanga, pate, and Gedi in Kenya, Kilwa, Songo Mnara, and Unguja Ukuu in Tanzania among many more, from the Tang through Qing Dynasties (ca. AD 618-1908) points to a long, productive relationship between China and East Africa. Trade ceramics recovered in East Africa usually include Islamic ware and glazed ceramics, Chinese ware and porcelain, Indonesian and Thai porcelain, and Indian unglazed pottery. Chinese ceramics exported to the East Africa coast is mainly from different kiln complexes in south China as well as some few kilns from northern China. During the late Tang dynasty and during the Song dynasty the Chinese ceramics exported to East Africa came from both Northern China and southern China kiln complexes.

Under the auspices of the Ministry of Commerce of China, the joint archaeological team of Peking University and the National Museum of Kenya (lead by Professor Qin Dashu) made three archaeological investigations between 2010 and 2013 on Chinese ceramics discovered by other scholars from earlier archaeological excavations or surveys in 37 ancient sites or archaeological contexts (such as a shipwreck) in the coastal areas of Kenya. These include some well-known Swahili ruins such as the Fort Jesus ruins (built by the Portuguese in 1593, and occupied by them until 1698) in Mombasa, Gedi Ruin in Malindi, Shanga site in Pate Island, and Manda in Manda Island, etc. At the same time, a small

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<sup>18</sup> Tampoe M;1989; Maritime Trade between China and the West: An Archaeological Study of the Ceramics from Siraf (Persian Gulf), 8th to 15th centuries A.D.; British Archaeological Reports 555: International Series.

<sup>19</sup> 秦大树, 范佳楠, 《元代中国瓷器的外销特点与新安沉船的相关问题》, 《美術资料》, 2017, 第 92 号, 171-174

number of Chinese ceramics with unknown discovery sites were also studied, which were housed in three museums including the Fort Jesus Museum in Mombasa, the Lamu Museum and the Gedi Museum<sup>20</sup>. A total of 9,552 Chinese ceramic fragments (or restored pieces) were thus identified and investigated. In addition, the team also carried out the China-Kenya Cooperative Overland Archaeological Excavation Project during the three years, and a total of 1,060 Chinese ceramic fragments were unearthed and investigated. Furthermore, the project also covered a small number of ceramic finds that had been produced in Japan or Southeast Asia. Altogether, 10,612 pieces of Chinese ceramics were investigated over the three-year period<sup>21</sup>.

According to the statistical research on the origin and era of Chinese porcelain unearthed in the coastal areas of Kenya, it can be seen that the sales of Chinese porcelain in the Indian Ocean region from the Tang Dynasty to the mid-South Song Dynasty (9th and 12th centuries) are relatively small and can be regarded as a low tide period. The number of Chinese porcelains discovered has increased again from the late Tang Dynasty<sup>22</sup>; especially the output of the Yuan Dynasty is the most prominent<sup>23</sup>.



*Fig.7: Changsha shard, 9th century China; excavated in Shanga site, Kenya,*

## CHINESE CERAMICS FOUND IN SOUTH ASIA

The finds of Chinese export porcelain in Southeast Asia and the West, as noted above, show that during 9th-10th centuries, there were many ports on the coast of China engaged in maritime trade. The most important ports for export trade in this period were: Yangzhou, Mingzhou, Fuzhou and Guangzhou. However, these ports were not necessarily involved in exporting commodities directly to all destinations, and there were a number of entrepôts in the Indian Ocean trading circle. Cargo from ports in China could be transported firstly to

<sup>20</sup>秦大树，范佳楠，《元代中国瓷器的外销特点与新安沉船的相关问题》，《美术资料》，2017，第92号，171-174

<sup>21</sup> Qin Dashu;2014; Archaeological Investigations of Chinese ceramic Excavated from Kenya: Ancient Silk trade routes, Edited by Qin Dashu and Jian Yuan, World Scientific Publication, p87-110

<sup>22</sup> Zhao Bing;2015; Chinese-style ceramics in East Africa from the 9th to 16th century: A case of changing value and symbols in the multi-partner global trade, Institut des mondes africains (IMAF), p.6-10

<sup>23</sup>秦大树，范佳楠，《元代中国瓷器的外销特点与新安沉船的相关问题》，《美术资料》，2017，第92号，171-174

these entrepôts and then loaded onto ships coming from other parts of the Indian Ocean for onward shipping.

Thus, Chinese ceramic began to spread throughout the world in the Tang Dynasty. The ceramics produced in the northern and southern parts of China were assembled at the Guangdong port for international trade. These assembled ceramic travelled from Southeast Asia to Central Asia and then to Arabia. During the late Tang Dynasty to the Song Dynasty, a large number of Chinese ceramic were exported.

Chinese ceramic fragments have survived at archaeological sites in Mantai (Sri Lanka), Sanjan (India) and Banbhore (Pakistan). Māntai Port is a unique place on the Indian Ocean. Centrally located on the Maritime Silk Road, Māntai port has become a centre of exchange for goods to the West and East.

### MĀNTAI PORT IN SRI LANKA

Māntai port site is one of the most famous ancient ports in the Indian Ocean. Māntai port is located on the northwest coast of Sri Lanka. Excavations at Māntai have been conducted in 1886, 1907, 1926-28, 1950-1951, 1957, 1970, 1980-1984, 2009-2010 and 2018-2019. Evidence indicates that the port consisted of a fairly large settlement extending to about 8



*Fig.8: Chengsha Ceramic  
Māntai Excavation 1980/84*

hectares during the initial period up to about the fourth century A.D. The buildings in this phase had been wattle and daub constructions. But after about the fourth century A. D. they had been constructed with stronger materials such as bricks and stones<sup>24</sup>. From this period onwards, the port had functioned as the central turn table of the Indian Oceanic trade. Especially, Māntai archaeological works in the last centuries have been given the most magnificent results<sup>25</sup>. This excavation was a

systematic and largest excavation of Māntai, which began in the after 1980. The excavation

<sup>24</sup> Siriweera, W.I.;2003; Pre-colonial Sri Lanka maritime commerce with special reference to its ports, In Sri Lanka and the Silk Road of the Sea, Bandaranayake, Senake., Dewaraja, Lorna., Silva, Roland., Wimalaratne, K.D.G. (ed), Colombo: Sri Lanka National Commission for UNESCO and the Central Cultural Fund, pp.117-126.

<sup>25</sup> Carswell, J., Deraniyagala, S.U. & Graham, A.H.;2013; Māntai: City by the Sea, Archaeological Department of Sri Lanka, ed., Aichwald, Germany: Linden Soft Verlag, p.231-267



began in three phases. They are 1980, 1982 and 1984. In this research has been given a more detail of Chinese ceramics and ware type. There are numerous examples of Yue stoneware, Tang white ware, cream-colored porcelain, Changsha ware, Dusun storage jars and other type stoneware. It is highly possible that the material recovered from Māntai will be found to include the earliest Chinese wares that reached Sri Lanka. Most of the Chinese material has been stored in the Archaeological Department at Anuradhapura. As Sancai (Fig.1.46) was long believed never to have been exported from China its occurrence at Māntai, along with a bowl fragment from the 1984 season, refutes this view<sup>26</sup>.

- *Sanjan (Gujarat), India*



Fig.9: Changsha fragment from Sanjan in India

The Sanjan site was excavated over a period of three years from 2002 to 2004. The principals of the project were Dr Homi Dhalla and later Dr Mani Kamerkar. The Director of the Indian Archaeological Society New Delhi and co-Directore was Dr. Kurush Dalal, Mumbai <sup>27</sup>. The archaeological evidence suggests that during the earlier period of the settlement, Sanjan was probably involved more with coastal trading and had some limited contact with the foreign markets. It is likely that the contact may not have been direct initially and that it gradually developed until the trade with ports across the ocean become a mainstay of the

settlement. The traded goods in this initial stage appear to be items other than ceramics.

A considerable number of Chinese ceramics are represented in the Sanjan collection. Although quantitatively less prominent in the Sanjan Collection, they are of great relevance in understanding the dynamics of the trans-oceanic trade between West Asia and the Far East. However, it was in the 8<sup>th</sup> century and after that Chinese ceramic took precedence over silk, paper and other perishable goods which used to be the staple items of export<sup>28</sup>. Only one base Changsha shard has been found at Sanjan. As well as, Yue ware, Guangdong Storage jar and White ware ceramics have been found in here, but only several pieces of shards.

<sup>26</sup> Carswell, J., Deraniyagala, S.U. & Graham, A.H.;2013; Māntai: City by the Sea, Archaeological Department of Sri Lanka, ed., Aichwald, Germany: Linden Soft Verlag, p.231-267

<sup>27</sup> Rukshana J. Nanji;2011; Mariners and Merchants: A study of the Ceramics from Sanjan (Gujarat), (ed) Dr.S.P. Gupta, Dr. Homi Dhalla and Mr. K.N. Dikshit, Sanjan Report, Volume 1, p 80-87.

<sup>28</sup> Rukshana J. Nanji;2011; Mariners and Merchants: A study of the Ceramics from Sanjan (Gujarat), (ed) Dr.S.P. Gupta, Dr. Homi Dhalla and Mr. K.N. Dikshit, Sanjan Report, Volume 1, p 80-87.

### - *Pakistan – Banbhore site*

Banbhore is situated on the northern bank of Gharo creek, about 65 kilometres (40 mi) east of Karachi in the Thatta District of Sindh, Pakistan. Banbhore is the present name for an early port of importance on a branch of the Indus River, in the Sind region of Pakistan. Following early excavations on a limited scale by Henry Cousens (1929), N.G. Majumdar (1931) and in 1951 by Leslie Alcock, systematic excavations were started in 1958 under the direction of Dr. F.A. Khan and continued each year until 1965<sup>29</sup>.

The imported Chinese porcelain, celadon and stone wares as discovered at Banbhore mostly came through the sea trade. The presence of Chinese pottery of Tang period (618-906) and of a later date attest to a flourishing trade with Sindh during the ninth and tenth centuries, a time range confirmed by the numismatic evidence found in association with other imported pottery at Banbhore. It is significant that the blue painted porcelain of the Ming dynasty is absent at Banbhore indicating that the city had ceased to exist or had lost its importance after twelfth century CE. The Chinese imported pottery in Sindh consists of white porcelain, olive-green glazed stone wares that have a slightly grey body, the celadon wares and painted stone wares<sup>30</sup>.



Fig.10: Chinese Ceramic from Bandhore.

### **CHINESE CERAMIC TRADE (LATE TANG DYNASTY TO THE SONG DYNASTY)**

Among the commodities on the Silk Road, Chinese ceramics are introduced as a luxury good. Thus, Chinese ceramic began to spread throughout the world in the Tang Dynasty. The ceramics produced in the northern and southern parts of china were assembled at the Guangdong port for international trade. These assembled ceramic travelled from Southeast Asia to Central Asia and then to Arabia. During the late Tang Dynasty to the Song Dynasty,

<sup>29</sup> Khan, F. A.;1969; Banbhore, A Preliminary Report on the Recent Archaeological Excavations at Banbhore, 3rd ed. Karachi.

<sup>30</sup> Mohammad Rafique Mughal; 2012; Early Islamic Glazed Pottery from Banbhore and its Connections with Contemporary Cities during 8th to 11th Centuries CE; Studies In Heritage Of South Asia, (ed) Mokammal H Bhuiyan; Heritage Management & Research, Bangladesh, p.332-341



a large number of Chinese ceramic were exported. The remains of the disseminated Chinese ceramics are still found in many countries.

From the point of view of the whole Maritime Silk Road, we can see that China's Yue ware, white porcelain and Changsha ware and ewer have been unearthed or exported successively in Māntai port as well as Belitung Shipwreck, Cirebon Shipwreck, Port of Laem Pho and Ko Kho Khao in Thailand, Muara Jambi in Sumatra, Sanjan, Bandhore, Nishapur and Siraf port in Iran, Samarra in Iraq, Fustat in Egypt and other places, which shows that China's ceramic reputation is well-known. As early as the Tang Dynasty, it has been drifting across the sea and gaining global prestige. As well as the port of Māntai can be identified as the center of the ceramic trade in Silk Route and can be identified as a gathering place of Chinese traders and Arabic traders.

Changsha wares have been reported for sites all along the ceramic trade routes going from China to West Asia. The numbers are always small but the presence of these wares are significant considering that they were some of the earliest Chinese wares to be traded along with Yue and white wares of the kind found at Samarra. While a number of archaeological sites in West Asia and East Africa have recorded Changsha ware, one of the largest and most significant finds has been the discovery of the shipwreck off the island of Belitung in the waters of the java sea. The Guangdong Storage jars appear to have been containers for the Changsha bowls and other wares. Whitehouse discusses the Chinese ceramics from Siraf and dates them to the first quarter of the 9<sup>th</sup> century on the basis of their recovery from the Great Mosque. Changsha ceramics which he calls “painted stoneware”. As well as, Changsha ceramics (Bowl and Ewer) have been found in Māntai, Cirebon Shipwreck, Port of Laem Pho and Ko Kho Khao in Thailand, Muara Jambi in Sumatra, Sanjan, Bandhore, Nishapur, Manda, Shanga in Kenya and, Fustat in Egypt (Table.5.1/2). At most sites, the dating of this ware does not go beyond the middle of the 9<sup>th</sup> century. The Yue ware was one of the earliest Chinese imports in West Asia and at other sites of the Indian Ocean trade network. It occurs at Samarra, Siraf, Fusta, Bandhore, Laem Pho, Sanjan, Shanga. The Yue base shades of a bowl from Māntai are almost an exact copy from other sites (Table.5.3).

Guangdong storage ware shards have been found at sites all along the coastline of the Indian Ocean, indicative of the great demand for these for Eastern wares. These vessels were not only items of trade but were also containers for other trade goods of a more perishable or fragile nature. This is borne out by the cargo of the Belitung ship-wreck. As well Guangdong jars as one of the earliest exported ceramic in the Persian Gulf region.

Shards of Guangdong along with other ware such as Changsha bowls with glaze removed from the interior have been found in the Siraf. As well as Guangdong ware have been found in Cirebon Shipwreck, Port of Laem Pho and Ko Kho Khao in Thailand, Muara Jambi in Sumatra, Sanjan, Bandhore, Nishapur, Samara, Manda, Shanga in Kenya and Fustat in Egypt (Table.5.4).

Ceramic has been reported from almost all sites in the Indian Ocean littoral attesting to the great demand in the international market for this Chinese commodity. That a large part of the maritime trade was driven by the demand for specialty ceramic is clear from the far-flung regions which report them. From the West Indian Ocean to China, the demand for Chinese ceramic appears to have been high during the late Tang dynasty to the Song Dynasty (8<sup>th</sup>-11<sup>th</sup> century A.D.). The Chinese ceramic trade route stretched from the Southern Chinese coast through the Malacca straits or the Isthmus of Kra to Sri Lanka and the west coast of India to the Persian Gulf the red sea and the coast of East Africa. It is not surprising to find that Chinese ceramic have been reported from sites all along this route.

