Serendib in the Sea: Sri Lanka's Role in the Indian Ocean Trade Networks during the 1st Millennium CE

Mohns, Alexander D.L.

Serendib in the Sea

By A.D.L Mohns

Front Cover Image: Map of Taprobane 1400s from a private collection. Photographed on the 13/6/21.

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Alexander Devin Ludwig Mohns
Student Number (s1584308)
University of Leiden, Faculty of Archaeology
Course: MA Applied Archaeology
Supervisor: Dr. M.E.J.J. van Aerde
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Chapter 1

1. Introduction

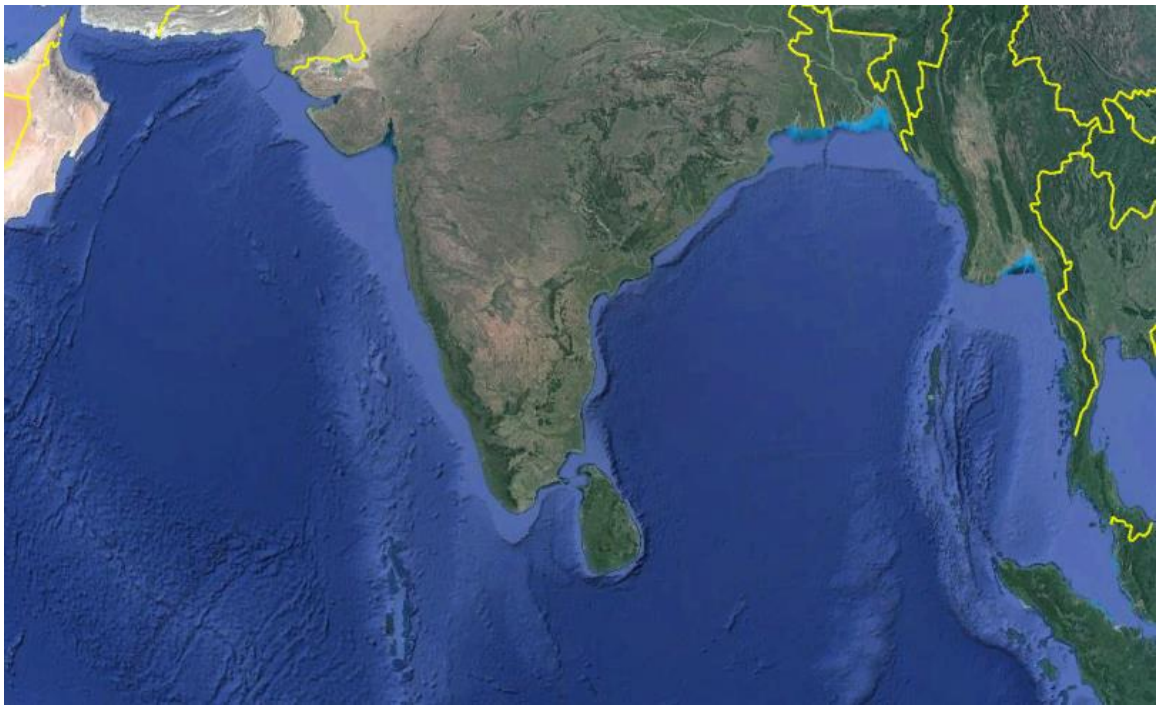

Figure 1. Sri Lanka in the Indian Ocean

Since antiquity the Indian Ocean has been a place of constant movement and activity. With the development of the early trade networks that ran throughout the old world, the Indian Ocean began to play an even larger role in the workings of the global economy. Goods were transported from west to east and vice versa, via land routes but also via sea routes. Over the last century or so of research there has been a tendency to focus on the influence of Western powers such as the Roman Empire in the functioning of the Indian Ocean trade networks, local agency within these networks tended to be sidelined, even as recently as 2020 European scholars have

perpetuated the idea that local cultures within the Indian Ocean trade networks only played a minor role or no role at all (De Romanis 2020, 298-321). Recent research has shown that these sea routes were exploited long before the rise of large empires such as the Roman Empire, with traders and merchants transporting goods throughout the regions connected to the Indian Ocean and even further away (Coningham *et al* 2017, 31).

At approximately the center of the Indian Ocean lies the island of Sri Lanka (Fig.1), known to the ancients by a variety of names such as Taprobane, Sielediba, Serendib and Ceylon during the colonial era (Bandaranayake *et al.* 2003, 17). Sri Lanka's location and topographical conditions allowed it to become a crucial trading point within the Indian Ocean trade network. Several factors aside from its location and topography gave Sri Lanka its prominence in the emerging trade systems during the first millennium AD, these factors included the political forces that were at work throughout the Indian Ocean which would have played a role in the efficiency of these trade networks. Alongside these political factors, a plethora of material goods that were available in Sri Lanka made it appealing for ancient merchants to make it a port of call during their trading voyages, these included pearls, beads, spices, textiles, gems, animals (elephants) and a variety of other perishable goods such as timber (Amarathunga and Gunawardana 2019, 96-102).

Figure 2. Location of Sites

Over the last 150 years, research has been conducted and data has been gathered throughout the island relating to foreign trade and long distance networks of exchange. The main areas that were documented and published were the ports of Mantai[1] in the northwest of the island, Anuradhapura, the main capital of the island during the period from the 5th century BCE until it's eventual collapse in the 11th century CE, as date by Robin Coningham (Coningham *et al* 2017, 32), and fairly recently the site of Tissamaharama[2] at the southern end of the island (Fig.2). The research that has been conducted so far in Sri Lanka has been relatively sporadic and usually focused on individual sites instead of the overall network that would have been functioning throughout the first millennium CE. Despite the important work done by archaeologists, the lack of focus on the broader networks as well as the spaces in between these main sites has prevented a thorough understanding of Sri Lanka's role in the Indian Ocean trade networks and all its intricacies.

Throughout this thesis I will use these sites as the main focal points of foreign trade with Sri Lanka during the 1st millennium CE. Each site will be a case study of how research has been conducted relating to Indian Ocean trade. Smaller sites such as Kantarodai, Ridiyagama, Kelaniya, Nariyagama and Godavaya will also be analyzed in order to provide a wider base of data for discussion within this thesis. Despite the data that has been collected from a variety of different sites, all linked to trading activities, there is still a lack of cohesion and accessibility when it comes to data that can be used for researching the broader contexts of Indian Ocean trade and Sri Lanka's role within that trade. Over the years, Sri Lankan and foreign scholars have collaborated together and created a substantial reconstruction of Sri Lanka's role within the Indian Ocean trade, however, there are still large questions to be asked that cannot be currently answered.

[1] Is also known by many names such as Mahatittha, Mantota, Matota and Tirukketisvaram. For the purposes of this paper I will refer to this site and its surrounding area as Mantai.

[2] Refers specifically to the site of Tissamaharama, not to be confused with the Kingdom of Ruhuna, in which Tissamaharama was a major site

1.1 Research Relevance

In an increasingly connected world we stand to gain a lot of information by looking at the past and the ways in which people from very distant regions interacted with each other, either directly or indirectly. Colin Renfrew's comment on the importance of ancient trade was "it's dual status", one of which is an indicator of intercultural contact and the other being its status as a motivator for interaction between ancient societies (Kessler 2016, 439). It is through the material remains left from these interactions that we can start to reconstruct our ancient past and in this case, improve our understanding of the role and importance of Sri Lanka in the ancient trade networks of the Indian Ocean.

As previously mentioned, the research conducted within this region has usually been focused primarily on individual sites, research into the broader networks of ancient trade networks involving Sri Lanka have been touched upon, but in far less depth than research on individual sites, such as Anuradhapura. This tendency to focus on individual archaeological sites is not only a phenomenon that occurs only in Sri Lanka, it occurs frequently throughout the study of Indian Ocean archaeology, and in this respect this thesis will be part of the initial steps towards moving away from the study of individual site towards the study of the broader contexts of Indian Ocean archaeology using data incorporated from several sites, both large and small. Aside from previous research focusing mainly on individual sites, there has been a large tendency to place archaeological evidence for Indian Ocean trade networks on the sidelines and instead focus on historical texts with a an emphasis on written sources, this has led to in some cases theories which are still propounded today which do not reflect the actual reality of what the archaeological evidence shows (De Romanis 2020). In this respect, it is also important to keep in

mind that Sri Lanka was part of a wider network of trade within the Indian Ocean and in order to understand its ancient history, we must look at its role in this wider network through the use of not only historical sources, but of actual archaeological data that represents the activities that would have been taking place during the 1st millennium CE. It is only through the use of interdisciplinary techniques that a fuller overview of Sri Lanka's role in this massive trade network can be gained, otherwise we run the risk of only gaining a small glimpse into the true reality of the past and from this, unfounded theories that exclude multitudes of cultures become engrained into the historical narrative, which diminishes the beauty of the human past within these regions.