## **SUMMARY**

During the Tang and Song dynasties, Chinese ceramics were exported to many countries, not only with a large variety and quantity, but also with a variety of shapes, beautiful flower patterns, and crystal enamels, which was deeply loved by foreign people. Its export area covers East Asia, South Asia, West Asia, Arab and Africa, the range of communication is very wide. The ceramic production centers were located in the North and South part of China. They are Yue ware - Yue kiln site in Zhejiang Province, Changsha ware and Changsha ewer- Changsha kiln (Tongguan kiln) in Hunan Province, Guangdong Storage jars, basin and other ware – Guangdong kiln in Guangdong Province, White porcelain – Xing and Ding kiln in Hebei Province and Gongyi kiln (Baihe) in Henan Province, White porcelain with green splashed ware – Xing kiln in Hebei Province and Gongyi kiln (Baihe) in Henan Province, and Sancai Ware – Gongyi kiln (Huangye) in Henan Province. With the rise of the international trade in Chinese ceramic in the late Tang Dynasty, the ceramic spread from the East to West. This has been confirmed by archaeological research, especially in the East and West port and shipwreck. Among the products belonging to the late Tang Dynasty to early North Song Dynasty, we can identify some of the products that were in high demand international trade.

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# **BINDING MEDIUMS, PROTECTIVE COATINGS AND MURAL PAINTING TECHNIQUES WERE USED BY ANCIENT PAINTERS**

**Janani Namal Seneviratne**

## **ABSTRACT**

Buddhist wall painting techniques originated in the 2<sup>nd</sup> BCE period and systematically developed with visual facts from the 2<sup>nd</sup> C.E and continued up to the present. The visual facts seen in ancient paintings in the early stage of Anuradhapura period runs as far as 247 BCE to 800 C.E Anuradhapura as well as 12 ,13 C.E. Polonaruwa Period. Existed before the Kandyan Period are considered to be distinguished styles where they have used plant glue, drying oil or plant extract mixed with lime or clay mortar to make a dry mixture known as Tempera technique, for painting purposes. Perhaps material namely Sesami oil, Haldummala, Dorana oil wood apple gum and cashew gum has been used. As early as the 2nd century C.E., gum and drying oil was used to add pigment and mortar details to tempera paintings. But during the Kandyan era, painters had changed the technique and used deferent layers and smooth pottery surface for their paintings. After the Kandyan style, the Southern style had been developing as a live one within a period of two decades. Until 1730 -1930 C.E. In the 19th and 20<sup>th</sup> century, painting technique utilizing tempera painting covered with light layer of resign like Dorana oil. When thickened, the oils become resinous and could be used as varnish to seal and protect paintings from water. Existence of paintings with features of transition from southern style to the modern period, could be seen and after 1930 C.E, this style had changed with the birth of a new generation as a result of testing few new artistic techniques. Accordingly, the most reliable method to prove the above fact findings, is to use the latest modern scientific analysis methodology, in order to clearly identify the methodology adopted separately by the relevant painting techniques used by ancient painters.

## **1. MURAL PAINTINGS TECHNIQUES OF ANCIENT PAINTERS**

Painting is an art, universally acknowledged as a mode of expression which maps the ideals, values of a social discourse. It might be heralded by the sheer artistic philosophy of the artist as well. It may also be expressed in the form of a wall painting, which speaks of a tradition through the artist's use of their techniques.

By making use of modern scientific analysis methods to ascertain as to how the mixtures, pigment bindings, presence of organic and inorganic chemicals and the preservatives used in wall paintings, accurate data could be derived. In this way, a clear solution could be obtained regarding the ideas published by the learned, written and unwritten facts etc. coming from the painting generations. There had been so many local and international personnel who had used these to identify the ancient techniques used by the then painters.

Even though the paintings of Sri Lanka are mainly identified as religious paintings, but the Sigiriya paintings are secular. Despite being recorded as 25 in the literary evidence, very few are seen at present in the main painting pocket. The upper part of the female figures are seen in the paintings and are depicted as fair skinned (yellow, golden yellow), while some are of dark in complexion (ruddy, or greenish complexion). The main cluster of

frescoes are seen on the western face of Sigiri-rock and confined to the two rock chambers A and B that are situated about fifteen yards above the gallery floor near its south end. Strictly speaking, there is one long cave 67'.6", divided into two pockets A(26'3"), B (41'3") respectively, by a cramped ledge. Whilst cave A is roomy, cave B is much higher and spacious enough to stand upright, except at the end.

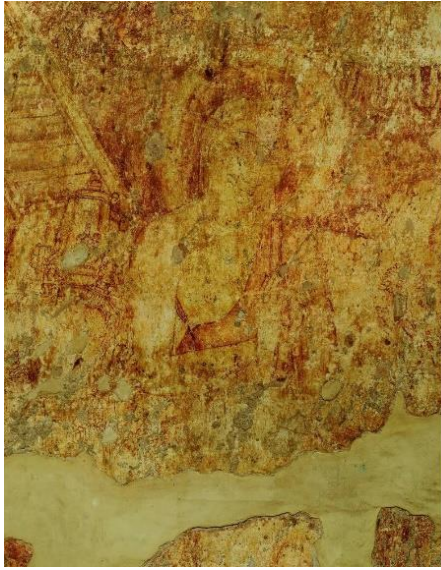
What techniques applied in Sigiriya paintings has been a matter of conjecture and controversy. According to Mr. Dhanapala, the paintings of Sigiriya were drawn using the Fresco Bueno technique.



*Figure 1: Sigiriya Painting*

However, Dr. O.P. Agrawal and Dr. Nanda Wickramasinghe state that they represent the Fresco Lustrato technique (Agrawal, 2002:122) and some are of the view that they are done according to the tempera technique. R.H De Silva is of the view that Sigiriya paintings are etched in a different technique and named it as “oil emulsion tempera with gum”.





*Figure 2:Tiwanka Image House*

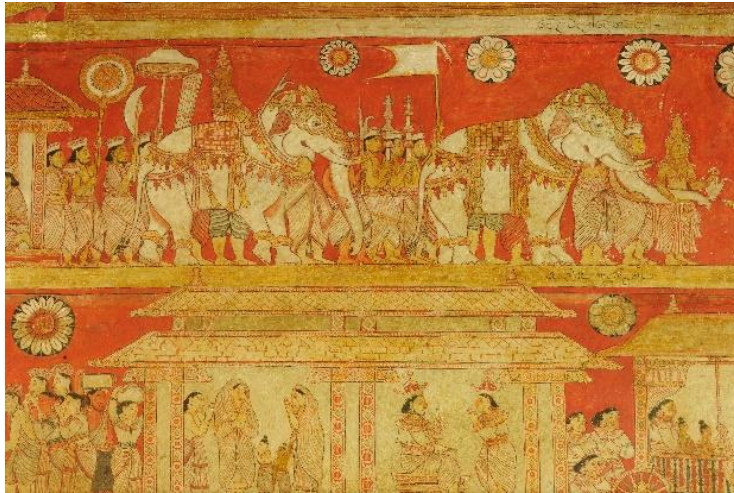
The art of painting appears to have been in a flourishing state during the Polonnaruwa period. Since the walls are thick in Tiwaka Image House, in some places, there are two layers of paintings. Perhaps, some of the paintings now seen in this shrine, belong to the twelfth century and not to the period of Parakramabahu II. An attempt had been made to revive the glories of Polonnaruwa. Apart from the Jathaka stories, the paintings depicting invitation from Gods for an earthly birth and after enlightenment of Buddha, in detail are seen in the sanctum. The colors used in these paintings are limited to red ,white ,yellow ,black and green, The outline of figures had been drawn in red and the pigments applied thereafter. The method of painting was tempera, the pigments had been applied on the dry plaster surface of the wall (Paranavitane,1954:37). Likewise in Sigiria, as per my investigations, a binding media consisting of vegetable oil(Dorona oil /Sesame oil ) along with wood apple gum had also been applied for the plaster and pigments during that period but, weaken with the time, and could not been seen clearly at present other than a minute trace.



*Figure 3: Rangiri Dambulla*

**Rangiri Dambulla** is a monastery, with five caves and is the largest, best-preserved cave-temple complex in Sri Lanka. The Buddhist mural paintings (covering an area of 2,100 m<sup>2</sup>) are of particular importance, as well as the 157 statues. This Buddhist cave temple consisting thousands of images of Buddha in sculpture and in paintings, have been created by ancient artists. The temple had been built in the first century BCE and paintings in the first four caves belong to the 18<sup>th</sup> C.E century, whereas, paintings in the 5<sup>th</sup> cave had been completed in 1915 C.E. The cave temple seen today had been restored by King Kirthi Sri Rajasinghe of Kandy (1747-1780 C.E). The Dambulla Vihara being the rock temple of importance in Sri Lanka, as we all know, a shrine held in great reverence by the Buddhists, and is a place of interest worthy of being maintained as a historical monument as it possesses a painted wall area and ceiling which is the best example of Buddhist art in the island.

**Degaldoruwa** Rock temple is the massive internal space is spatially differentiated by the arrangement of Buddha statues and the walls and ceiling contain paintings related to Buddhist stores.



*Figure 4: Degaldoruwa Mural Painting*

The traditional artists had used a very restricted palette which consisted only of yellow, red, black, blue and white. They have used black mixed with blue for hair, red for back-ground, yellow for robes and the body, white for eyes, shades of red for palms and flowers and blue for certain designs in seats and cloths. This reveals that they had used brushes with points varying between 0.5 and 3 mm. All the murals and statues show characteristics of the Kandyan period both in style and technique.



*Figure 5: Kathaluwa Purwaramaya*

**Kathaluwa Purwaramaya Viharaya** and **Thelwaththa Rathpath Viharaya** were situated in the Southern Province of Sri Lanka. This Image Houses belongs to the nineteenth century. The style of Southern and Western Regions of Sri Lanka show a contrast to that of the Central Region. In general, in spite of all the variations of styles of school of art and traditional styles, the most salient feature seen is the, strong connection between each style.



Therefore, these mural paintings which had been dispersed regionally could be categorized as sub-styles. The stylistic evaluation of these paintings belongs to Southern tradition. Many points of stylistic and thematic similarity, align with the present series in Purvarama Image Houses at Kataluva, Galle which belong to the period 1880 C.E to 1890 C.E and appears similar to the series at other two .



Figure 6:Thelwatthya Tathpath Viharaya

Much data has been collected by applying the above methodology to confirm the technology used by the Anuradhapura, Polonnaruwa and Kandyan Painters. Even though very little information is available regarding the paintings in Southern region, the differences of this painting generation could be identified even in the absence of written documents or any other way expressing the techniques. Even this is so, by using the new The scientific analysis technology and examining the pigment mixtures of the paintings in these temples, unique features relevant to their generation as well as similarities, differences etc. could be identified along with the extent of the commitment made by the Southern Painters. When applying the technology, southern painters apart from the styles which had come from generation to generation, they have followed the methods of the earlier periods specially, some of the styles of the kandyan period, in their paintings. Accordingly, by examining the styles used by painters in different regions separately, it is observed that the kandyan styles had been practiced in many instances.

Tampita Image House tradition (where Buddha statues are located) belonging to kandyan period could be quoted as an example for using new techniques unique to Sri Lankan architecture. The platform of the statue had been made by laying wood planks pasted together on 6 ft. high stone columns. Kithul(*Caryataurens*) columns have been placed in

the four corners and bamboo laid horizontally filled with clay to form the walls. In order to protect the walls from cracking and also to make the painting surface smooth, the kandyan as well as southern painters had applied a layer made out of young coconut, Aralu and Godapara (*Dillenia retusa*) outer layers, cut into tiny pieces, chopped finely mixing 10 lbs. mixture into 4 gallons of water and keeping to settle for about a month. Thereafter, 1 gallon of this mixture with the extract of about 100 aralu seeds is mixed together to form the paste (Kumarasamy, 1962:118) This had been used by the Kandayan Painters also since the lime stone plaster used by the southern painters had not been familiar to them. In some of the southern creations, like Mulgirigala temple, clay walls mixed with kanji water had been used for paintings. This may have been a result of southern painters following the techniques of Kandyan painters. (Somatillake, 2004:300-304)

Since the painters had made their own colors, they would have had a clear knowledge of the paste mixtures they use in the temple industry. Trainee painters had used a sand plank for learning purposes. Thereafter, a board with application of a paste prepared out of Tamarind (*Tamerindus indica /acid seasoning*), coconut shell charcoal mixed with extract of Nil kikirindiya (*Verbesina prostrate*) together with metal powder, had been used by them. After the board gets dried, a tool made of a bone obtained from the ekiriya (living in the sea) had been used for drawings and in this manner the trainees had improved their skills. (Kumarasamy, 1962:183)

Another method of making the paste was to mix lime and sand with plant extracts. For this process, 3 portions of sand was mixed with 2 portions of limestone and letting it settle for 20 days. To make the mixture stronger, Kithul trickle, kaduru (*Pagianta dichotoma*) and gingerly oil had been added. For curving purposes, aralu extract, inner layer of young coconuts and outer layer of godapera is boiled and the water had been mixed with clay, sand, cotton wool and bees honey to make the necessary paste. The white of the egg had been used to get the shinning effect. (Somatillake, 2004:300-305)

Later, Painters had used makul (kind of earth) taken from wetakegama in mathurata to get the white effect. This kind of earth is a mixture of carbonate of lime and carbonate of magnesium which had been found in a dolomite cave. However, laboratory tests had proved the presence of hydromagnaside in this kind of earth used by many painters. (Seneviratne B.J.N, 2018:84)

There is visible proof regarding the presence of this earth in many locations in the south. Some painters had used crushed burnt limestone to get the white colour. They had kept the crushed limestone under soil for about a month and thereafter making a thick paste by separating the sand. Use of this method is clearly seen in places where peeling had taken place. To obtain the yellow colour, extract (milk) of the Gokatu plant and limestone (mud Colour) mixed with wood apple gum and grinded with dorana oil. (Kumarasamy: 1962.179)

Many experiments had revealed that the ancient painters had used lime stones containing Ascenic Sulphide to obtain the yellow colour. Mud hiriya and metal stone hiriya had been used for wood and pottery painting. Equal portions of gokatu extracts, hiriya and red saffron mixed with old jack gum had been ground to get the yellow colour. Furthermore, the roots of the jack tree cut finely, mixed with pure water and kept aside for a day. Thereafter, drained and mixed with a little yolk of eggs, guruga, siwanguru, saffron and grinded together and lastly adding coconut toddy. There had been another way of obtaining the yellow colour without using the hiriya. According to lab tests, hiriya containing Ascenic Oxide had been used for the red colour and this had been confirmed by scientific analysis process. (Seneviratne B.J.N,2018:84)

The methods used by painters to obtain the black colour is a complex one. For this, jack gum, kekkunu or dorana oil and haldummala had been used. All these had been mixed and ground with pieces of cotton cloth and burnt in a closed pot. Thereafter, the dust settled in the covering had been collected which was named 'Andun deli'. The product which is oily does not dissolve in water and some other solution had been used to make it into a liquid. There had been many methods of obtaining the black colour and those methods had been confirmed by scientific analysis (Seneviratne B.J.N,2018:84). As per the scripts written in palm leaves, the manufacturing process of the black is as follows:

“Black soil of the sea roasted in a pot, ground finely and half of it had been mixed with sulphur. Thrice of that amount of Thibiri extract poured on to an identical amount of coconut toddy with pottery clay and cow dung mixed with one portion of the sulphur mixture and burned together. The residue had been dissolved in coconut toddy, reduced to half and mixed with sulphur mixture and a third of that mixed with Dummala oil and boiled to get the black colour”(Lagamuwa: 2006.270).