By researching Sri Lanka's role in the wider framework of Indian Ocean trade networks, a crucial step towards fully understanding the different dynamics at play in the ancient Indian Ocean can be taken. Sri Lanka's centrality within the Indian Ocean makes this research even more important because of Sri Lanka's role as a trading hub from East to west and vice versa. Research into this central point within the large networks of trade may also provide very useful information relating to other sites within the Indian Ocean.

Another main aspect for this research is the potential that it holds for future archaeologists researching Indian Ocean trade networks. By proposing new methods and techniques that can be applied usefully for this topic, further research can be produced and a greater understanding of the topic can be achieved, thereby allowing the growth of academia within Sri Lanka as well as foreign academia focused on Sri Lanka. With the identification of new sites as well as further research on known sites such as Mantai, Sri Lanka has the potential to be a leading contributor to the field of South Asian archaeology. Mantai has been described as "Potentially one of the most important sites in historical archaeology today"(Carswell *et al.* 2013, 12), Dr. B.K Thapar even went as far as to say that "if properly excavated Mantai may well establish itself as the greatest urban complex in all south Asia" (Carswell *et al.* 2013, 11). Only with further and more intensive research can these statements be validated.

1.2 Research Questions/Aims

As previously mentioned, despite the large amount of data that has already been gathered over the preceding two centuries, academic focus has been primarily concerned with researching individual sites rather than the role of these sites within the broader network of Indian Ocean trade. There is a noticeable preference to discuss sites such as Mantai, Anuradhapura and only recently the site of Tissamaharama, whereas the information needed to make a proper reconstruction of ancient Sri Lanka's relationship with trade and the rest of the Indian Ocean may lie in smaller lesser known sites such as Kantarodai and Ridiyagama, which were also known sites associated with trade (Bandaranayake *et al.* 2003, 54). Much of the research relating to the smaller and lesser-known sites is scattered and has not been fully integrated with the predominant narrative of ancient trade networks in Sri Lanka. There are still many questions that remain unanswered within this field of research. Where did the foreign imports end up in Sri Lanka after they had passed through Mantai and Anuradhapura? How were these goods transported throughout the country and how did Sri Lankan exports travel to different regions located in the Indian Ocean? These are but a few of the larger questions still left unanswered and often ignored by historians that focus mainly on textual evidence that never truly provides a full overview. It is my hope that this thesis contributes to the overall discussion of Indian Ocean trade relating to Sri Lanka by answering the research questions that I pose in the following passages.

The main aim of this thesis will be to provide a general overview of the research previously conducted in Sri Lanka in terms of analyzing the broader context of trade and exchange involving Sri Lanka within the Indian Ocean. By understanding the research that has been conducted both on the main sites as well as a number of lesser-known sites, this thesis allows a reconstruction of the

connections within the Indian Ocean trade networks that included Sri Lanka as a point within the network. With this overview in mind, I propose ways in which the acquisition and storage of archaeological data can be improved in a manner that would enable further research of the wider networks within Indian Ocean trade during the first millennium AD, with a specific focus on Sri Lanka. The tools I utilize in order to do this are the use of LiDAR (Remote aerial laser scanning) in order to determine potential new site locations, the application of accessible databases that allow for data to be shared throughout the wider academic world and the use of archaeological documents and reports in order to provide a cohesive understanding of the research conducted so far and what potential research may still be waiting for future scholars.

To that end, my first research question is "What can we learn about the integral role of Sri Lanka as part of the Indian Ocean trade networks, based on the archaeology present at these main sites?". In order to properly examine this question I use the sub questions " What can we learn from port sites?" and "What can we learn from the archaeological record?".

The second research question is "What modern techniques and methods can scholars use to achieve a better understanding of Sri Lanka's role in the Indian Ocean trade networks?". This also has the sub questions, "What can be hypothesized as an efficient working methodology based on this thesis?". The second sub question would be "What techniques can be applied to enable efficient storage and dissemination of data?". Both of these research questions and their sub questions help provide answers in the form of a proposal for future archaeological research for Sri Lankan as well as foreign scholars.

1.3 Methodology

In order to answer the research questions and sub questions that I have proposed, I use 2 main methods in order to provide answers to the questions I have posed. Due to the lack of actual fieldwork for this topic, I aim to use these methods in a way that they can provide a platform from where further research can be done with these techniques in mind.

The first main method is very straightforward. I give an overview of the existing previous data gathered in archaeological reports, texts and any other sources of information on the main sites that I analyze. The second main method I implement is the use of a case study wherein LiDAR was used to identify archaeological sites. Alongside this my final method will be the suggestion of databases to store the gathered data to allow for further research by scholars from around the world. It should be noted that the reason for these suggestions and not the actual implementation of these methodologies is due to the inability to actually implement them due to COVID19 and all the travel restrictions that have resulted from it.

1.3.1 State of the Research/Data overview

This method consists of reviewing previous archaeological reports, and data that has been gathered from the 3 main sites of Mantai, Anuradhapura and Tissamaharama. Alongside these 3 main sites I will also briefly present evidence from smaller and lesser known sites such as Kantarodai, Godavaya, Ridiyagama, Kelaniya and Nariyagama. By going through the existing data I will create an overview of what is already known as well as show connections which were previously not known. This will be done through the use of archaeological reports,

articles and publications to provide useful information on how Sri Lanka was connected to the Indian Ocean trade networks.

By using publications that have focused on specific topics within the broader topic of Sri Lanka's role in the Indian Ocean trade networks, such as chemical analyses of material from these main sites, ceramics analyses and material from Sri Lanka found in foreign contexts, I aim to provide a much more detailed overview of Sri Lanka's role in the Indian Ocean trade networks than previously done. Using data from sites also related to trade with ancient Sri Lanka will also provide a broader perspective than only looking at material from Sri Lanka itself.

1.3.2 Proposed Techniques

The use of digital techniques such as LiDAR and databases can be very useful when looking at distribution patterns and connections between archaeological sites. I have had some previous experience with this kind of research for my BA thesis, which was focused on rock carvings in the upper Karakoram Mountains (van Aerde & Mohns *et al.* 2020). By looking at the distribution of carvings and the specific types of carvings found in certain locations, Dr. van Aerde and I were able to identify certain patterns, which may lead to previously unknown archaeological sites. It is these kind of techniques that I will discuss here as well in order to better understand how research can continue on the 3 main sites of Mantai, Anuradhapura and Tissamaharama, to see how they are connected to each other as well as to smaller sites found in between these main sites. There are certain limitations in the application of this methodology due to issues that will be discussed below in the limitations section of this chapter. However, despite these limitations, digital techniques such as LiDAR remain a very feasible methodology to apply remotely. In order to verify the feasibility of LiDAR in terms of gaining knowledge on trade networks in Sri Lanka, a case study will also be used where LiDAR was successfully implemented in Cambodia for the identification of a previously unknown archaeological landscape. An example of a widely accessible database will also be given to show how archaeological data can be widely disseminated to the benefit of all scholars as well as the research itself.

The methods that I have suggested above were chosen due to a number of various reasons and circumstances. First and foremost the present day pandemic of COVID19 has severely limited the potential methodology that could be used for this thesis, which will be discussed in the limitations. Other reasons for the choice in methodology are related to the answering of the 2 main research questions.

For the first question of "What can we learn about the integral role of Sri Lanka as part of the Indian Ocean trade networks based on the archaeology present at these main sites?" the methodology of creating an overview of already existing data is the most straightforward method to apply. By reviewing and understanding all the work that has already been done on this topic, we can combine all the information to provide a much more detailed overview of these sites as well as a better understanding of the ways in which these 3 sites and smaller related sites operated within and were part of the broader Indian Ocean trade network.

For the second research question of "What modern techniques and methods can scholars use to achieve a better understanding of Sri Lanka's role in the Indian Ocean trade networks?", the second methodology will be applied, thereby allowing us to see whether new techniques in LiDAR imagery can provide new observations from a combination of both previous research, collected data and modern survey techniques. And finally I will give suggestions for how the data gathered from these methods can be made accessible to the wider academic community.