To make the red colour, painters had used finely ground red colour guruga and this had been used for painting in Sigiriya and Polonnaruwa thiruvannamalai statue. In some instances,



ground sagalingaum imported from India mixed with extracts of Rath Mal had been used. Also some painters had used Yellow hiriya and red hiriya in equal portions mixed with the extracts of milla, gommalu and gokatu to get the red colour. There is a doubt about the red pigments importing from Siam. (Thailand). Equal quantities of Hiriya, gokatu extract, mercury, sal ammoniac, borax and white lead ground with dorana oil had been used to make the red paste. The paste so prepared had been applied to places so required and polished using the divi dela to get the extra shine. This process had been confirmed by scientific analytical process. (Weerasinghe,1994:23)

Even though the blue colour had been used very rarely by local painters, it had been very popular in the 19<sup>th</sup> century. The details written in the palm leaves reveal the way in which the blue pigment had been prepared. Extracts of external layers of Wal waraka, bomi, cotton, asethu bo, thotilla and thibiriya, mixed with white of egg, ground together with roasted silica and mixed with alcohol and extract of endaru and boiled in a pot which forms the colour blue when settled. Extract of nil avariya boiled and mixed with alcohol, is another way of making the colour blue. Later year, the robin blue used to was the cloths have been used. However, the blue colour in Sigiri paintings is quite different. As per the experiments reveal, the blue green appearing in them has been known as Terre Verte- $\text{Fe}_2\text{O}_3$ , (Wickramasinghe,2002: 43) by the experiments carried out on 2013, it was proved for certain that the blue green appears in the Sigiri paintings is a oxalate named whewellit ( $\text{CaC}_2\text{O}_4\text{H}_2\text{O}$ ), a mineral obtained from the vicinity of Sigiriya. (Seneviratne B.J.N,2018:84)

The Buddha statues created during the Kandy style had been in three sizes namely, large, medium and small. The statues made out of stone had not been done during this period. Common materials used during the period had been brick and lime plaster. These materials had been used to create the reclining statues seen in the central as well as Southern and western regions. Very commonly, clay had been used to make the statues during the Kandian period. Herein, one portion of clay found in caves, with half of that quantity of ashes of paddy husk and double quantity of sand well grinded together finely to form a paste. Also, clay found in fields mixed with Imbulpulan had been used to make a paste. There had been instances, where cotton wool and bees honey had been mixed. In order to make the binding media strong and long lasting, ancient creators had used sufficient quantity of clay mixed with silica together with gum. Whether it is clay or lime, they had made it a point to make the paste firm to avoid cracking and bursting. To make the binding stronger in statues, oils such as cotton oil, gingerly oil or wood apple gum, and jaggery trickle, uk treacle had

been used with clay or lime paste. Anyway use of clay had been the oldest style and this runs as far as the regime of King Pandukabaya during whose time, the statues made out of clay had been offered to demons as a gesture of good will (Wijesekera,1993:203)

The manner in which the selection of architectural creations for special painting processes had been done, likes and dislikes of the then generations could be identified. There had been temples where the base had been made using bricks and clay, kabok and lime, bricks and lime etc. All the temples other than those made out of wadichchi wall, are large in size and the Buddha statues and statues denoting Gods, carvings in makara pandol (*Makara Thorana*) could be considered large in size. The said temples have a high strength value and coated with a strong lime paste well smooth and colours have been applied. These paintings are still very colourful and shiny due to the methods used by the ancient painters when making colours which prove the expertise of the techniques applied by them. However, even the materials used had been variable, the original features had been unique.

Among the above, special attention will have to be given to Kandyan and southern styles where many coloured murals and paintings are seen compared with remains of Anuradhapura and Polonnaruwa.

## **2. FACTORS-CARRIER, GROUND, PIGMENT, BINDING MEDIUM, GUMS, OIL AND RESINS.**

**2.1. Carrier or support:** term used as surface on which paintings executed. With the discovery of oil as binding media in mural paintings, carrier could be rock-cut caves, temples, palaces, brick walled structures, monasteries made up of adobe structures etc.

**2.2. Ground:** term used to mean the surface materials of the carrier, which is applied as a plastic mass made by mixing certain inert materials with adhesive, letting the mass to dry so that a smooth surface can be obtained on which drawing/painting work can be executed. Materials used generally for preparation of Lime, Clay, gypsum, kaolin, white pigments (white lead, zinc or titanium white), all inert materials. To make the powder hold in a firm layer on the support or carrier, some type of adhesive is needed and generally animal glue or Vegetable glue is used.

### **2.3. Preparation of Plaster**

Another important constituent of plaster is the addition of organic materials, a feature still in use. The different organic materials which were opted for use in the ancient time in Sri Lanka are glue, oil and many plant products, etc. The organic materials not only diminish the chances of cracking of plasters but also increase its overall binding capacity. The mix

proportion of binder to aggregate and the chemical composition of the binder are mostly determined by quantitative chemical analysis.

Before commencing the drawings, a clay coating mixed with liquidized plaster has to be laid on the surface of the walls and the ceiling of the cave. The clay used in sculptor too is prepared in the same manner. Liquidized plaster was prepared by boiling aralu nuts, husks of kahata (*Careya arborea*), Kurumba water (water of very young coconut) and the husk of Godapera together. Clay had been prepared by clay of the ant-hill powdered and mixed with cotton wool and bees honey had been added to the mixture and subsequently mixed with liquidized plaster.

**2.4. Pigments:** Pigment (colour) + binding medium = paint, applied on the ground. There are many types of pigments presently available for use. Pigments can be obtained / used from naturally occurring colours (earth colours), synthetic pigments (both organic and inorganic) and natural organic pigments obtained from animal or plant origin.

Pigments can be classified as according to their origin.

Naturally occurring pigments in the form of earth colours and minerals, ochres and iron oxides, Raw Sienna, Burnt Sienna, Raw Umber and Burnt Umber etc. Red Ochre, anhydrous  $\text{Fe}_2\text{O}_3$ , and the hydrated Yellow Ochre ( $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$ ). Charcoal, or carbon black, has also been used as a black pigment since prehistoric times.

Animal or plant origin Pigments Madder lake, indigo, bone carbon, Indian yellow.

Synthetic pigments Lead white, Prussian blue. Alizarin lake, pigments like azo and diazo compounds which are the source of wide spectrum of colors.

Pigments that are chemically incompatible in water colour may often be mixed in oils with much less chances of their interacting with each other, and when resin is added to the oil it is even possible to use colours made from mixture of pigments containing sulphur and copper without fear of subsequent chemical interaction which would lead to the loss of brilliance. Chemical changes occurs, they are irreversible.

Ultramarine blue is occasionally found to have lost its brilliance to white appearance due to the action of acid, produced from ill-advised process of cleaning in the past. Brilliant green of copper compound changes to dirty brown due to action of alkaline solutions.

Two different Red pigments due to ageing / chemically altered to black which are as below:

- i. Cinnabar  $\text{HgS}$  and
- ii. Red lead ( $\text{Pb}_3\text{O}_4$ )

The possible cause of alteration of red to black and Cinnabar i.e. meta-cinnabar (hexagonal) to meta-cinnabar (cubic or amorphous)

Red lead  $Pb_3O_4$  to plattnerite [ $\beta$ - $PbO_2$ ] and anglesite [ $PbSO_4$ ].

Blue pigment Lapis lazuli  $(Na,Ca)_8(AlSiO_4)_6(S,SO_4,Cl)$

dark blue to light blue fading of lapis lazuli has been attributed to the breakdown of the Al-O-Si bonds

White lead  $(PbCO_3)_2 \cdot Pb(OH)_2$  turn black in presence of  $H_2S$  as Lead sulfide.

## 2.5. The preparation of colors.

The subject of preparation of pigments and the tools used in painting rock murals in ancient tradition formula and methods of pigmentation differ from color to color.

**Yellow** - The yellow color is prepared from a tree called Gokatu (Gamboge/ *Garcinia morella*) and made from the glue latex taken out from this tree. The trunk of the tree is damaged with a point of a knife and left to ooze and the extract is left for about three days for it to become hardened on the tree trunk. Thereafter it is removed from the tree and kept in a water vessel for about a day for it to absorb the water and strained after crushing hard. This extracted substance is gummy and yellow in color. Generally it is possible to obtain only a very small quantity of extract from one tree. (less than 10 grains in weight approximately).

**Red** - Sadialingum (Cinnabar/ $HgS$ ) is powdered and mixed with glue from the wood apple 'divul' (*Feronia elephantum*) tree. This mixture is then diluted in water. The Divul glue gives the colour and an adhesive texture.

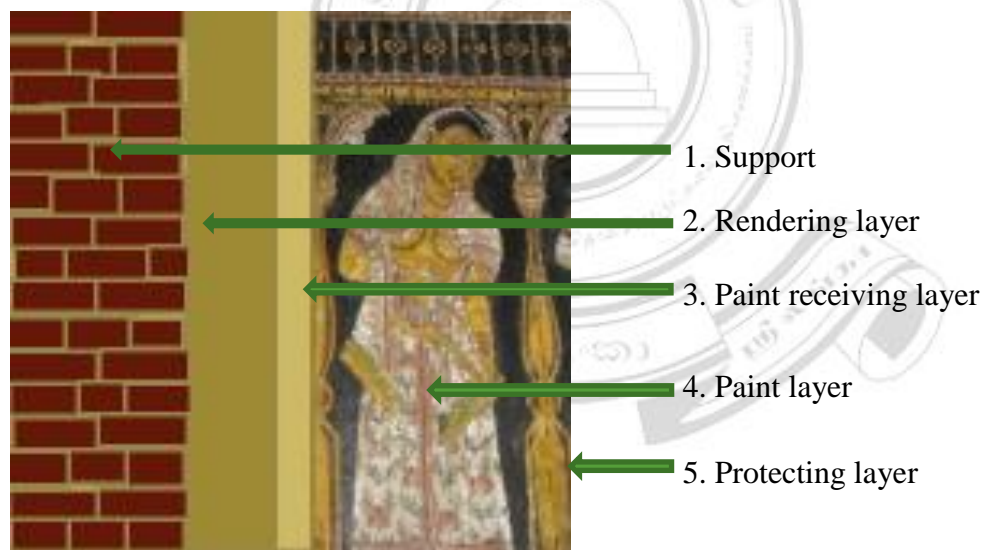
**Blue** - The process of making blue is more complicated than the yellow and red. First the leaves of the kola nil or averiya (*Indigofera tinctoria*) are grinded and then aralu (*Terminalia chedbula*) or Galnat is added to it. This mixture is then buried underground for at least six months for it to mature to get the required consistency and texture and finally the glue of *divul* or wood apple is added before it is used.

**White** - A type of clay called macula matte ( $Kaolinite/Al_2Si_2O_5(OH)_4$ ) which is not commonly available is used in preparing this colour. This clay is ground finely and mixed with water and then strained and mixed with wood apple gum. There is a particular place where this clay could be obtained (Ulpatala in Pothuvila) and this clay is found at a depth of 10ft and is milky white in colour. This had been named as Maturata mukulu obtained from maturate.

**Black** – Resin and the gum obtained from jack fruit is kept for some time, and powdered together. This mixture is put in to a clay pot and added fire while covering the pot with a newly made clay pot. The soot which gets collected in the lid is finally mixed with the wood apple gum to form the paint.

In order to increase the quality of the pigments, it is mandatory to grind the ingredients finely for a long time. This is commonly done by the students training under the painters. The ground ingredients are mixed with water and grinded again. Most successful method is to mix this mixture with wood apple gum and water before using. Kandyan painters as well as southern painters have followed this system of making the pigments with the local ingredients and used wood apple gum as the binding media. There had been instances where curd had also been used as a binding media. Initially, the curd is separated from water, put into a cloth and boiled for several hours for it to get harden. Thereafter it is mixed with lime and used. This type of binding media could be kept also for future use.

Painting is a stratified structure built up of series of layers which are fused and interlocked, when it is in sound condition.



*Figure 7: General cross section of the Mural Paintings in Sri Lanka*

**2.5. Binding medium:** When binding medium is gradually added to pigments, each pigment particle is progressively covered by a film of absorbed binding medium. After that the voids between the pigments particles are filled up this is referred to as interstitial binding medium. At the beginning, the film must be sufficiently liquid to be able to wet the substrate. The substrate should be porous & the film should not shrink on drying. When quantity of

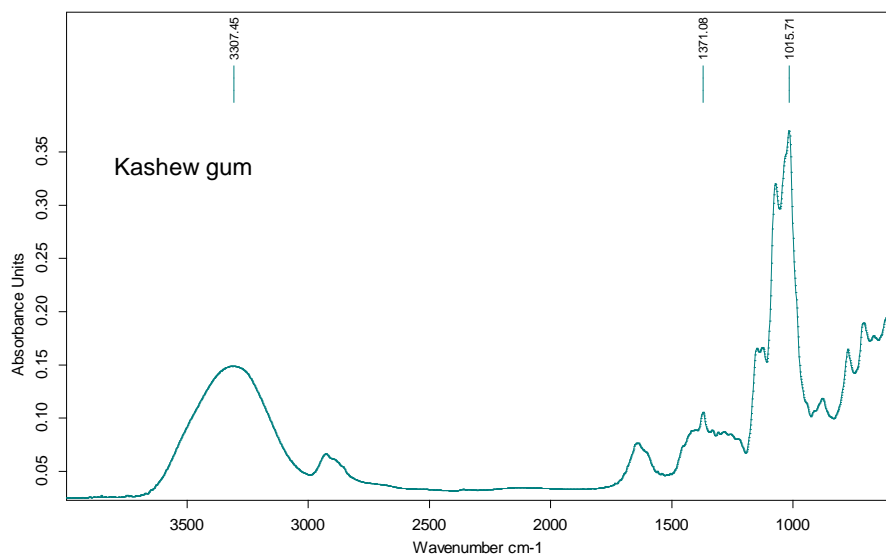
pigment in paint is progressively increased, it may be seen that the opacity increased rapidly. Oil is used as binding medium in oil paintings.

**2.6. Gums:** group of non-crystalline structure less materials, occurring widely in plants composed of mainly carbon, hydrogen and oxygen forming viscous solution. Chief characteristics are when dissolved in water forms clear solution and swell when soaked in water. This differentiates gums from resins. Gums are of vegetable origin. Gum is obtained mainly bark, stem etc. of certain trees.

For an example traditional painters in Sri Lanka have been used Kashew gum and wood apple gum(*feronia elephantum*). Wood apple, is a species of tree native to the Indian subcontinent and Southeast Asia. Wood apple glue is a by product obtained as a result of certain metabolic mechanism of plants and trees. The gum is clear, bright and brown-colored gum, multipurpose by product. Natural gum obtained from plants are either water soluble or absorb water to form a viscous solution.

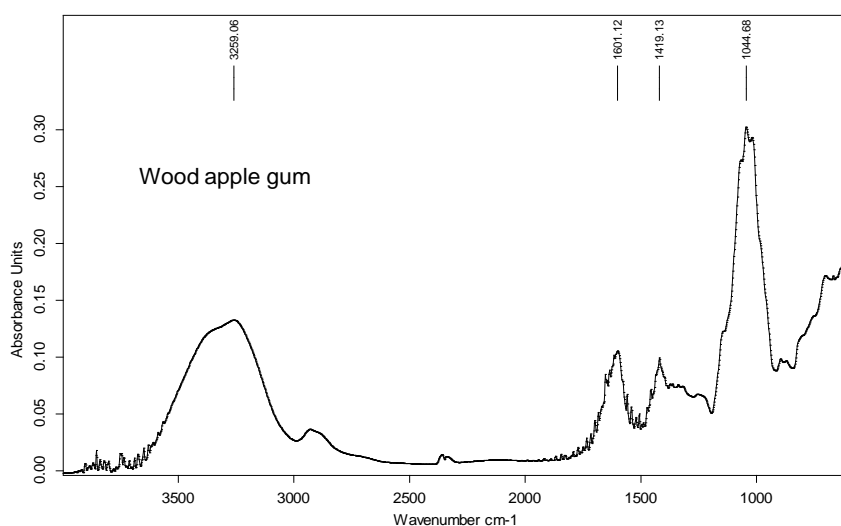






|                                      |            |            |
|--------------------------------------|------------|------------|
| H:\FT-IR DATA\2013\0924\kashew gum.0 | kashew gum | 24/09/2013 |
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Page 1/1



|                                           |                 |            |
|-------------------------------------------|-----------------|------------|
| H:\FT-IR DATA\2013\0924\wood apple gum3.0 | wood apple gum3 | 24/09/2013 |
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Wood apple gum (*Feronia Elephantum*) and cashew gum are also similar.

## 2.7.Oils and Resins

**2.7.1. Drying oils** are used as binding medium in oil paintings. Oil is said to be drying when after being spread out in a thin layer, it forms a continuous film within a reasonable time (in few days). Rate of drying of oil can be increased by heating to 150-160°C with small amount of salts of lead, cobalt or manganese, boiled oil obtained. This procedure induces the start of oxidation & polymerization. The material formed is more viscous and dries more quickly.

Resins are hydrocarbon secretion of many plants particularly coniferous trees. Natural resins have been used since ancient times, mainly as varnish and adhesive. They are often mixed with oils or waxes in order to improve their toughness or adhesively.

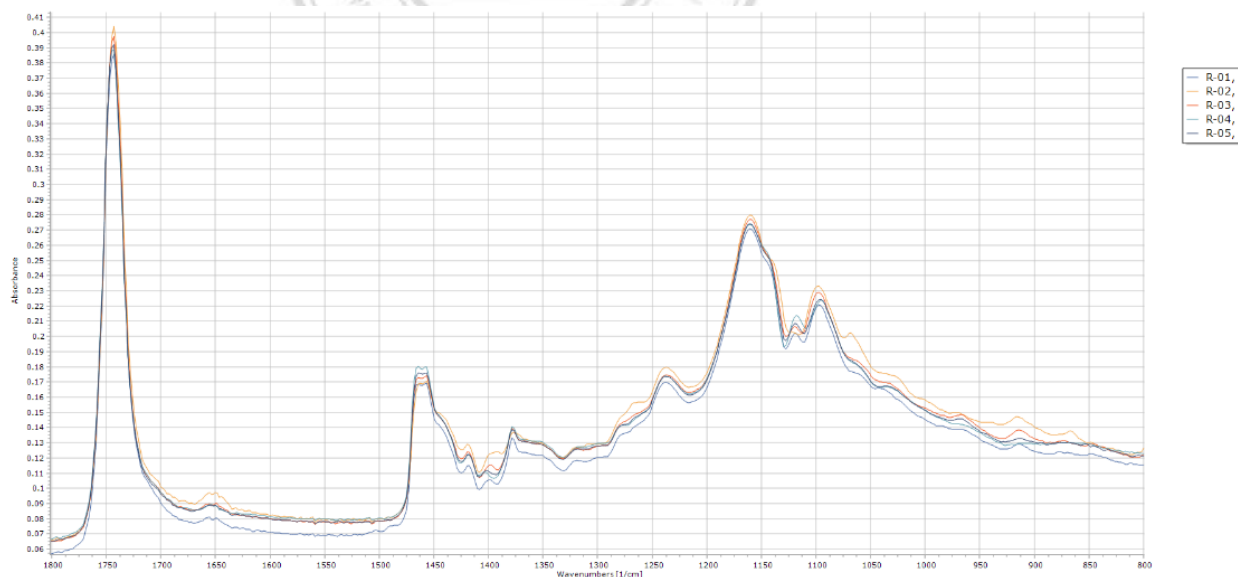
**Egg yolk oil** - Obtained from egg. Very low drying power.

**Dorona oil** - (*Vateria copallifera* )

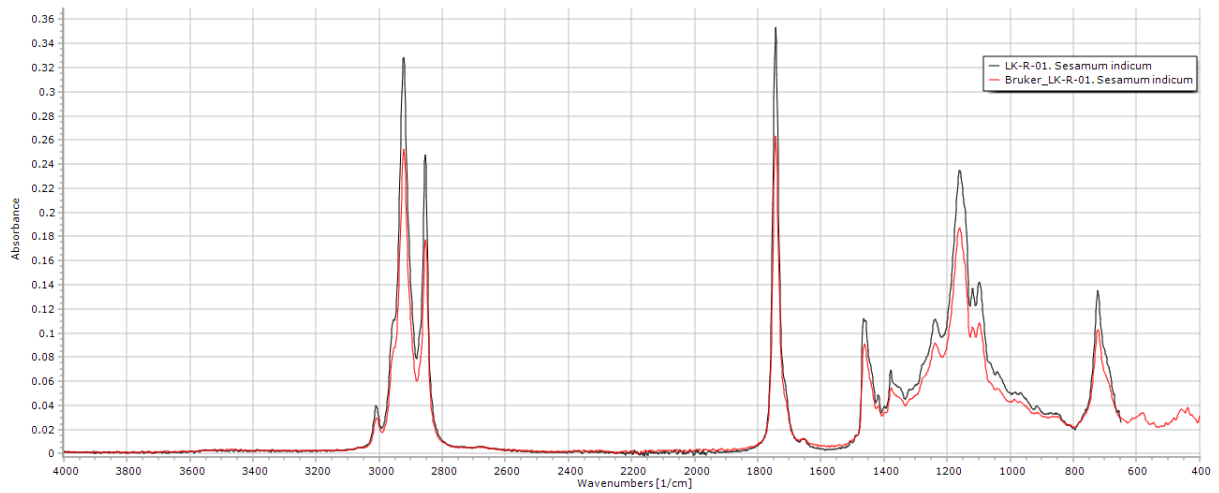
**Haldummala** -(*Dipterocarpus glandulosus*)

**Sesami oil** - (*Sesamum indicum*)

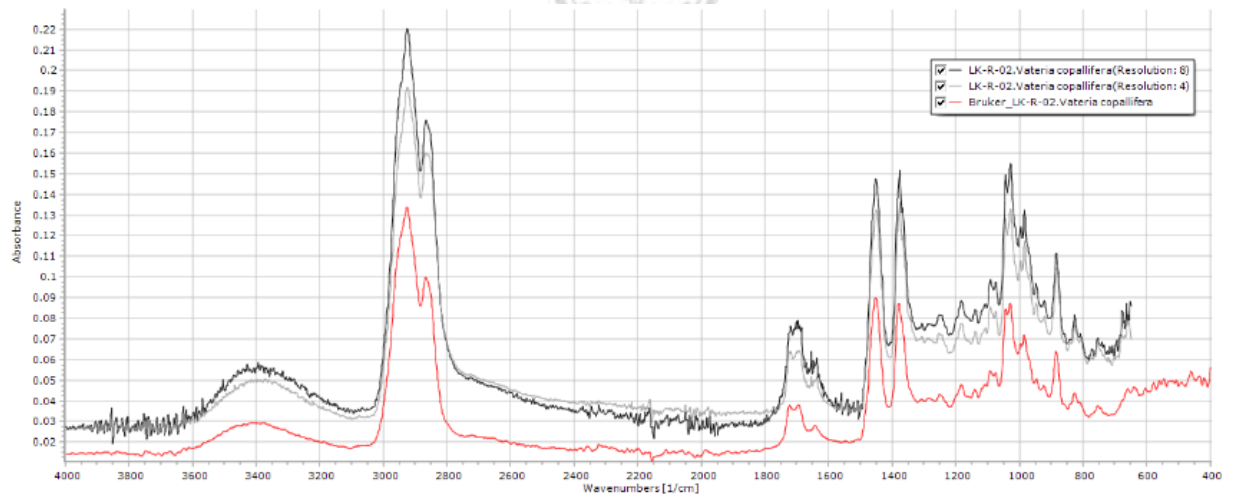
| LK-R-01                                                                | LK-R-02                                         | LK-R-03                   | LK-R-05              | LK-R-06                |
|------------------------------------------------------------------------|-------------------------------------------------|---------------------------|----------------------|------------------------|
| Sesamum indicum                                                        | Vateria copallifera                             | Dipterocarpus glandulosus | Limonia acidissima L | Anacardium occidentale |
| Flavonoids                                                             | Sitosterol                                      | Stilbenoid oligomers      | Flavonoids           | Flavonids              |
| Tannins                                                                | Dipterocarpol                                   |                           | Tannins              | Tannins                |
| Alkaloids                                                              | β-amyrin<br>[C <sub>30</sub> H <sub>50</sub> O] |                           | Terpenoids           | Terpenoids             |
| Phenols                                                                | Copalliferol A                                  |                           | Glycosides           | Glycosides             |
| Saponins                                                               | Copalliferol B                                  |                           | Alkaloids            |                        |
| Lignans sesamolin<br>[C <sub>20</sub> H <sub>18</sub> O <sub>7</sub> ] |                                                 |                           | Phenols              |                        |
| Sesamin<br>[C <sub>20</sub> H <sub>18</sub> O <sub>6</sub> ]           |                                                 |                           | Saponins             |                        |
| Pinoresinol<br>[C <sub>20</sub> H <sub>22</sub> O <sub>6</sub> ]       |                                                 |                           |                      |                        |
| Lariciresinol<br>[C <sub>20</sub> H <sub>24</sub> O <sub>6</sub> ]     |                                                 |                           |                      |                        |



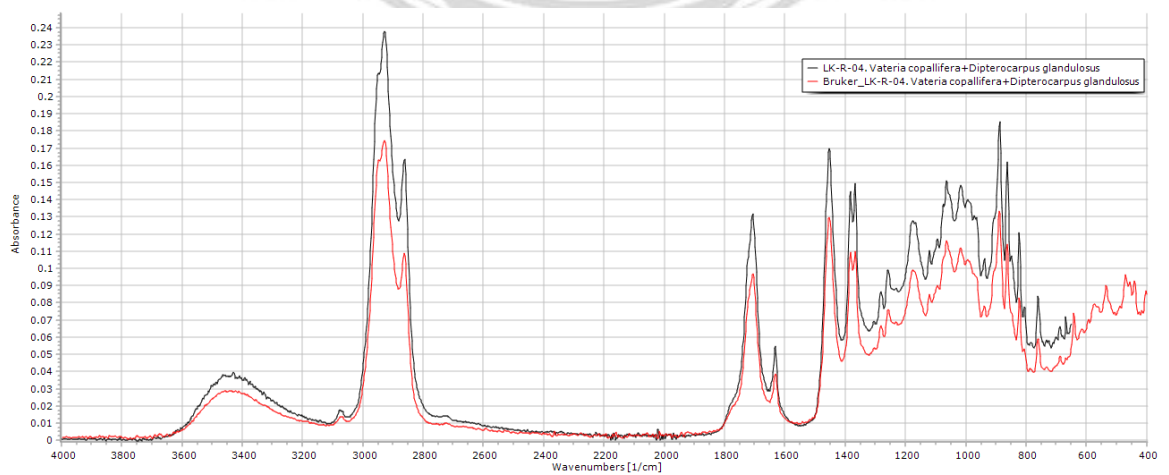
*The spectrum for Sesami oil ,Haldummala and Dorana oil has a similar resemblance to natural tree risings.*



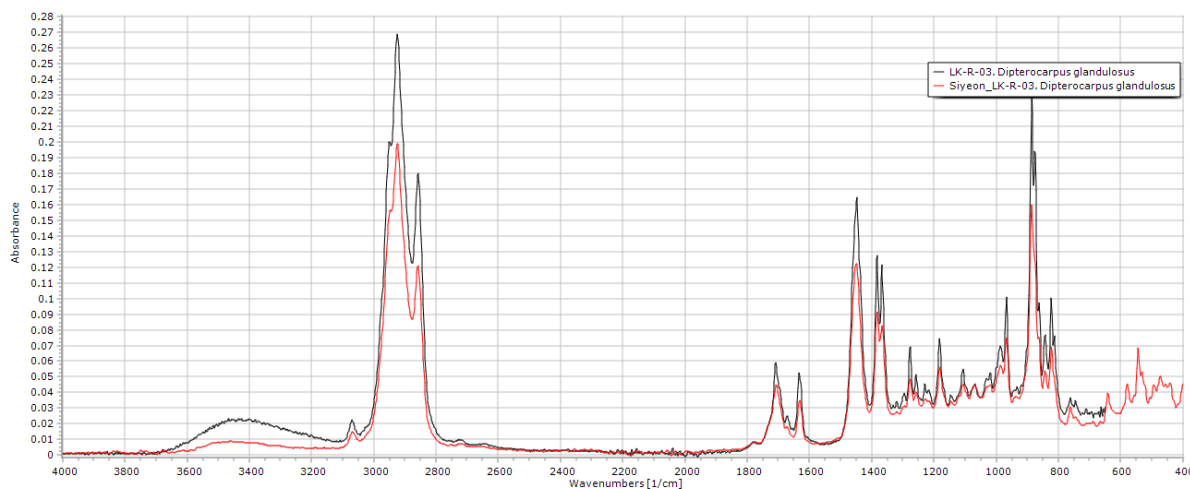
*Sesami oil - (Sesamum indicum)*



*Haldummala - (Dipterocarpus glandul)*



*Dorona oil - (Vateria copallifera )*



*Vateria copallifera + Dipterocarpus glandul*

There are several oils and resins available with which to make as a varnish. Dorona oil and Haldummala were used as a final coating for a Mural paintings to protect the picture, to enhance its appearance, to give depth and luminosity to the colours. It can, for example, make the surface appear either matte or shiny, or protect the paint film from chemical reactions with the atmosphere and from mechanical abrasion. All natural resins becomes brittle, disintegrate with age, and develop yellow/dark colour.