1.4 Limitations

Over the last few decades Sri Lankan scholars have done outstanding work often times with little funding and without the help of foreign institutions. This previous research has allowed for this thesis to be written in order to take the next step with this research. Despite this solid work, there are still issues and information that is needed to address this research topic. And in this respect this thesis is meant to highlight these limitations and provide suggestions for tackling them, thereby enabling further research of this topic for scholars inside as well as outside of Sri Lanka who have limited access or understanding of the data that has been collected by Sri Lankan scholars, and in turn taking the next step forward to a better understanding of Sri Lanka's role in the Indian Ocean trade networks.

One of the major limitations is the lack of excavation reports that have been published in English. The main archaeological reports that have been published were published by mostly English and German projects in collaboration with Sri Lankan scholars. Namely, the excavations at Ruhuna (Tissamaharama), Mantai and Anuradhapura (ASW2, etc.), despite the publications of these excavations, there has been more work done at smaller sites that could be complementary to the research of these large ancient centers, which has not been published in English and most likely remains in Sinhalese.

Another limitation that is directly linked to this thesis is the lack of fieldwork related to the identification of new sites and application of new methods and techniques, which I will be discussing. Due to the COVID 19 pandemic that began at the end of 2019 then continued on throughout 2020 and is currently still ongoing I was unable to do any practical research in Sri Lanka itself. The travel restrictions and the restrictions of fieldwork all resulted in having to rely on textual and digital sources for this thesis. Initially I had planned to travel to Sri Lanka to gain firsthand knowledge of the sites that I will be discussing as well as to examine the material from these sites and archaeological depots that may contain more information on

smaller sites relevant to this thesis, since most of these reports are not accessible or outside of Sri Lanka itself or simply have not been published at all. This would have also been through collaborations with Sri Lankan Archaeologists such as Dr. Sudharshan Seneviratne. Unfortunately these plans were scrapped and a remote digital approach was deemed the most effective. The lack of fieldwork and firsthand practical knowledge limits my ability in actually testing the proposed methods and techniques, however, to compensate for this I use case studies where these techniques have been applied and use those as comparable scenarios for this thesis. However, it must be understood that this thesis is the next step in research into Sri Lanka's role in the Indian Ocean trade networks, and provides suggestions and proposals for different solutions to issues that are still very complex and difficult to fully encapsulate within this short space of a thesis. This thesis will also be accessible to researchers outside of Sri Lanka allowing for a wider dissemination of information on this vast topic.

1.5 Thesis Outline

In the second chapter of this thesis I will provide a historical background, complete with summaries of previous research and site descriptions. This gathering of information all in one accessible place has not been done before and allows the reader to be aware of the historical and archaeological context of this research. Once I have given a proper description of the sites and their histories, chapter 3 will focus on the data overview part of my methodology. Within chapter 3 I will show what work has already been done on this topic but I will also attempt to connect the information in order to provide a much more detailed overview than has been previously done. Within chapter 3 the archaeological evidence for Sri Lanka's role as a central trading hub will be provided and a deeper look into the ways that it functioned within the Indian Ocean trade networks will be discussed. The aforementioned evidence consists of archaeological reports, which contain

information on artifacts and sites. Alongside those, historical documents relating to knowledge of Sri Lanka's involvement in ancient trade will also be mentioned.

Chapter 4 will consist of the LiDAR case study of my methodology. Using a case study I will show how this technique can be applied usefully in order to provide answers to research questions related to my central topic. Alongside this I will also present examples of accessible databases that allow for the proper storage of archaeological data that can be available to a wider audience.

Chapter 5 will be a discussion of all the materials and outcomes that have been mentioned in chapters 3 and 4. This will also include a review of the methods and techniques that I have used and whether or not they are feasible for this research. Afterwards I will conclude this thesis in chapter 6 by providing answers to the main research questions as well as ideas that will contribute towards the continuation of this research.

Chapter 2

2. Historical Overview, Site Descriptions and Archaeological Reports and Research

Over the last century, there has been quite a substantial amount of archaeological research conducted in Sri Lanka. Many of these initial excavations and surveys were conducted by British colonial officers and scholars during the colonial era (Fig. 3, 4). However, within the last 60 years, Sri Lankan scholars have conducted excavations and surveys throughout the island and have brought to light many more archaeological sites and artifacts that have helped to reconstruct the ancient history of the island.

Within this chapter I will provide a brief summary of the history of Sri Lanka's involvement within the Indian Ocean trade networks during the early first millennium CE. Following this I will give an overview of the previous research and a site description of each of the 3 main sites, Anuradhapura, Tissamaharama and Mantai, as well as smaller sites associated with them, such as the port of Godavaya, the inland sites Kelaniya and Ridiyagama which are associated with Tissamaharama, and Kantarodai, a port site also associated with Mantai.

Figure 3. Excavations at Anuradhapura, clearing of
Figure 4. Excavations at Anuradhapura in colonial times.
Removal of vegetation.

2.1 Geographical and Historical Overview

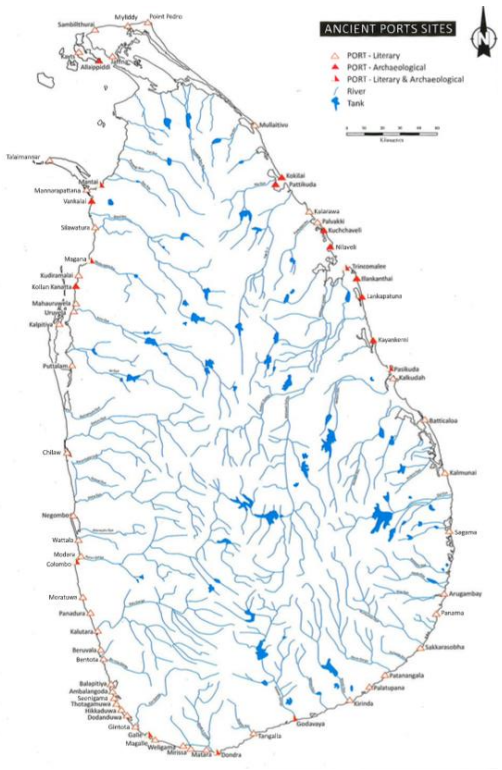

Figure 5. Map of ancient port sites

The island of Sri Lanka has long been a safe haven for seafaring travelers and merchants. In a way it seems like the ideal place to have a major trading center, its geographical location puts it almost right at the center of the Indian Ocean. Alongside its location, the natural features of the island make it very appealing to sailors, with its many bays and lagoons that provide safe berths for ships to anchor and favorable currents (Fig.5), it is no surprise that ancient sailors would have chosen to stop in Sri Lanka. This ideal topography allowed Sri Lanka to become a prominent figure in ancient maritime trade, not only were these natural bays and lagoons ideal for ports and harbors, but they would also be located very close to rivers that could allow goods to travel further inland without additional difficulty of overland transportation. An example of Sri Lanka's ideal natural harbors can be seen in Trincomalee, located on the eastern coast of Sri Lanka, which even today is a famous deep-water port.

With the discovery and mastery of the monsoon winds around the beginning of the Early Historic Period, trade between the Middle East, Mediterranean and the Indian subcontinent was significantly expanded (Vidanapatirana 2012, 43; Gunawardana 2003, 17-32). The monsoon winds were crucial for maritime

navigation of the Indian Ocean during the Early Historic period, particularly the Northeastern monsoon winds that occur from November till February which allowed ships from India to travel to Sri Lanka and Southeast Asia and then return by using the Southwest monsoon winds that occurred between June and September (Tripati 2017, 13)(Fig.6).

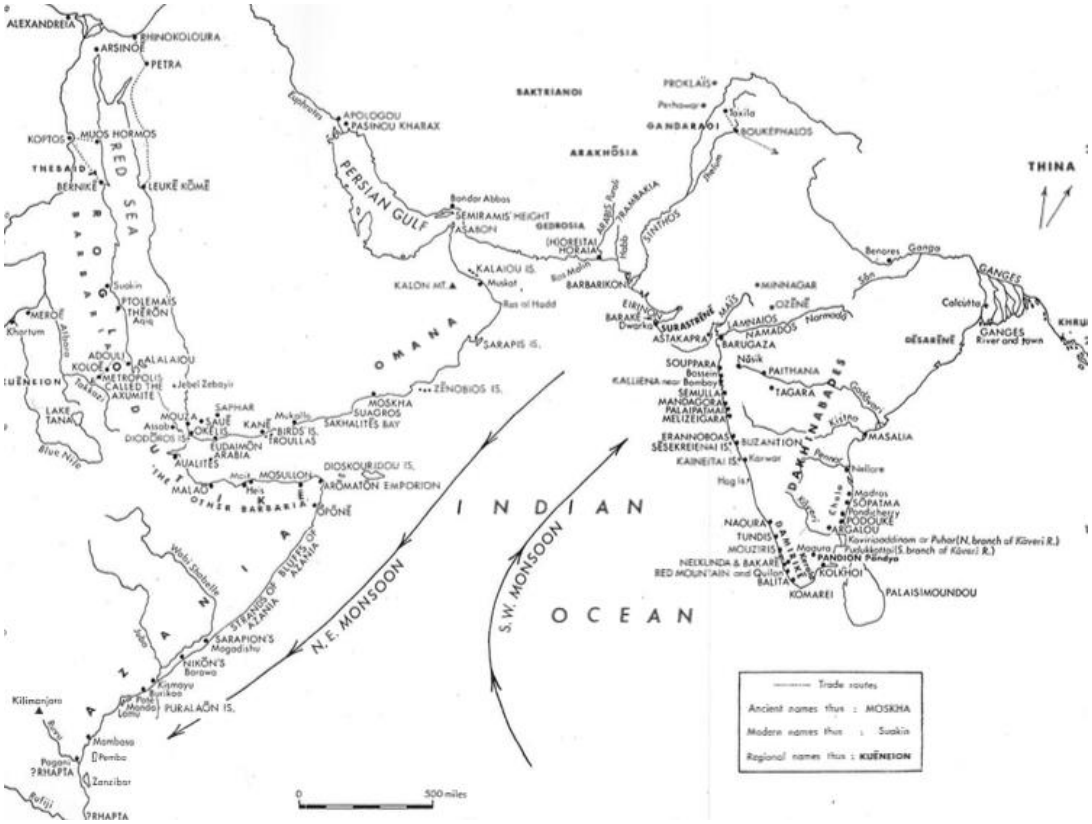

Figure 6.Map of Monsoon winds

Sri Lanka itself is a remarkably diverse island with various landscapes, such as its coastal zones, dry zones, wet zones and its central highlands (Fig.7). This diversity has often led to issues in governance and control of the island. But despite the difficulties that this topographical diversity presents, the island itself has long been famous for being abundant in natural resources that were very much in demand in the ancient world, particularly its precious stones, pearls and spices.

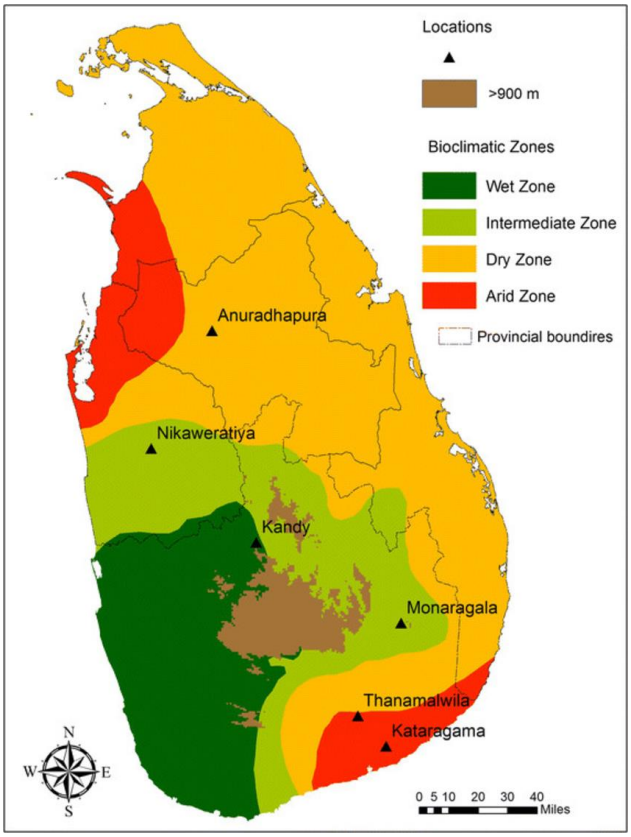

Figure 7 Map of climate zones

Historically, Sri Lanka was already known in places as far as the Mediterranean. Mentions of *Taprobane*[3] can be found dating all the way back to the 4th century BCE from authors such as *Onescritus* (Prickett-Fernando 2003, 53). Well known authors from the ancient Mediterranean were also aware of its existence, Pliny also wrote about envoys from Sri Lanka that reached Rome during the reign of Emperor Claudius (41-54 AD), it was there that they also mentioned that they were involved with trade with China in the East, once again attesting the fact that Sri Lanka had been heavily involved within the Indian Ocean trade networks before the involvement of Romans in Indian Ocean trade (Gunawardana 2003, 19). Other well-known mentions of Sri Lanka in antiquity are present in the works of an anonymous writer that wrote *"The Periplus of the Erythraean Sea"* also known in Latin as *"Periplus Maris Erythraei"*, where Sri Lanka and its ports feature prominently as part of the maritime trade network in the Indian Ocean.

Despite Sri Lanka's long tradition of maritime trade, it is only relatively recently that Sri Lanka's importance in pre-colonial trade networks has been researched. For many years it was believed that trade within the Indian Ocean was

[3] In antiquity Sri Lanka was known by a number of names including *Taprobane, Sielediba,* and *Serendib.* Up until the 20th century it was also known as *Ceylon*.

minimal until the involvement of the Roman Empire (Coningham *et al.*2017, 26) , but recent studies have shown that there was a thriving mercantile network long before the Romans got involved (Coningham *et al* 2017, 31-32; Coningham *et al* 2017, 26). This focus on Western influences on the subcontinent and its surroundings resulted in a focus on textual sources that only provide a partial reconstruction of the ancient past, and usually these texts were written by authors from the ancient Mediterranean world. Ancient texts such as the *Mahavamsa* and *Culavamsa*[4] were not take into full consideration in the wider academic sphere, usually only by South Asian scholars.

Trade networks within the Indian Ocean were already in operation when Sri Lanka is thought to have joined in the mercantile activity. It is assumed from the evidence collected over the last decades that Sri Lanka was not fully involved in the maritime trade networks of the Indian Ocean until around the 1st century AD (Schenk and Weisshaar 2016, 464 and Weisshaar *et al* 2001, 7). Trade between eastern and western civilizations was facilitated through agents such as the Tamil rulers of Southern India. It was after defeating the Tamil kings in the 2nd century BCE, that the Sinhalese ruler *Dutugamunu* was able to unite Sri Lanka and made it able to establish themselves as a major player within the aforementioned trade networks (Weisshaar 1998, 39-40). With the establishment of Anuradhapura as a major urban center in Sri Lanka, the involvement of Sri Lanka within Indian Ocean trade was increased significantly. Ports that would have facilitated this trade would have been spread throughout the coastline of the Island, allowing for safe passage and safe anchoring for merchant vessels. Among these ports, Mantai and Tissamaharama are the most notable ports discovered to this day, both of which would have been connected to Anuradhapura during the late 1st millennium BCE and throughout the 1st millennium CE. Both Mantai and Tissamaharama were established in the late first millennium BCE, with Tissamaharama having a slightly earlier date for the first proper settlement of the site. Mantai however, has a very deep history stretching back to the Mesolithic period in Sri Lanka, however after

[4] These are the main 2 texts that provide accounts for the history of ancient Sri Lanka

this Mesolithic period of occupation there was a hiatus up until the 3rd century BCE when a new settlement was established. Both of these sites remained in use throughout the 1st millennium CE, with Mantai falling into decline around the 13th century CE (Prickett-Fernando 2003, 109) and Tissamaharama falling into decline around the 5th century CE, but continuing to be inhabited for several centuries after its importance had waned (Schenk and Weisshaar 2016, 463). Many early scholars used the two main Buddhist chronicles of Sri Lanka, the *Mahavamsa* and *Culavamsa* in order to determine the history of Sri Lanka, and within its pages, the phenomenon of the "collapse" of the Sinhalese kingdom of Anuradhapura was attributed to invasions from the Chola Empire in Southern India (Seneviratne 1994, 34; Coningham 1999, 15; Longhurst 1937, 4) Recent research has disputed this claim, and the reality of the "collapse" of Anuradhapura can be linked to several different factors and not just invasions from a northern enemy (Strickland 2017). However, the fact remains that Anuradhapura did lose its control over the majority of the island around, and with this loss of control the port sites that once supplied the city with luxurious goods and exported local products fell into the hands of new rulers and over the centuries into disuse and eventually into ruin until they were forgotten.

It must be noted that the kingdom of Anuradhapura endured for over 1000 years as the main political ruler of the island of Sri Lanka. After its collapse trade did continue, but at a much smaller scale than what was occurring during the 1st millennium CE.