There is evidence to prove that the painters had used a protective substance to protect the paintings from dampness. This is commonly seen in southern paintings and those painters had named this as an application which had been made in three ways and those methods have been confirmed by scientific analysis. (Seneviratne, 2018:84)

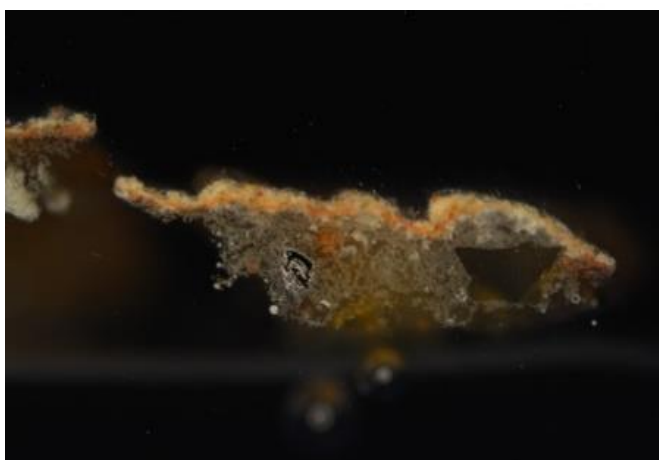
1. Clean dummala powder mixed with dorana oil, boiled and set aside for it to get cool (This dries quickly and gives a deep shine).
2. Gokatu paint with a deep shine and a protective which dissolve in water.
3. Heated Keppitiya gum used as a single application.

### 3. LABORATORY ANALYSIS

Result of the analysis of the materials used for paintings, namely the plasters and pigments including techniques of painting are summarized below.

**Sigiriya** - Sigiriya paintings have the characteristic of fresco as well as of tempera. This is because the painting were etched on wet lime plaster but a binding medium had been mixed with the pigment. In early period murals, the composition of the plaster had been either clay and sand or lime and sand. De Silva (De silva ,2009: 40) had observed that the first layer of the ground comprised of a ferruginous clay which could well have been derived from termite nests, and prepared with an admixture of chopped straw, rice (paddy) husks,

and in some occasions dried leaves and tiny twigs included, with a binding medium containing an emulsion (in Water) of a drying oil (Sesami/ Dorana) and a vegetable gum (wood-apple). which aligns with my observations as well.(2013,2018 : GCMS/FTIR) The second layer of ground consist of a mixture of freshly burnt lime and light coloured clay and sand to which a vegetable gum and oil in water had been mixed. The Sigiriya plaster has a layer of clay and sand over which another layer of lime and sand is mixed with paddy husk, straw jute and wood apple gum. My conclusion as that of R .H de Silva, is that Sigiriya paintings are done in a technique which could be called as “ Gum mixed emulsion tempera ”.



*Figure 8: Sigiriya plaster with pigment*

With regard to pigments used, according to Dhanapala, natural minerals in blue and green color pigments had been used in Sigiriya. But Nanda Wikramasighe and De Silva had indicated that blue and green (Lapis lazuli and terre verte) would have been obtained from natural earth.(De Silva ,2009: 37). According to my conclusion, terre-verte and Whewellit – $\text{CaC}_2\text{O}_4\text{H}_2\text{O}$  obtained from the soil in the Sigiriya site had been used in respect of blue and green and the comments regarding the other colours are the same as theirs.

In the late period in murals of Dambulla, Degaldoruwa, Katheluwa, Thelwaththa and Mirissa, completely different plaster (tempera) had been used in which clay was the major component in Degaldoruw and Dambulla where in Mirissa, lime and organic materials like coconut fiber and cotton had been used. For the final coat of plaster kaolin Kolinite -  $\text{Al}_2\text{SiO}_5(\text{OH})_4$  been used in Dambulla, but in Mirissa lime had been used in the paint receiving layer. Artists of the early period used a limited number of colours like red, yellow, and white and had occasionally used black, green and blue. In Sigiriya red ochre, yellow ochre Terre-verte Whewellit – $\text{CaC}_2\text{O}_4\text{H}_2\text{O}$  and lamp black had been detected.

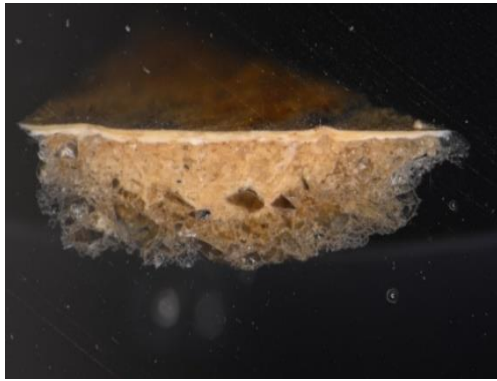
**Tiwanka** -Three layers could be seen in the plaster layers. The composition of the first layer is lime, sand and clay, the second layer is lime and sand while the third is only lime. As in Sigiriya, gum and oil emulsion were used to make the tempera plaster. Even though there are similarities, in both Sigiriya and Tiwanka, due to the difference of techniques used in Tiwanka when compared with Sigiriya, the solidity of paintings is less at the Tiwanka Image House. Even though gum mixed oil emulsion tempera had been also used in Tiwanka, it is observed that the technique is more similar to the tempera and suggest that the Tiwanke had been based on tempera technique rather than gum, oil mixed emulsion tempera.



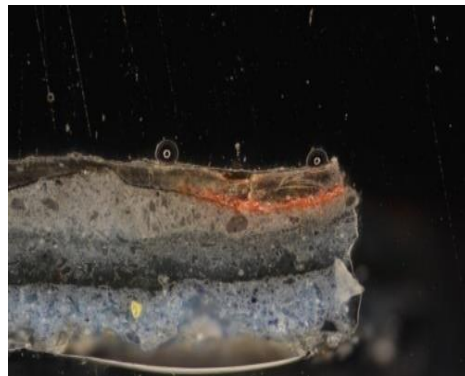
*Figure 9: Tiwanka plaster with pigment*

**Dambulla**-In the analysis, three plaster layers have been observed, first and second layers consists of clay, sand and stone grit composition with presence of coconut fibers, while the third layer is fine clay. In Dambulla, white and barite cinnabar had been used for red and lamp black. It is observed that the tempera technique had been used in Dambulla. Unlike in southern paintings, no coating such as Dorana oil with haldummala had been applied over the paintings to protect the paintings. However, due to the use of natural gum like wood apple in pigments and formation of a patina (formation of carbon), paintings had been protected from deterioration. In the event of the patina being damaged, since the absence of a protecting coating, they will be water soluble, which will result in destruction of the paintings. This had been the reason for not attempting a wet cleaning of the painting surface in Dambulla up-to-date.





*Figure 10: Dambulla*



*Figure 11: Mirissa*

### **Different Pigment and Plaster layers**

Even though the paintings at Mirissa, Thelwattha and Katheluwa had been done using tempera technique, they are entirely different from the features of Sigiriya and Tiwanka. Lime and sand had been used in the plaster but pigments have been mixed with wood apple gum, dorana oil and haldummala. However, the technique used for plaster and pigments is different from the tempera technique applied in the early period. Due to this reason, a protective coating had been applied consisting of haldummala and dorana oil, but this protective coating is weak and not long lasting. This had been the cause for flaking after about 200 years. Hence, we could come to a conclusion that there are differences in the tempera technique applied in Thelwaththa and Kathaluwa from that of Sigiriya and Tiwanka Image House.

Accordingly, from the information provided above, we could come to a conclusion that the easiest and the most reliable method is the use of the modern scientific analysis method to find out the true facts of the procedure followed by painters who have invested much effort and dedication to maintain the quality.

### **4. CONCLUSION**

In considering the above data, it is evident that the painters had sustained the elegance of the painting tradition which they had inherited from their older generations and carefully improved its quality with much dedication. Even though, some painting methods had been documented and preserved, the prominent feature is that most of them had been passed on to the next generation without hindering its unique identity. Yet, this industry could not be continued purely by learning the techniques, but by their innate talent and improving efficiency all by themselves with the assistance and guidance of the teaching generation. These painters had systematically learned the techniques of the industry and thereafter had

improved efficiency with hands on experience and thus had become experts. This had been the prominent feature of this painting generation.

Following the steps from the initial stage of selecting the base, preparation of the plaster, making of pigments, organizing the sketches using raw material, improving the sketches, application of colours and thereby completing the painting, is a result of a very complex procedure administered by the painting generation of the Anuradhapura period and carried on by the southern Painters. Gathering above information is a part and parcel of the process, in order to proceed with the research and expose findings.

Paintings selected from Sigiriya, Thiwanka, Dambulla and other sites represented a cross section of the various periods as well as of regions of Sri Lanka. Results of the analysis of the materials used for paintings such as plasters and pigments are summarized. Early period murals like in Sigiriya and Thiwanka, composition of the plaster were either clay and sand or lime and sand only. They have also used organic materials like paddy husks, straw, coconut fibers etc. Analysis of binding medium of the paint, apart from the paint sample FT-IR spectra of the material namely Sesami oil, Haldummala, Dorana oil wood apple gum and cashew gum were taken. The spectrum for Sesami oil, Haldummala and Dorana oil has a similar resemblance to natural tree resins. Wood apple gum (*Feronia Elephantum*) and cashew gum are also similar. Findings reveal the existence of a minute trace of Wood apple gum, Sesami oil and Dorana Oil in the samples of Sigiriya and Thiwanka. Mirissa paintings contain Dorana oil but in Thiwanka and Sigiriya paintings, the resin could be either Dorana or a similar Sesami oil. The conclusion of the analysis is that the protecting layer containing a major portion of Dorana Oil or the paint layer mixed with Dorana oil had disappeared in Mirissa paintings with the course of time, the existing binding media and resin could be the ones which had been used in recent conservation work. However, Wood apple gum and a trace of resin is present in Dambulla and Thiwanka paintings.

Painters in Sri Lanka had used resins as binding media for the execution of murals. A kind of resin known as haldummala obtained from the hal tree (*Vateria copallifera*) and dorana oil which is obtained from dorana tree (*Dipterocarpus glandulosus*) are boiled together and mixed with the pigment. In some instances, the artists had used this mixture as a preservative coating or final coating for a painting to protect the picture, enhance its appearance, give depth and luminosity to the colours, and unify the appearance of the surface. For example, it could make the surface appear either matt or shiny, or protect the paint film from chemical reactions from the atmosphere and mechanical abrasion. Scientific

analysis of the drying oils shows the overall result that the constituents of all the oils used for painting are largely the same. Even though, the spectrum for Sesami oil, Haldummala, and Dorana oil has a similar resemblance to natural tree risings.

The painting technique used in the paintings of Sigiriya and Thivanka is completely different from the tempera technique used in Kandy and Southern traditional paintings. Sigiriya and Thivanka's pigment has been coated with adhesive and drying oil, so it took some time for the plaster to absorb the pigments as well.

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## **Walking in the Sun's and Moon's paths: Astronomical orientations of the megalithic burials of Palippotana, Sri Lanka**

**Thilanka Manoj Siriwardana, Nadeera Dissanayaka, Indika Jayasekara and  
Thusitha Mendis**

*There is a light that shines beyond the world, beyond everything.  
Beyond all, beyond the highest heaven....  
This is the light that shines in your heart...*  
- **Chandogya Upanishad**

### **ABSTRACT**

The present work will discuss the measured angular orientations of megalithic tombs recorded from Palippothana, Sri Lanka. The spatial orientation of each slab and burial was studied whereas it was identified the orientations are properly coinciding with the annual solar solstices and equinox, minor lunar standstill and major lunar standstills, which was not previously identified from the megalithic burials in Sri Lanka. The burials are built according to the changing directions depending on the above celestial events' movements. Though it is too early to define the motives of such archaeoastronomical uses, the possible trends in native and foreign burial orientation were discussed. Further, the traces of such practices in the Upanishad literature were presented to the other researchers' future consideration.

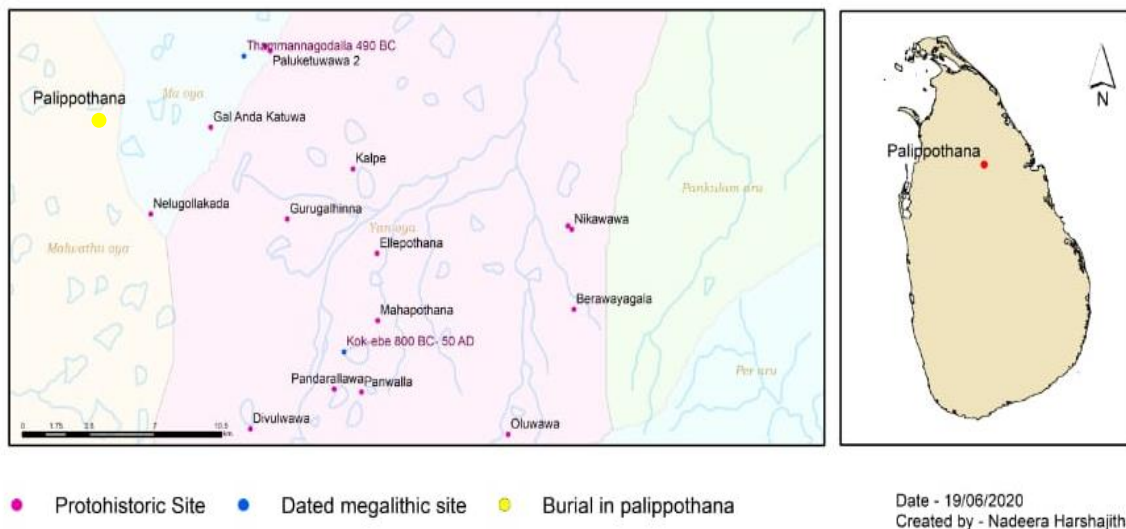
**KEYWORDS:** Megalithic, Orientation, Solstices, Lunar standstills, Upanishad

### **Introduction**

This paper focuses on the astronomical orientation of megalithic burials at Palippothana, Kahatagasdigiliya. During the field surveys, it was noticed the burials are not randomly constructed but deliberately oriented in a range of angles. The reported angle range is precisely overlapping with the annual lunar path and solar path. This will be the first record reported from Sri Lanka of orienting the megalithic burials with such astronomical patterns; hence, only the findings and basic interpretations will be made. Further studies regarding other burials are required to strengthen the idea. Many megalithic sites around the world reported with their orientation with lunar standstill and sun solstices. A. Thom (1971), CLN Ruggles (2015), Lionel Sims (2016), Frank Prendergast (2016) and many others introduced several theoretical underpinnings to understand this phenomenon in archaeoastronomy and approaches to study the megalithic burials.