2.2 Anuradhapura

2.2.1 Site Description.

The site of Anuradhapura is located in the North Central province of Sri Lanka. The area itself is located in what is known as the "dry zone" of Sri Lanka. The site itself spans around 40 square kilometers, and is considered to be one of the major archaeological sites in the world (Coningham 1999, 1). Topographically, the area is formed as a series of shallow valleys stretching along approximately 120 kilometers of the nearby river called the Malwatu Oya (Fig.8)

Figure 8. Malwatu Oya flowing near Anuradhapura

(Coningham 1999, 7). The city itself has been divided into 4 distinct zones, each characterized by their function and the inhabitants of that particular zone. The innermost zone is the "Citadel zone", next is the "monastic zone" also known as the "sacred city", followed by the "tank zone", which in turn is followed by the outermost zone the "forest and hermitage zone"(Fig.9)

The citadel zone measures approximates 100ha in area, it consists of the secular buildings that would have been used by royalty, merchants and anyone who lived within that zone, these buildings include palaces, temples, and workshop all made from mud brick or timber (Coningham *et al* 2017,36; Seneviratne 1994). The monastic zone is as one may expect made up of buildings that were used by the monastic community based in Anuradhapura. There are 4 major monastic areas

known within Anuradhapura, each one of these areas has a main dagoba[5], these dagobas are namely, the *Jetavana* dagoba[6], the *Ruwanwelisaya* dagoba, the *Abhayagiri* dagoba and the *Mirisavati* dagoba (Figs. 10, 11, 12). It is worth noting that the *Jetavana* dagoba is one of the largest brick buildings in the world. Alongside these enormous dagobas, the monastic zone comprises of residential areas for monks as well as the famous *Sri Maha Bodhi Tree*[7] (Coningham *et al* 2017, 36).

The next zone, the "tank zone" is essentially the hinterland of Anuradhapura; it consists of residential areas as well as 4 large artificial tanks constructed for irrigating agricultural areas throughout the region. These tanks are extremely big and sustained the population of ancient Anuradhapura and are still useful for irrigation in the present day (Coningham *et al* 2017, 36; Parker 1909, 360-400).

The outermost zone, the "forest and hermitage zone" was known for being used by hermits and ascetic monks that would

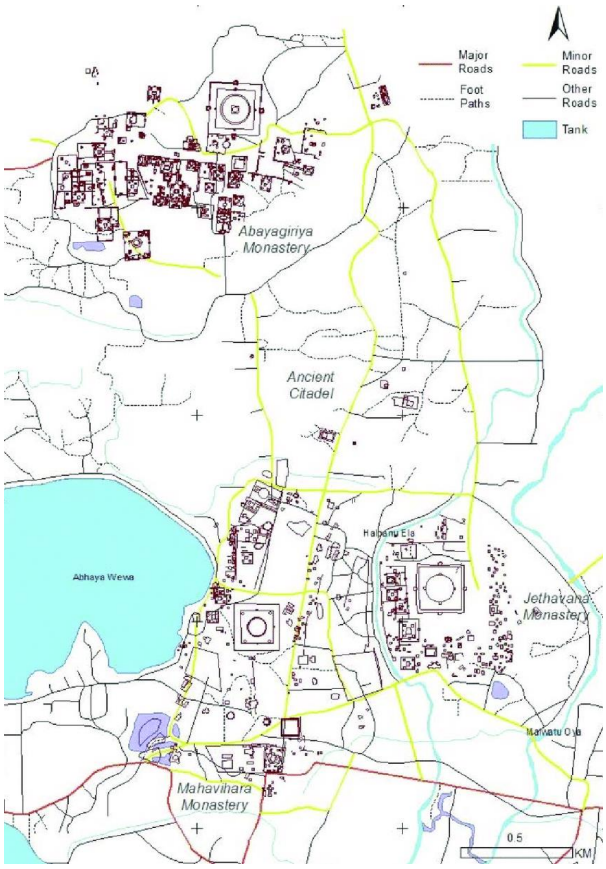

Figure 9. Map of Anuradhapura

[5] A Dagoba is a Buddhist shrine meant for worship, these are also known as stupas and usually contain some small reliquary. The form of these dagobas can be varied, but usually they are dome shaped with a spire at the center of it.

[6] The Jetavana Dagoba is also frequently referred to as the Jetavanaramaya.

[7] A tree (*Ficus* Religiosa) thought that is believed to have been brought to the island from a cutting from the original tree under which the Buddhas achieved enlightenment.

have inhabited the forested areas of this zone (Coningham 1999, 25-25; Seneviratne 1994, 81)

In short, Anuradhapura is a vast urban complex, which contains hundreds of mud brick buildings, residential, commercial and religious in nature. Most of the land in the area is flat, and where there are no modern buildings it is usually forested, with large areas of the site still being covered with soil and tree cover. The main kinds of soils found within the area are usually reddish brown earths; these soils are usually fine textured and have relatively good drainage (Coningham 1999, 11; Epitawatte 1990, 44).

Figure 11. Ruwanwelisaya Stupa

Figure 10. Jetavana Stupa

Figure 12. Mirisavati Stupa

2.2.2 Previous Research

Anuradhapura is arguably Sri Lanka's most famous archaeological site, and has therefore been the center of attention when it comes to archaeological research in Sri Lanka. Large areas of the ancient urban center have been excavated/restored and are open for tourists to visit. The first European recognition of Anuradhapura as a historically significant site begins already with mentions of the ancient city in the 17th century by Robert Knox (Knox 1681). Subsequently, with the translation of the Mahavamsa in 1837 into English, increasing interest in the archaeology of Anuradhapura led to attempts by the British to gather more information about this vast ruined city (Strickland 2017, 9; Coningham 1999; Hocart 1924). During the colonial era in the 19th century, the British attempted to excavate parts of the city, but these excavations were aimed at restoring and recovering monumental objects and sites (Figs.3, 4), little attention was given to the actual archaeological finds that would normally constitute a proper archaeological excavation, such as ceramics, archaeological features and architecture made from perishable materials (Strickland 2017, 9).

With the establishment of the Archaeological Survey of Ceylon, systematic excavations were conducted in Anuradhapura. But much like the previous non-scientific excavations, these newer excavations were mainly aimed at restoring the larger buildings at the site and identifying sites that were mentioned in the *Mahavamsa*. Large areas of the ancient city were cleared and the jungle that had held its grip on the ruined city for centuries were burned away to reveal a vast city made of mud brick and hewn stone (Strickland 2017, 9; Bell 1892, 1893, 1904a, 1904b, 1904c &1904d). It must be noted that throughout these early attempts at archaeological research, the Pali chronicles were heavily relied upon to provide information on what these structures actually were that were being uncovered. This reliance upon textual sources led to incorrect interpretations of buildings and their functions, which later had to be corrected (Strickland 2017, 9; Coningham 1999, 16; Hocart 1924, 10-14).

It was only later in the 20th century that research oriented excavations were conducted in Anuradhapura (Fig. 13) (Coningham 1999, 16-17; Deraniyagala 1957; Sestieri 1958). As with many archaeological excavations in Sri Lanka, one of the major issues that have plagued research from being disseminated has been the lack of publishing full reports (Strickland 2017, 12). This lack of fully published reports has hindered deeper knowledge of the site from being presented to the wider academic community.