The burials constructed by using large slabs are popularly named 'megalithic' and assigned as a cultural trait of Sri Lanka's protohistoric period (Senaviratne, 1984; Dissanayake, 2018). These can be associated with a basic form of religion among the early farming communities, such as an ancestral cult (Somadeva, 2006, 313). Since RW Levers' Gurugalhinna megalithic burial report in 1889 and H. Nevil's discovery of urn burial in 1887 (Kennedy, 2000, 336) and initiation of excavations from 1923-24 by Hocart at Pomparippu following S. Paranavithana's extensive excavations during 1956-57 (ibid, 352)

116+ cemeteries representing these various burial traditions have been recorded from Sri Lanka (Dissanayake, 2018, 3). These studies have produced a vast knowledge of the Sri



*MAP 1: LOCATION OF THE PALIPPOTHANA MEGALITHIC BURIAL IN THE MAVATHU OYA BASIN. YAN OYA BASIN IS IN PINK.*

Lankan protohistory. The megalithic burials in Sri Lanka primarily date to c. 800 BC- 50 A.D.(Mendis, 2017).Stones or slab constructed burials are widely encountered from the dry zone, with few rare records from the intermediate and wet zones.The common types of grave goods reported from the burials are coinciding with the introduction of iron technology to Sri Lanka from India. The emergence of the Iron Age of Sri Lanka was dated to 900-600 BC, and distinguishing features were the iron technology, pottery (notable Sri Lankan variants of Black and Red Ware/BRW), the horse, domesticated cattle and paddy cultivation (Deraniyagala, 1992, 709) which laid the foundation to the hydraulic civilisation of the country.This knowledge base provides us with a broader understanding of social formation, but we need to ask new questions, take different approaches and novel thoughts to disclose further information from this valuable material culture.For instance, a recent inter-site spatial pattern study shows the burial builders had concerns of flooding, water and resource availability (Katugampola, 2015).

While there is copious literature on the megalithic-protohistoric studies in Sri Lanka, the burial orientation has not taken into account sufficiently. The only available records including orientation of the skeletons (Ragupathy, 1987, 119, 124), slab orientation in a single burial (Liyanage, 2006, 32) and mentioning the orientation of bodies in the Indian megalithic burials (Sasitharan, 2012, 83). Overall, however, the orientation of megalithic tombs in Sri Lanka has not been subjected to a discussion earlier.



The Palipbothana burial complex is a newly recorded site exposed after clearing the vegetation for slash-and-burn farming. During the field survey, 81 burials and related remains were recorded from a ca. 20,000 sqm area. Burials have signs of advanced iron technology usage in the constructions, with four burials showing different levels of chisel usage. Following the survey, three burials were excavated, including a cist with a capstone, a cist without a capstone and a double orthostat and the radiocarbon dates are still being processed and will be published in the project publication. The Black and Red Ware (BRW), the chisel marks, burial findings (iron and copper objects, beads) and other features assign the burial complex from the mid to late protohistoric period. This paper considers the cist and double orthostat burials' measured orientations in Palipbothana and explores two thematic ideas: the attributes of directed burials and possible culture causatives for those particular patterns. The findings on megalithic orientation will contextualise limited to the present burial complex as no other records are available yet.

## LOCATION

The burial complex is located at  $8.522350^{\circ}$  N and  $80.667340^{\circ}$  E, an elevated land stretch in N-S direction and rise to 161msl from the surrounding flat peneplain of 140msl in the uppermost region of the Malvathu Oya and the Ma Oya basins. It is in the Palippotana village of Kahatagasdigiliya Divisional Secretariat in the North Central Province. Geographically, it is located in the Highland Series and belongs to the Charnokite rock formation. Climatically the site is in the Dry Zone. The surface is covered with low-humic gley soil with prominently underlying red and brown soil. The burial distribution is limited to the southern slope and the 159-154 m contour region. Three series of low elevated granitic gneiss outcrops and other highly weathered rock boulders are found in both east and west to the burial ground, used as the source of the burial stones. These can be identified as exposed tips of a long underground ridge visible at the Natunkanda rock outcrop located southwardly and then at the Hadagala and Veddakanda at the north.

## METHODOLOGY

The data presented in the study are drawn from field exploration, and excavations were done by the authors of this article. To find the expansion of the burials, a  $5\text{km}^2$  area centred on the burial ground of the Palipbothana was surveyed using the transit field walk method. The transits were laid by considering the current land use patterns, the vegetation and the distribution of the tanks. All the burials were mapped and drawn on 1:20 scale. Only the

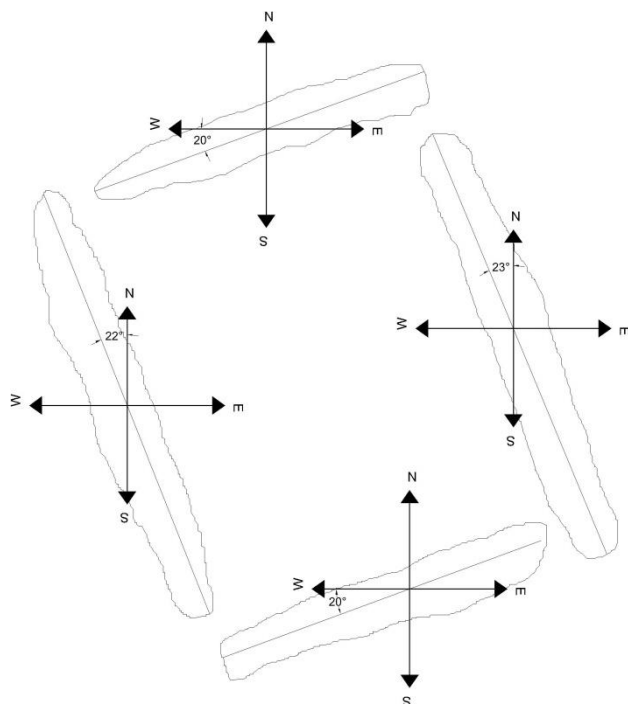


Figure 1 - Method used to record the angle of the slabs

azimuth bearings. Recording method is illustrated in figure 1.

The converted tabular data of north-south slabs and east-west slabs were projected separately in a graph with each record's angle. Except for the double orthostat burials, other E.W. projections rotated  $90^0$  and overlapped with the N.S. records. The final projected graph tested along with the solar and lunar paths. The magnetic North bearings are different from the true north; current magnetic declination at Kahatagasdigiliya was recorded (magnetic-declination.com), which shows a  $-1^0 53'$ , negative (west) declination. This is negligible and not corrected in the recorded data.

The term 'cist' refers to the burials constructed by using four slabs or with evidence of such a construction and with or without a capstone. The burial chamber can be square or rectangular. The term 'double orthostat' describes burials with two vis-à-vis slabs and other ends open. The schematic visualisation of the results was created by using Autocad software. The graphs are projected to the west of a matrix, and the number of slabs and burials shown in a graph at the edge of the matrix. The length of the line represents the number of slabs or burials. This creates a comparable graph.

undisturbed slabs were selected to measure the angles. An orienteering lensatic compass was placed parallel to each slab's edge, and the graduation ring used to measure the positive or negative difference of the angle of each slab in relation to north or west and was measured relative to the edge of a slab. Angles were taken to the nearest round degree. At the end, all the recorded data were converted to

## RESULTS

Eighty-one burials and related remained features were identified during the field survey. The burial distribution is linked with the rock outcrops, and four burial clusters could be identified. Fifty-three burials recorded with slabs suitable to take angle readings. There are a total of 149 slabs in the burials, and 113 angles were recorded from slabs ( $n=109$ ) and capstones ( $n=4$ ). The angles and azimuth recordings are given in annexure 01. The remaining slabs come from the burials that are either partially destroyed or not in good condition.

The range of the angles is between  $0^{\circ}$  to  $40^{\circ}$ , and none of the burials exceeding the maximum. While most of the burials fall into the range  $0^{\circ}$  to  $30^{\circ}$  (96.5%), only four slabs with  $40^{\circ}$  (two slabs from a single burial and two isolated cases) and no slab reported in the angles between  $30^{\circ}$  -  $40^{\circ}$ . 28 out of 52 burials shows the same angle occurrence in all of its recorded slabs, which was reported from burials with two slabs ( $n=16$ ), burials with three slabs ( $n=8$ ) and burials with four slabs ( $n=4$ ). Fifteen burials have a single slab or capstone suitable to record the angle. Nine burials have slabs with different angle orientations. In such cases, the most well preserved or longest slab was taken into account, and other angles were disregarded. Fifty-four slabs (49%) in 25 burials are aligned into cardinal directions either with exact magnetic North ( $n=31$ ) or west ( $n=23$ ). Among others, seven burials face S.W., and 17 burials face N.W., relatively to the western slab of each. Fifty-nine slabs oriented into ordinal directions. There are seven single slab burials, where four are facing west, and three are facing north.

Slabs of four double orthostat burials facing exact north and slabs erected east-west direction, except burial 15, which both slabs facing N.W. by a  $15^{\circ}$ - $20^{\circ}$  angle. This burial is also unique among the other similar type due to the slab size, elevation from the ground level, and the fineness of slab preparation. A wall-like construction between the two slabs was identified during the excavation of this burial. Burial no. 10 is another double orthostat but has west-facing north-south oriented slabs, and also, the slabs are not vis-à-vis. It is possibly another burial tradition.

Several noteworthy observations were made from the above cases. Burial no. 25 shows a peculiar orientation of its slabs. Three slabs of the burial are angled  $20^{\circ}$  toward N.E. facing direction. Two separate stone slabs are erected to the west side of the northern section of the burial. One of the slabs is  $30^{\circ}$  angled toward N.E. while the other slabs were

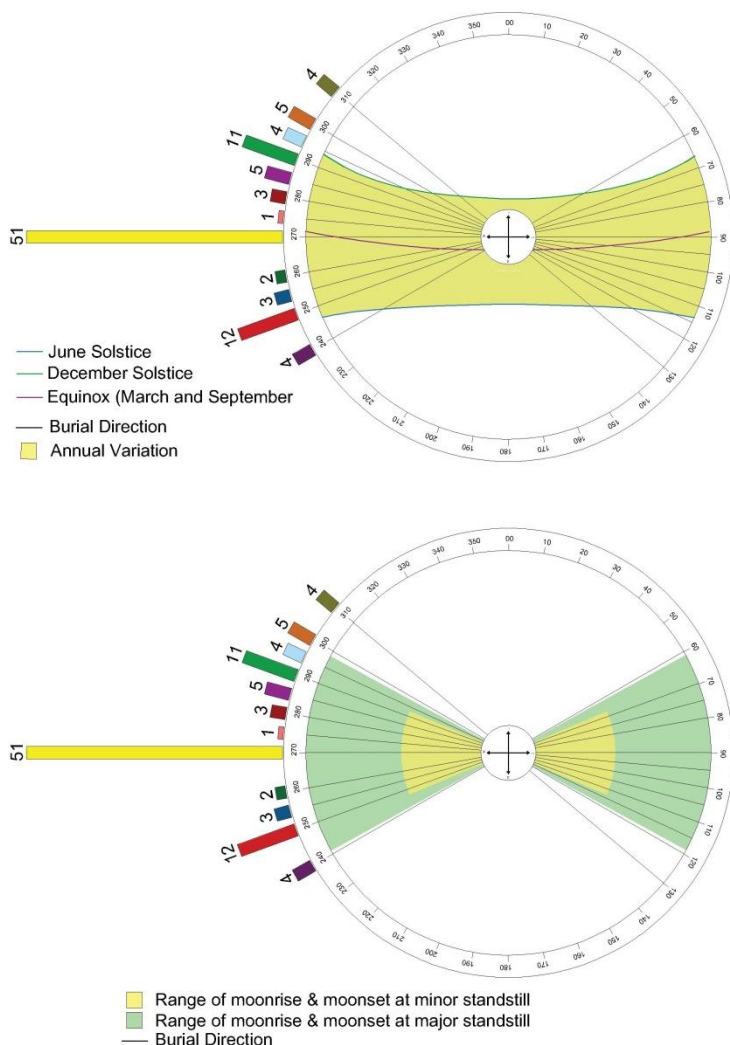


CHART 1- SLAB ORIENTATION OF THE BURIALS IN PALIPPOTHANA. ABOVE - COINCIDING WITH SOLAR PATH, BELOW - COINCIDING WITH LUNAR PATH

north-west. Prendergast (2016, 12) propose ten criteria for assessing megalithic tomb orientation as; random, view, societal, sacred, geographies, water, topographical, focal, skyline and astronomical. It is apparent that the burials are not randomly oriented and not evidence of the causative contribution of the societal or sacred factors. Except for the location of rock outcrops impacting the burial clustering, no other evidence is falling into the geographical, topographical or skyline criterion. Four burial clusters are associated with the rock outcrops, and no other meaning could raise. Two burial clusters have several burials which are in a line but has different angled positions. As the  $0^{\circ}$ - $30^{\circ}$  angled orientation of the burials are higher as 96.5%, it was assumed a repetitively observable event(s) such as an astronomical phenomenon must have influenced the burial construction. The sun solstices and lunar standstills (lunistics) were examined along with the above data sets,

erected in exact N.S. alignment. It may also be noted the burial no. 27, the largest burial in the complex, is oriented north and its cupmarks are also slightly aligned to N.S.

## DISCUSSION

The above results indicate that the Palippothana burial complex contains two types of burials where the cist burials face west or ordinal directions of north-west or south-west in a specific frequency of range and double orthostat burials facing north or

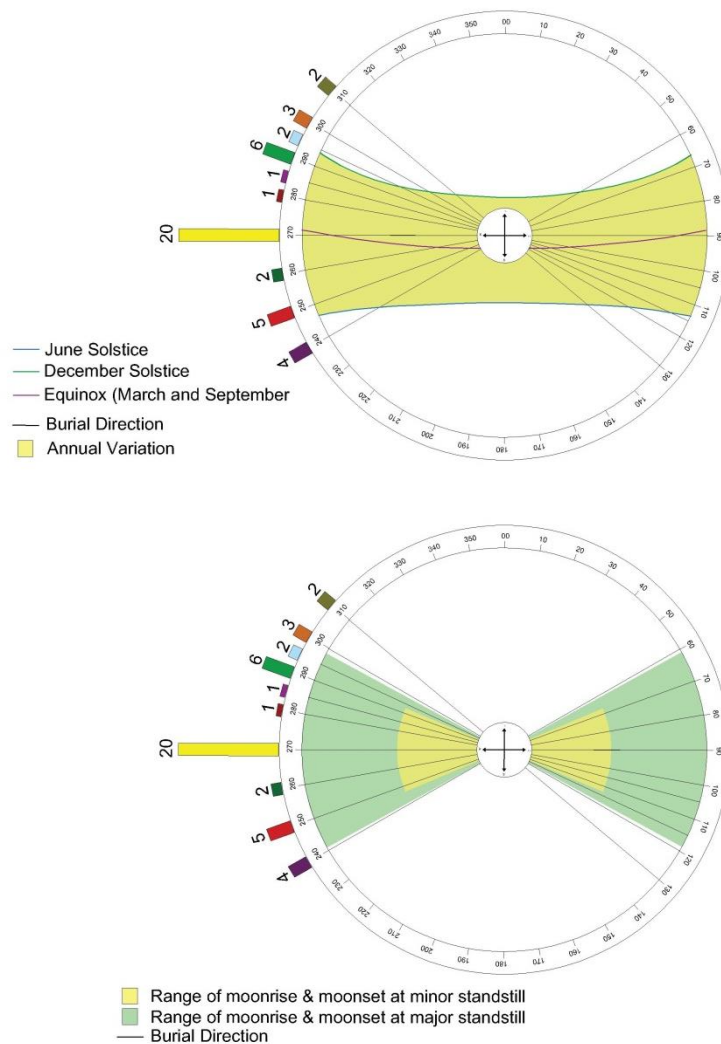


CHART 2 -ORIENTATION OF THE BURIALS IN PALIPOTHANA. ABOVE - COINCIDING WITH SOLAR PATH, BELOW - COINCIDING WITH LUNAR PATH

which on these days, the sun is exactly above the Equator (Sims, 2016, 467). From Sri Lanka, in  $6.9^{\circ}$  North latitude, the northern extreme of Sun is  $22.4^{\circ}$  and the southern extreme is  $24.6^{\circ}$  (Ratnatunga, n.d).

### The lunar standstill

The Moon's orbit is inclined  $5.1^{\circ}$  to Earth's orbit around the Sun, and as a result, the Moon's declination changes rapidly in a lunar month (27 days), known as minor moon standstill. Moreover, the Moon has a period called the "major lunar standstill period" of 18.6 years, rising and setting at an extreme northern position and extreme southern position. The extremes in the Moon's northern or positive declination ranges from about  $+18.2^{\circ}$  to  $+28.7^{\circ}$ . The extremes of Moon's southern or negative declination ranges from about  $-18.2^{\circ}$  to  $-28.7^{\circ}$ . Moon's declination stops at  $+18.20$  at the north or  $-18.20$  at the south in the minor

and both patterns are coinciding with each other. The following discussion will draw upon these criteria.

### Solar solstice

The Earth is slightly tilted on its axis; hence, different Earth points receive more or less sunlight during different times of the year, causing seasonal changes. The two solstices are occurring in June (20 or 21) and December (21 or 22), which on these days, the Sun's path in the sky is at the farthest north or south from the Equator. The equinox happens in March (20 or 21) and September (22 or 23),

Moon standstill. The declinations are from the lunar path computation from the mooncalc.org for Kahatagasdigiya for 2025 (major northern standstill) and 2034 (major southern standstill). One should be cautious when using other archaeological references to calculate the moon azimuth as its values depend on latitude.

### Solar path or lunar path?

The astronomical declination could be traced from 53 of the 81 burial, where the remaining 28 are ruined or destroyed. The axial azimuths of the burials and slabs are shown in chart 1 and 2. These encompass the most incredible possible range of lunar and solar declination. From the tested data set, 37 burials (92 slabs) coincide with the solar path, while 44 burials (101 slabs) coincide with minor and major lunar standstills. There are two outlying burials (4 slabs), which are not overlapping with both patterns, and this case will be discussed separately. Categories and frequencies are summarised in table 1.

| <b>Astronomical phenomenon</b> | Solar northern solstice | Solar southern solstice | Solar equinox | Lunar north major* | Lunar south major* | Lunar minor standstill |
|--------------------------------|-------------------------|-------------------------|---------------|--------------------|--------------------|------------------------|
| <b>Number of burials</b>       | 10                      | 7                       | 20            | 3                  | 4                  | 37                     |
| <b>Number of slabs</b>         | 24                      | 17                      | 51            | 5                  | 4                  | 92                     |

*Table 1 - Number of cases reported coinciding with each astronomical phenomenon.*

*\* only coincide with the major lunar standstills without the counts falling into the minor standstill*

The Sun and the Moon's horizon movements with their extremes were often noted by the ancient communities from the prehistoric period in many cultures around the globe (Prendergast, 2016, 15). From Palipbothana, a greater incidence of lunar alignments is reported when compared with the solar alignments. Also, the equinoctial alignment is higher than any other. There is no significant difference between the number of burials in northern or southern solstices or lunar major events. It can be assumed the burial builders' observations of both celestial bodies impacted the orientation and used both alternatively. The number of burials in the equinox that occurs twice a year is equal to the sum of solstice burials. When compared with the lunar declinations, the solar changes are more apparent and lasts longer. Lesser number of burials in major lunar standstills occurring every 18 years, indicates the same pattern. It is apparent that they had such a knowledge to trace these objects' movements, but the purpose of expressing it physically is the most challenging to study.



As it was noted from the excavations of burial 12 and 13, north slab is aligned to the same angle and then both east and west slabs retained to it. Fourth slab in several burials are shorter and smaller than the rest, and we assume that the intention were to open the burials time to time for offerings or reuse. As noted from the burial 25, the main burial was oriented toward the northern solstice or lunar path while a small associated slab erected toward the north may represent two different burial events. Also, the excavation of the burial 12 indicates the placement or intentionally broken potteries outside of the western and southern slabs, which can be a sign of a ritual or a traces left by mourners.

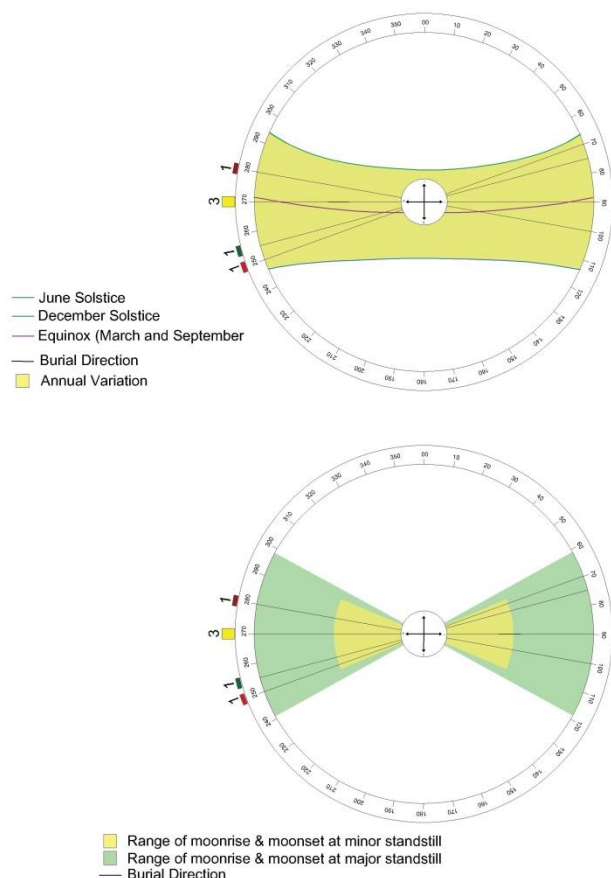
We do not believe the orientation of the burials as a direct symbolic expression of a ritual or the use of direction based knowledge at the time was a groundbreaking innovation. Alternatively, we suggest that it was a as part of the daily knowledge of early agrarian-husbandary communities who used those skills in many other ventures such as travelling, weather forecasting, etc.

### **OTHER TRADITIONS**

Two burial sets show different characteristics from the above orientation.

a. Double orthostat burials - three out of four double orthostat burials has two vis-à-vis slabs facing north and running east-west. The exceptional case is the burial 15, which is also characteristically different from the others and oriented toward north-west and south-east directions (chart 3). However, both the east and west sides of the burials are open. It can be assumed that these burials also serve the same concept of creating a path to a leaving or resurrecting soul.

b. Burials with declination of  $40^{\circ}$  - Four slabs reported from three burial have a declination which is not coinciding with any astronomical pattern. In all these cases, at least



**CHART 3 -ORIENTATION OF THE DOUBLE ORTHOSTAT BURIALS IN PALIPPOTHANA. ABOVE - COINCIDING WITH SOLAR PATH, BELOW -**

### CONCEPT- NATIVE OR INTRODUCED?

It was commonly believed that the Indian invasive colonisation was concurrent with the megalithic Iron Age tradition (Kennedy and Deraniyagala, 1989, 397). However, the multiple burial traditions coexisting in the same burial complex with different cosmologies encourage us to think of the likely advent of alien cultures to the natives who curiously started to follow the new social practices along with theirs in the protohistoric transitional period. There is evidence for both possibilities.

Several burial orientation prototypes were reported from the Indus valley and other Neolithic/chalcolithic cultures in India. Burials at Chalcolithic cemetery of Mehrgarh has east-west orientation where head toward the east or northeast (Dibyopama et al., 2015, 2) which also visible in the cemetery H stratum II of Harappa (1900-1700 BC) while the contemporary Lothal has burials with a supinely extended position in a north-south orientation (Kennedy, 2000, 295) which is similar to the Chalcolithic burials at Ladmod mounds in Nevasa (1500-1000 BC) and Tekwada, in Maharashtra (ibid, 318). Hullikallu,

one or two other slabs in the same burial have a declination between  $20^{\circ}$ - $30^{\circ}$ . Therefore, it is assumed the outliers can be a result of later alterations of the slabs. However, the possibility of other orientation traditions are not ruled out.

The analysis of megalithic tomb orientation in the present study is solely based on their directional alignment with the rising/setting celestial targets. As shown above, some of the burials are falling into the annual solar path and all other burials overlap except the burials in  $40^{\circ}$  with the major and minor lunar standstills.

a chalcolithic site in Andhra Pradesh, contained a supinely extended skeleton in an E.W. direction, head toward the west (Ibid, 323). Most of these are oriented to cardinal directions.

Burials oriented into cardinal directions and celestial objects are reported from the Indian Megalithics as well. Aswani and Kumar report several alignments, menhirs and stone circle aligned to the sunrise and sunset during solstices and equinox (2018, 651). Use of the menhirs as sightlines to sunrise and sunset during the solstices and equinox (Menon and Vahia, 2011), solar, lunar and stellar orientations of megalithic (Rao, 1993, Rao et al., 2011), conceptual similarities in the direction and cosmology among the megalithic burials and later temple architecture (Menon, 2018) are discussed. The physical and cultural interactions between the Indian peninsular and Sri Lanka during the Megalithic BRW techno-cultural complex were widely discussed by Sudarshan Seneviratne, based on skeletal and artefactual similarities (Seneviratne, 1984, 284).

On the other hand, the burial records of the Mesolithic culture associated with the Pleistocene-Holocene periods in Sri Lanka are also significant. While the secondary burials, incomplete skeletons, ochre coating on the bones (Kennedy and Deraniyagala, 1989, 394), shallow burial pits are characteristic to the oldest burials reporting from the cave habitations as Fa-Hien cave - 38,000BP (Kennedy, 2000, 181; Perera, 2010 175), Batadomba lena -  $28,150 \pm 2150/1710$  B.P. and  $15,830 \pm 680 - 580$  B.P (Kennedy, 2000, 182), Kitulgala Beli lena -  $13,210 \pm 80$  B.P. and  $11,750 \pm 390$  B.P. (Kennedy, 2000, 184), Ravana Ella (Kennedy, 2000, 236), a tendency of burying the dead in a flexed position is also reported from Batadomba lena 16,000- 19,000 BP (Perera, 2010, 176) and Alugalge (lying left side facing east) (Kennedy, 2000, 220). Several deliberately oriented burials in flexed position from mid-Holocene toward the last phase of the Mesolithic were also reported from Bellan Bandi Palassa - three north heading (two facing west) and three west heading (Deraniyagala, 1958, 65; Kennedy, 2000 assign the site to mid-Holocene), Pallemalala - 4500 bc/north-south oriented (Somadeva and Ranasinghe, 2006, 22), Miniathiliya -  $3680 \pm 40$  B.P/ heading north (Kulathilake et al. 2014, 5), Potana - 3919-3727 BCE/ doubled up flexed posture (Adikari, 1994, 67). Placing the dead in a flexed position on their right or left side was a unique trait in many cultures around the world. This position was interpreted in two ways (Szucs-Csillik and Comsa, 2017, 212),

- a. it shows sleep or resurrection in another life
- b. a comparable position with a foetus represents the deceased returning to the womb of mother Earth

Few primary burials reported from the megalithic contexts in Sri Lanka has similar cardinal direction oriented flexed position, from Anaikottai - 300 BC-100 AD/ Extended inhumation oriented from west to east (Ragupathy, 1987, 119, 124), Cattirantai - Karainagar in the dawn of the Christian period (microlithic flakes may suggest even an early date)/ one east to west and one west to east (ibid, 129-130). The tradition was even continued to the historical period as it can note from the burial remains found from Mantai - 160-190 AD (Kennedy, 2000, 353).

The orientation of clay canoe burials is also noticeable. Two north-south and east-west oriented clay canoe burials reported from Kalupahana (Somadeva, 2011, 8) and five other north-south oriented clay canoes reported from Haldummulla. Somadeva proposes the orientation was intentional to avoid the impact of surface runoff water (Somadeva, 2010, 4-5).

The majority of these inhumations are either headed west or north. Though the motives for the changes of Mesolithic hunter-gatherers' burial rites from mid to late Holocene are not clear, it can be assumed that their cultural norms easily align with those of the Indian megalithic cultural influencers and had developed a common ground of funerary practices. Transformation of the megalithic burial rites into other religious practices are observed since the post-Megalithic period (Seneviratne, 1984, 266).

### **THE UPANISHADS – ANOTHER CLUE**

Though we do not have direct references from the Sri Lankan megalithic builders, traces of their thoughts could be found in the contemporary religious essays. Upanishad is such a source which contains the views presented by priests, royals and even Shudras. Therefore, it might have been in the popular discourse during the first millennium BC. In this context, the following extracts from the Prasna Upanishad (composed possibly during the second half of the 1<sup>st</sup> millennium B.C.) is significant (Prasna Upanishad, 1922).