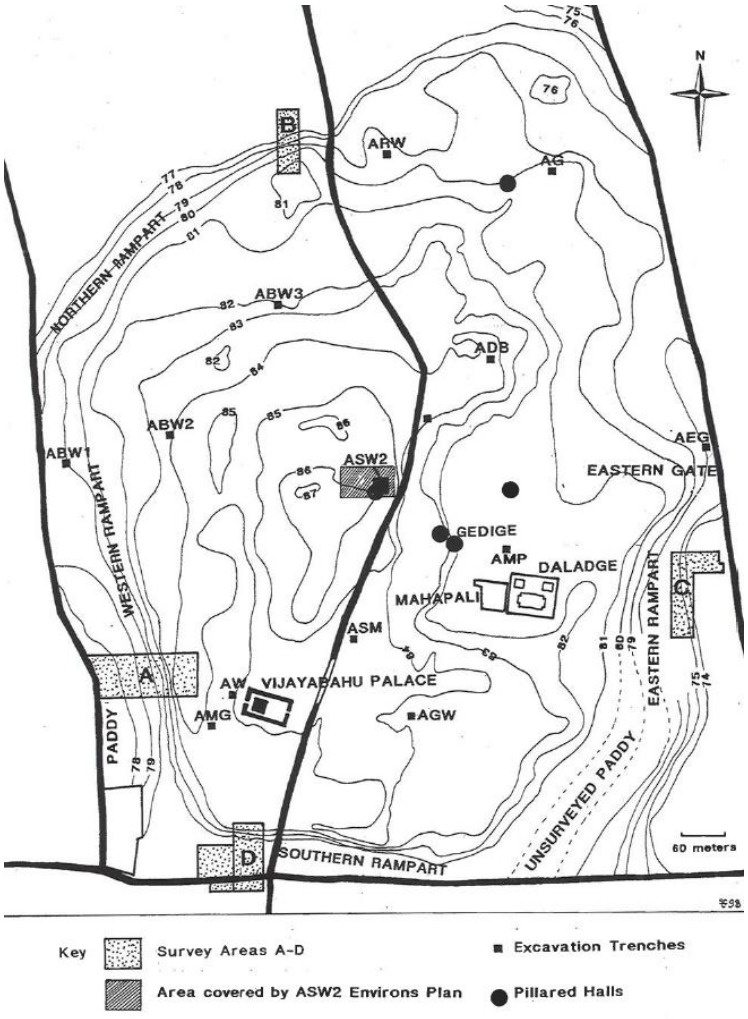

Figure 13. Map of Coningham's excavations at ASW2

The most extensive and well-known excavation reports from this site come from various excavations conducted in the 1980s with different foreign institutes (Coningham 1999, Bouzek 1993). The excavations from this particular team focused on the Citadel, the monastic zone and the hinterland. To date, this is the most in-depth archaeological report published on Anuradhapura (Strickland 2017, 12). The Sri Lankan-British team published all their finds and the details of the excavations in 3 volumes. It is these 3 volumes that have given major insight into the history of Anuradhapura.

2.3 Mantai

2.3.1 Site Description

Figure 14. Map of the mound at Mantai

The site of Mantai (Fig.14), which was linked with Anuradhapura via the Malwatu Oya river (today known as the Aruvi Oya) is located on the northwest coast of Sri Lanka, very close to the small stretch of land that once connected India to Sri Lanka known as Rameshvaram (Rama's Bridge). Mantai was conveniently located close to the mouth of the *Malwatu Oya* river (also known as the *Aruvi Aru*), the same river that flows close to Anuradhapura (Fig.8). From this entrance to the river, ships could travel further inland with trade goods (Carswell *et al.* 2013, 90). It was also located near the Palk Strait (Fig.15), which is a small corridor through which ships can pass from the west coast of India to the east coast, without having to circumnavigate the whole island of Sri Lanka, or use overland routes to transport the goods to the east coast or vice versa (Carswell *et al.* 2013, 22). The Palk straits are known to be treacherous as difficult to navigate, and Mantai is conveniently located in an area that could have easily controlled the navigable waters through which merchants would have sailed (Carswell *et* al. 2013, 22). The site of Mantai itself is in the form of a large mound that is located in the area. This mound was the main center of the site, which was a symmetrically planned urban center and this was also surrounded by a horseshoe shaped moat for defensive purposes (Carswell *et al.* 2013, 14). The surrounding landscape around Mantai is surrounded by urban buildings and farmlands. One notable architectural feature in the landscape is the very large water tank known as the "Giants Tank"

that was built around the same time as the main center of Mantai (Fig.16), this tank was used for water management for agriculture throughout the centuries and is still used today.

Figure 15. Overview of the Palk Straits

Figure 16. Location of the Giants tank

2.3.2 Previous Research

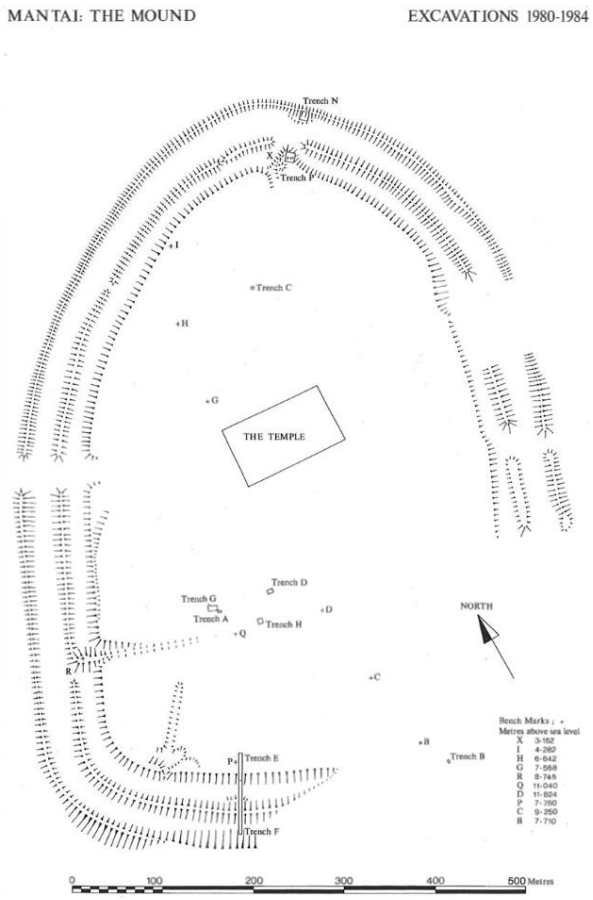

Figure 17. Map of trenches dug in the 1980s

The site of Mantai was historically known already from the 16th century, when Portuguese soldiers had taken note of the ruins in the area. There was even an excavation by a man named Diogo do Couto, who decided to excavate certain areas and recovered Roman coins (Do Couto 1961 in Carswell *et al* 2013, 25). However, during the later years, the site was not properly researched, but only visited occasionally. It was only after several British colonial officers had already excavated small areas of the site that in 1926 a man named A.M. Hocart began to realize the importance of this site in the history of Sri Lanka and undertook excavations at the site (Hocart 1927 in Carswell *et al* 2013, 31-34). Throughout the following decades different scholars continued research and eventually in the 1980s a joint effort from Sri Lankan and international researchers excavated the area further and came up with the most recent publication (Carswell *et al* 2013). The main excavations took place in 1980, 1982 and 1984, after which political condition prevented further research. This was mainly due to the increasingly hostile political conditions that were present in Sri Lanka due to the civil war between the Sri Lankan government and the Liberation Tiger of Tamil Eelam (LTTE, Tamil Tigers).

During the excavations in the 1980's trenches revealed the presence of Mesolithic inhabitants in the area, indicating that this site had quite a long history of occupation (Carswell *et al* 2013, 112-130), however this is not relevant to this paper, but it is worth noting that this area had been occupied for a very long period

of time even before trade began in the Indian Ocean. Trenches were excavated throughout the site focused primarily on the main mound of Mantai and the surrounding defensive structures (Fig.17) (Carswell *et al* 2013, 92-107). From these trenches a substantial amount of archaeological material was gathered, among these were items indicative of foreign trade with Mantai. Also present were, seals, inscriptions, pottery, and several other categories of material remains (Carswell *et al* 2013, 187-505). From further analysis researchers have been able to see that foreign goods from both Western and Eastern Asia are present at Mantai. The sequence of these material remains will be discussed in the coming sections when dealing with the historical background of these sites.

2.4 Tissamaharama

2.4.1 History of the Site

There is not much information on the history of Tissamaharama. The *Mahavamsa* states that the town was founded by king Mahanaga around 270BCE, but excavations have contradicted this information with architectural evidence of settlement already from around 400BC (Schenk and Weisshaar 2016, 459). This early settlement appears to have consisted of wattle and daub structures. It is also speculated that settlers from northern India arrived around 400BCE bringing with them iron tools and horses. Throughout the centuries following the establishment of Tissamaharama the settlement experienced restructuring and reorganization, as is normal with any settlement that is occupied for several hundred years. Starting from a settlement consisting of buildings made form wattle and daub and progressing until the town was a commercial center for the region with its architecture consisting of organized streets and mud brick buildings. The settlement seems to have declined round 500CE, but the citadel was still occupied for much longer with finds dating until the 9th century CE (Schenk and Weisshaar 2016, 463).

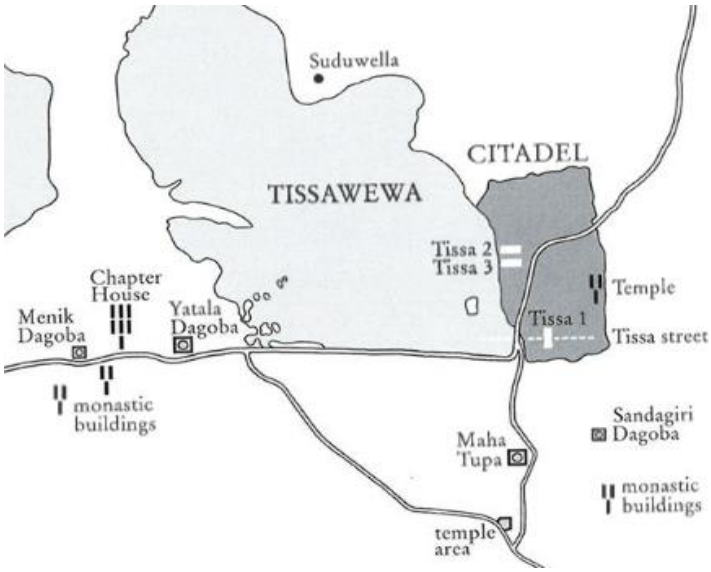

Figure 18. Map of the citadel and the adjacent reservoir.

2.4.2 Site Description

The site of Tissamaharama is located on the southern end of the Island (Fig.2). The site itself was an urban center but not the site of a port or harbor it is located further inland about 10km from the sea. The main harbor/harbors that would have been directly linked with Tissamaharama would have been the port of Godavaya, located around 30km southwest of Tissamaharama at the coastline, or the town of Kirinde, which is situated 12km away from Tissamaharama (Fig.19) (Roth 1998, 3-4). The main urban center of Tissamaharama is located on a hill called Akurugoda, which is located close to the lake called Tissawewa (Fig.18) (Weisshaar *et al.* 2001, 8). Akurugoda is a settlement mound, made up of different layers of occupation stretching back up till the 4th century BCE. The mound itself has been labeled as the "citadel" and measures roughly 600x200m (Schenk and Weisshaar 2016, 459). The surrounding area nearby Tissamaharama is sparsely inhabited and mostly used for agriculture, with most of the area being used for rice paddies and banana plantations, these agricultural fields are also irrigated using large artificial water tanks such as the Tissawewa (Weisshaar 1998, 41).

Much of the area that would have been part of the Ruhuna kingdom has now been covered by extensions to artificial tanks, which have submerged parts of the site, however ruins of the ancient kingdom can still be found in the surrounding area, usually covered by jungle.

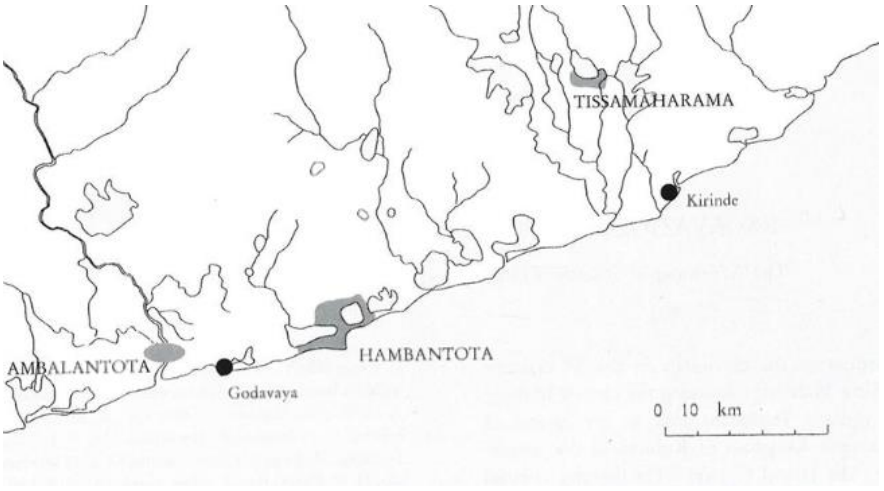

Figure 19. Map of Tissamaharama, Godavaya and Kirinde

Within the surrounding landscape, there are 4 large dagobas (temples), the largest of which is called the Maha Tupa, built in the 2nd century BC. At the time of its construction this was the largest of its kind in Sri Lanka (Weisshaar 1998, 41).

From the excavations and surveys conducted in the 90s, the layout of the site was properly mapped and analyzed. It appears that Tissamaharama was constructed in a symmetrical fashion, relating to the notion of the "ideal town layout", this concept was written in ancient texts and so far Tissamaharama is the closest example of a large urban center in Sri Lanka following these guidelines (Weisshaar 1998, 41; Schenk and Weisshaar 2016, 459). Cuts at the northern and southern ends of the mound have been thought to be where gates or entrances to this town would have been located, but this has yet to be determined (Weisshaar 1998, 42).

The excavations also have revealed differences in the usage of this settlement, the western section of the citadel is believed to have been occupied by noble's families and elites, whereas the southern section is believed to have housed the craftsmen and workers who would have worked within the citadel (Schenk and Weisshaar 2016, 460).

The settlement itself changed throughout the centuries as differences in settlement structure have shown in the different occupation layers. Changes in function and organization can be seen in examples such as a series of battery furnaces found from an early period that fell into disuse around the 1st century CE (Weisshaar 1998, 48).

Much like the site of Mantai, the site of Tissamaharama was located close to a river, which would have allowed goods to flow inland from the coastlines. Tissamaharama was located on the left bank of the Kirindi Oya, which leads to the sea, entering the ocean near the site of Kirinda (Fig.19) (Bopearachi *et al.* 1999, 8). It is through this connection to the Kirindi Oya that scholars believe that imported goods were brought upriver to urban centers located further inland, such as Tissamaharama (Bopearachi *et al.* 1999, 11-14).

2.4.3 Previous Research

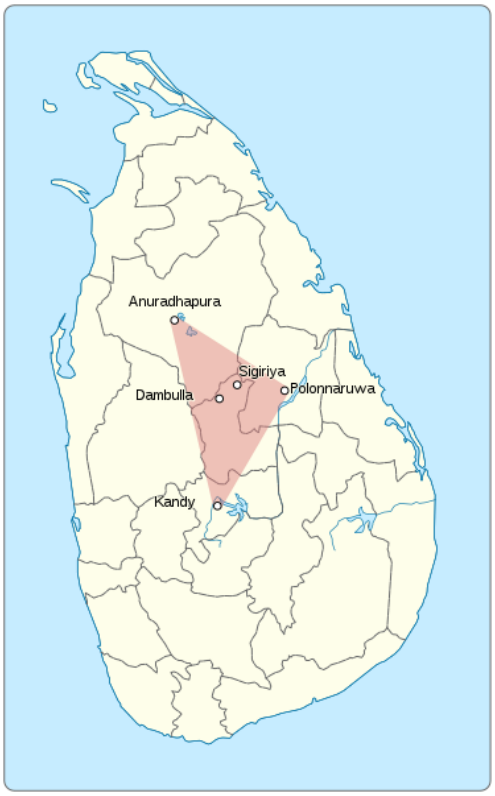

Figure 20. The Cultural Triangle of Sri Lanka

The site of Tissamaharama has a much more recent history in terms of archaeological research. For much of the 20th century, archaeologists in Sri Lanka have been focused on what has been called the "Cultural Triangle", this cultural triangle consists of the 3 main ancient archaeological sites in Sri Lanka namely, Anuradhapura, Sigiriya, and Polonnaruwa (Fig.20). It is only fairly recently that other parts of the island have been studied in detail (Weisshaar 1998, 40). The main archaeological research conducted on the site was done during the 1990s by a Sri Lankan-German team (Weisshaar *et al* 2001, 3). The excavations conducted on the site revealed that this was a major urban center linked to the trade networks of the Indian Ocean, as evidenced by the foreign pottery found throughout the site, this pottery included wares from Western Asia, Roman wares, as well as ceramic wares from the Far East including China (Schenk 2001, 74).

From the trenches that were dug by this research team, several architectural features from the urban center were discovered, including the Citadel, workers quarters (Tissa 1, 2, 3), the aforementioned battery furnaces, residential houses, public spaces and a well (Figs. 21, 22) (Weisshaar *et al* 2001, 8-39).

All in all, the German-Sri Lankan team excavated approximately 1500 square meters of the site. This was split up over the 3 different sites (Tissa 1, 2, 3) within the citadel itself.