*“The creator... created the pair, Matter and Energy (9)... The Sun is energy and Matter indeed is the Moon (10).... Now when the Sun having risen enters the east, by that, he holds the eastern pranas in his rays. When he illumines the South, the West, the North, the Zenith, the Nadir, the intermediate quarters... he holds all the*

*Pranas in his rays (12)..... The year is verily Prajapati, and two are his paths, the southern and the northern; now those who perform the Ishtapoorta (sacrifices and charitable works) as works of supreme value, attain the world of the Moon and afterwards return there again. Therefore those Rishis who desire offspring go by the Southern path. Matter verily is this path of the manes (14)....But those who have sought the Atman by austerity, abstinence, faith and knowledge, attain the Aditya by the Northern path. This is the source of all the forces.... immortal and free from danger...supreme resort. From there they do not return, it is the end (17).... The month is verily Prajapathi. Its dark fortnight is Matter, and its brighter one is the Prana (energy). Therefore some Rishis perform their sacrifices in the bright fortnight; others in the other half (19)..."*

It is narrated that the Northern path is blocked for the ignorant and persons devoid of the necessary qualities (Sharvananda, 1922, 17). A class of spirits called 'Pitris' are widely mentioned in the Brahmanic beliefs and described as spirits of the dead who drink from the Moon the sweet amrita during the dark half of the month. They are not sinners, but fathers of individual families, fathers of tribes and fathers of the race (Seneviratna, 1986, 212).

Further, Ishavasya Upanishad elaborated *Ishtapoorta* as, *Ishta*; the daily sacrifice of Agnihotra, penance, truthfulness, maintenance of animals, feeding of the guests and feeding the birds and beasts and *Poorta*; sinking wells or excavation of tanks for the public, building temples, giving food to the hungry, laying out public gardens ((Sharvananda, 1922, 15). We are inviting the readers to compare the King Pandukabhaya section of Mahavamsa with these notes. The fabrication and construction of stone structure for honoured mortuary rites require labour, time, material, and organised commitment; hence it is not for everyone (Kennedy, 2000, 356), and only the honoured people received the recognition. Do these burials indicate the paths the deceased opted to go?

## CONCLUSIONS

Research focusing on the Megalithic or protohistoric period gradually developed in Sri Lanka since the 1980s, more multidisciplinary approaches such as chemical analysis and GIS applications were introduced recently. With the present study's outcome, it is possible to link ancient cosmology with the landscape where people laid the first seeds of a larger civilisation. Further, the cosmological observations might be linked with two worlds, 'life' and 'death', a cyclic process in most philosophies originated in India, including Hinduism, Buddhism and Jainism. We must consider the fact that ancient people might have had a different cosmological sense from ours. Is it encapsulated in the symbolism in architecture?

The outcome of this paper allows us to study the protohistoric burial traditions in Sri Lanka more meaningfully, in a broader sense of social belief systems and natural phenomena. Ancient burial orientations solely depended on the axial alignment of rising, setting celestial targets or non-astronomical factors (Prendergast, 2016, 1). Revealing these will help find minor cultural differences of those communities, level of acculturation, geographical distribution and contribution of each regional community to the emergence of a central governing system. Even the origin of the cosmological knowledge of ancient societies can be traced back to different sources. Hitherto, the cultural landscape of Sri Lanka was explained through geographical and ecological means. Connecting the attributes such as the horizon, sky, and cyclical celestial phenomena is vital to complete the whole cultural landscape scenario. Hence, the present research may not concluding the discussion, but opening a new theme to be discussed in the future progression of Sri Lankan protohistoric cultural studies.

The protohistoric-historic mortuary studies in Sri Lanka leading to some controversial tensions usually stemming from the concerns of 'identity' and attempts of establishing ethnic affinities of the ancient communities or linking with the quasi-historical races and tribes hence the romantic trend of finding modern ethnic ties with the ancient communities or diffusionist views should not be encouraged (Kennedy, 1980, 411). The sense of celestial changes and using it in daily life should not necessarily a introduced concept. In Sri Lanka, the megalithic burials show less vibrant than the prototypes of India (Deraniyagala, 1992, 710) that can be counted as evidence of the origination of a local variant adapted by the local tribes after contacting the cultures of Indian seafaring traders. As the level of the grave goods and the burial's spatial distribution is not identical with the Indian burials complexes, it is fair to believe the authors of these burials in the Island were natives who had mixed cultural traits introduced by the Indian merchants. Therefore, archaeology should not reinforce the dialogues of local or regional politics but necessarily need to mediate the complex social issues.

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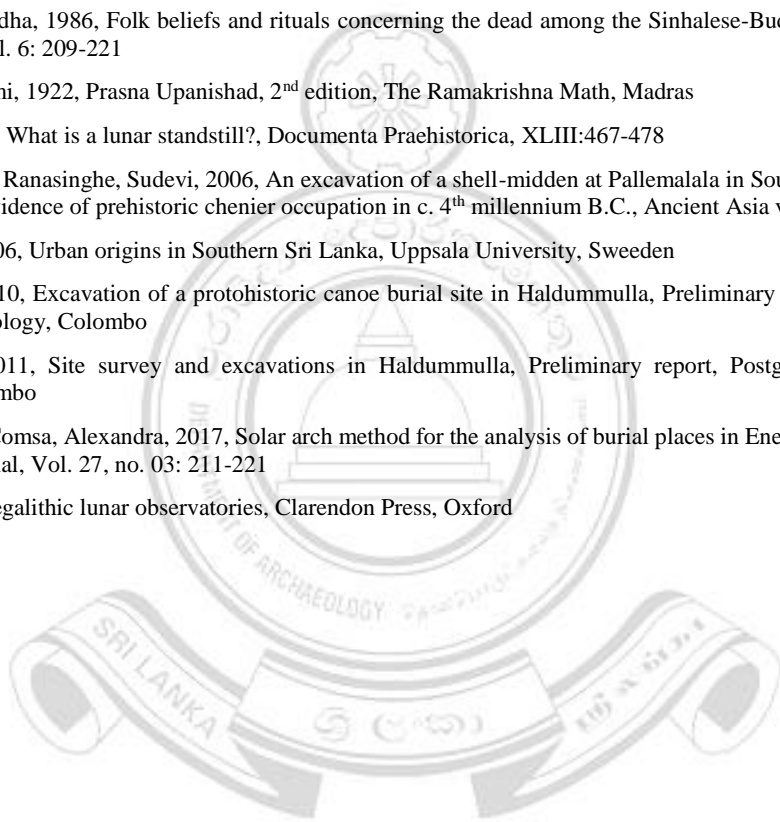
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## Annexure 1

**Table 2: angles of intact slabs. Azimuth measured from the north to the outside of each slab. Capstone measurements are taken from the most clear edge and angle given accordingly. (West slab align with compass dimensions given as 360, which also equals to 0)**

| No | Burial number | Slab      | Azimuth angle | Relative to N or W direction | No | Burial number | Slab        | Azimuth angle | Relative to N or W direction |
|----|---------------|-----------|---------------|------------------------------|----|---------------|-------------|---------------|------------------------------|
| 1  | 1             | N         | 70            | 20 -                         | 56 | 26            | E           | 160           | 20 -                         |
| 2  | 1             | E         | 160           | 20 -                         | 57 | 26            | W           | 340           | 20 -                         |
| 3  | 1             | S         | 250           | 20 -                         | 58 | 25 sub 2      | W           | 360           | 0                            |
| 4  | 1             | W         | 340           | 20 -                         | 59 | 27            | E           | 180           | 0                            |
| 5  | 2             | E         | 160           | 20 -                         | 60 | 27            | W           | 360           | 0                            |
| 6  | 2             | S         | 240           | 30 -                         | 61 | 27            | capstone    | 180           | 0                            |
| 7  | 2             | cap stone | 335           | 25 -                         | 62 | 28            | single slab | 190           | 10 +                         |
| 8  | 3             | W         | 340           | 20 -                         | 63 | 29            | capstone    | 270           | 0                            |
| 9  | 4             | N         | 90            | 0                            | 64 | 30            | S           | 270           | 0                            |
| 1  | 4             | E         | 180           | 0                            | 65 | 30            | W           | 360           | 0                            |
| 1  | 4             | S         | 255           | 15 -                         | 66 | 31            | N           | 90            | 0                            |
| 1  | 4             | W         | 360           | 0                            | 67 | 31            | E           | 180           | 0                            |
| 1  | 5             | N         | 90            | 0                            | 68 | 32            | N           | 90            | 0                            |
| 1  | 5             | E         | 170           | 10 -                         | 69 | 32            | S           | 275           | 5 +                          |
| 1  | 5             | S         | 255           | 15 -                         | 70 | 32            | W           | 360           | 0                            |
| 1  | 5             | W         | 350           | 10 -                         | 71 | 39            | single slab | 200           | 20+                          |
| 1  | 6             | cap stone | 360           | 0                            | 72 | 40            | E           | 180           | 0                            |
| 1  | 7             | N         | 90            | 0                            | 73 | 40            | W           | 360           | 0                            |
| 1  | 7             | E         | 180           | 0                            | 74 | 41            | E           | 180           | 0                            |
| 2  | 7             | W         | 360           | 0                            | 75 | 41            | S           | 270           | 0                            |
| 2  | 8             | N         | 105           | 15 +                         | 76 | 44            | N           | 90            | 0                            |
| 2  | 8             | E         | 220           | 40+                          | 77 | 44            | E           | 180           | 0                            |
| 2  | 8             | W         | 30            | 30 +                         | 78 | 44            | S           | 270           | 0                            |
| 2  | 9             | E         | 195           | 15 +                         | 79 | 44            | W           | 360           | 0                            |
| 2  | 9             | W         | 15            | 15 +                         | 80 | 45            | E           | 200           | 20+                          |
| 2  | 10            | E         | 180           | 0                            | 81 | 45            | S           | 295           | 25+                          |
| 2  | 10            | W         | 360           | 0                            | 82 | 45            | W           | 20            | 20+                          |

|   |          |   |     |      |
|---|----------|---|-----|------|
| 2 | 11       | N | 90  | 0    |
| 2 | 11       | E | 180 | 0    |
| 3 | 11       | S | 270 | 0    |
| 3 | 11       | W | 360 | 0    |
| 3 | 13       | N | 110 | 20 + |
| 3 | 13       | E | 220 | 40 + |
| 3 | 13       | W | 40  | 40 + |
| 3 | 14       | S | 250 | 20 - |
| 3 | 15       | N | 70  | 20 - |
| 3 | 15       | S | 255 | 15 - |
| 3 | 16       | S | 300 | 30 + |
| 3 | 16       | W | 40  | 40 + |
| 4 | 17       | N | 90  | 0    |
| 4 | 17       | S | 270 | 0    |
| 4 | 18       | N | 90  | 0    |
| 4 | 18       | S | 270 | 0    |
| 4 | 19       | N | 70  | 20 - |
| 4 | 20       | E | 180 | 0    |
| 4 | 20       | W | 360 | 0    |
| 4 | 21       | E | 150 | 30 - |
| 4 | 23       | E | 200 | 20 + |
| 4 | 23       | W | 20  | 20 + |
| 5 | 24       | N | 90  | 0    |
| 5 | 25       | N | 105 | 15 + |
| 5 | 25       | E | 200 | 20 + |
| 5 | 25       | W | 20  | 20 + |
| 5 | 25 sub 1 | W | 30  | 30 + |
| 5 | 26       | N | 110 | 20 - |

|     |    |             |     |      |
|-----|----|-------------|-----|------|
| 83  | 52 | single slab | 205 | 25 + |
| 84  | 65 | E           | 150 | 30 - |
| 85  | 67 | E           | 180 | 0    |
| 86  | 67 | W           | 360 | 0    |
| 87  | 68 | N           | 90  | 0    |
| 88  | 68 | E           | 180 | 0    |
| 89  | 69 | E           | 200 | 20 + |
| 90  | 69 | S           | 280 | 10 + |
| 91  | 69 | W           | 15  | 15 + |
| 92  | 70 | N           | 110 | 20 + |
| 93  | 70 | E           | 180 | 0    |
| 94  | 71 | N           | 90  | 0    |
| 95  | 71 | W           | 360 | 0    |
| 96  | 72 | single slab | 150 | 30-  |
| 97  | 73 | E           | 180 | 0    |
| 98  | 73 | S           | 270 | 0    |
| 99  | 74 | N           | 120 | 30 + |
| 100 | 74 | E           | 205 | 25 + |
| 101 | 74 | W           | 25  | 25 + |
| 102 | 75 | N           | 90  | 0    |
| 103 | 75 | S           | 280 | 10+  |
| 104 | 76 | E           | 180 | 0    |
| 105 | 76 | W           | 360 | 0    |
| 106 | 78 | single slab | 90  | 0    |
| 107 | 79 | single slab | 90  | 0    |
| 108 | 80 | N           | 110 | 20 + |
| 109 | 80 | E           | 210 | 30 + |
|     |    |             |     |      |

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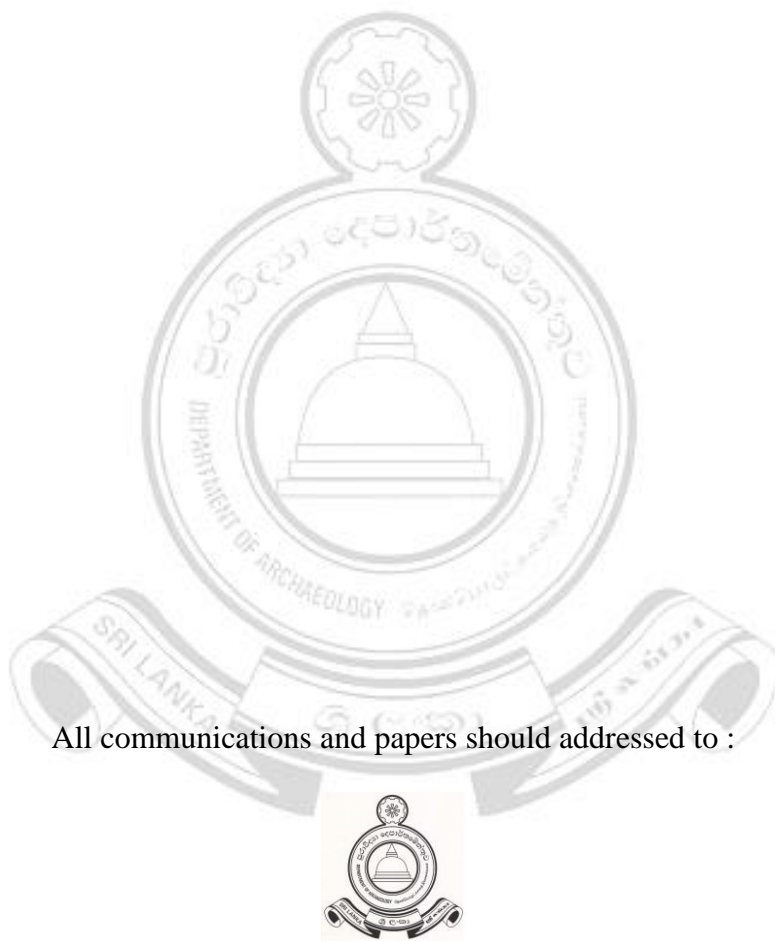
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The Director General of Archaeology would be pleased to receive papers dealing with Sri Lanka's archaeology and allied subjects for consideration for publication in this Journal.

Such papers should be concise, typed with required format and contain unpublished original materials.

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