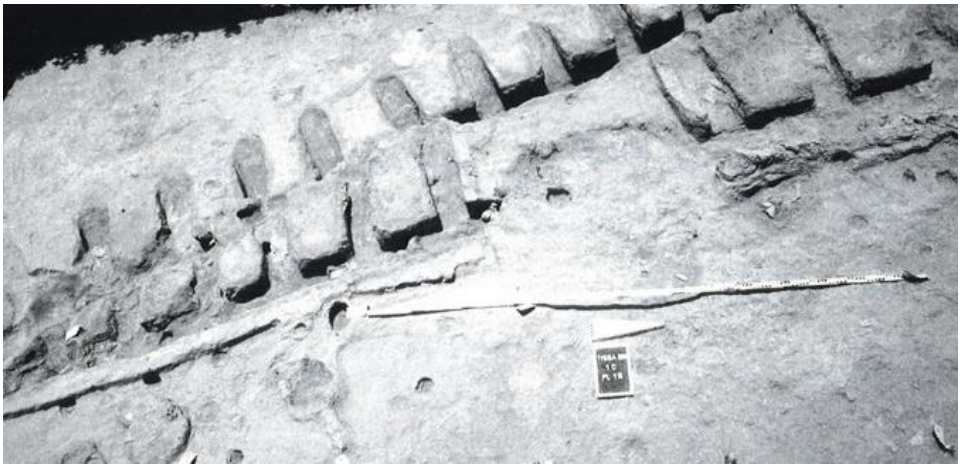

Figure 21. Battery Furnaces found at Tissamaharama

Figure 22. Ancient square well found at Tissamaharama

2.5 Godavaya

2.5.1 Site Description

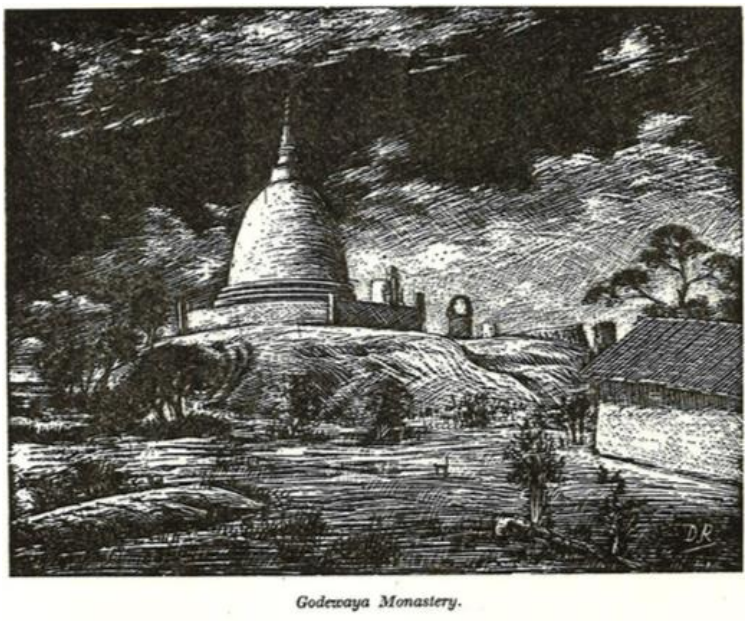

Figure 23. Artists drawing of the Monastery at Godavaya

The site of Godavaya is located some 30km southwest of Tissamaharama and it thought to have been one of the main ports connected to the main urban center (Fig.19). The site itself is located on a coastal plain close to the mouth of the river known as the Walawe Ganga. The site itself can be split into 3 sections as it was done during excavations in the area, the monastic complex, the residential area and the port site.
The topographical conditions of Godavaya make it a good location for a natural harbor, located close to the mouth of the river and with large rock cliffs nearby, ships would have been safe from the monsoon winds while anchored nearby (Kessler 2016, 441; Kessler 1998, 15-16).

The surrounding area consists of small fishing communities and an agricultural landscape. Towards the coast, one is confronted with thick mangroves and lagoons, which would have also made this site ideal for mercantile port since these features are beneficial for the protection of ships seeking anchorage. The bay itself is deep enough for ships to safely anchor. One of the landmarks within the area is a temple located atop of the cliffs close to Godavaya (Fig.23). This temple can be seen from quite far off and can be used as a navigation landmark for ships (Fig.24) (Kessler 2016, 443). At the site itself an image house was located at the cliff face and was dated to two building phases, the 2nd and 5th centuries CE (Kessler 2016, 443).

Other architectural features at the site include smaller stupas, an area for burials, and an area for residents and craftsmen, and close by to the monastery a building with evidence of it being a customs office have been discovered (Kessler 2016 441-449).

One very important discovery that was made a few kilometers off the coast of Godavaya is the discovery of the oldest shipwreck known from South Asia dating to the 2nd century BCE (Bopearachi et al. 2016, 416). This shipwreck was thought to be a merchant vessel and was carrying items that have been compared with items found within the Southern region of Sri Lanka at sites further inland (Bopearachi 2013).

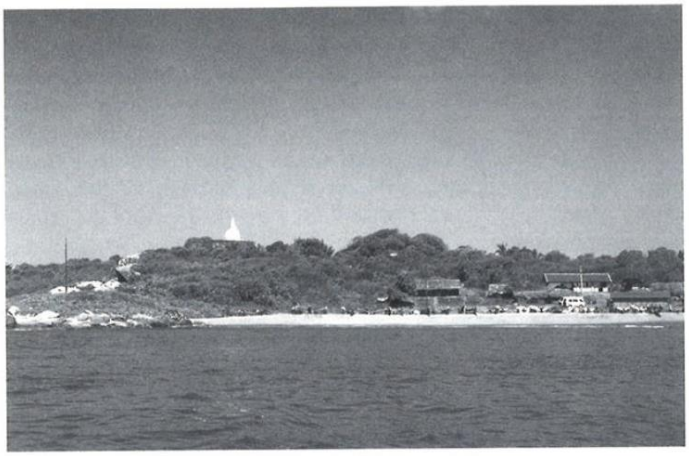

Figure 24. View of Godavaya from the sea

2.5.2 Previous Research

The research conducted on the site of Godavaya began in 1994 by a German-Sri Lankan team working for the German archaeological institute of Bonn and the Archaeological Department of Sri Lanka (Kessler 1998, 12). This work was closely linked to the works done at Tissamaharama. The discovery of the site of Godavaya was only possible through strategically surveying the surrounding landscape of Tissamaharama in order to find the port sites that would be associated with it. Alongside ideal topographical conditions, scattered evidence found over the years led to a high possibility that there would be archaeological evidence of mercantile activities at Godavaya. Among these scattered pieces of evidence were the discovery of hoards of Roman coins in the vicinity as well as rock inscriptions found near the ancient monastery at Godavaya, and these inscriptions actually mention taxes from

the port of *Godapavata* (Godavaya) being given to the local monastery by order of a King called *Gamani Abhaya* (Fig.25) (Kessler 1998, 14 and Kessler 2016, 441).

The discovery of the Godavaya shipwreck can also be attributed to the work done at the port site of Godavaya. In 1999 fisherman reported a site containing numerous artifacts to the research team that was working at Godavaya and from there, underwater excavations were organized and conducted up until the present day.

Figure 25. Inscription from Godavaya

2.6 Kantarodai

2.6.1 Site Description

Figure 26. Map of Kantarodai

The site of Kantarodai is located at the northern tip of Sri Lanka, next to the village of Chunnakam. The site itself is located next to a grove of palm trees that partially cover the site. Not much remains of ancient structures above the surface, although there is an area that has been reconstructed which has several small stupas(Fig.27), thought to have been located in the area based off previous research that found evidence of stupa architecture in the area (Begley 1970, 23). The site has been described as difficult to excavate and fully understand due to the dense shrubs that grow around it which prevent researchers from gaining easy access to it (Begley 1970, 23). The site itself dates to the Early Historic period in Sri Lanka and is one of the earliest and largest sites that date to this period within Sri Lanka (Murphy *et al.* 2018, 2). The site also consists of a settlement mound that is approximately 25 ha, which makes it the "largest early archaeological site in the Jaffna peninsula" (Murphy *et al.* 2018, 2). It is also thought that Kantarodai was the main urban settlement with the site of Jambukolapatthana (5km north of Kantarodai) being the main port linked to Kantarodai (Murphy *et al.* 2018).

2.6.2 Previous Research

The site of Kantarodai has had an unusual history of research. With identification of the site going back to 1917 when the site was examined by Paul. E. Pieris (Pieris 1917 in Begley 1970, 21). Not much was done with the site up until the 60s when it was excavated by C.E. Godakumbura in 1966. Alongside this an excavation done by Vimala Begley was also conducted in 1967 (Begley 1970, 21). Unfortunately to this

date there has been no official excavation report published on the site, with only scattered information from the 60s and an obscure publication from 2016 that cannot be considered as a reliable source of archaeological data due to the unusual nature of its publication (Thiagarajah 2016). However, to this date it is one of the more complete compilations of information on the site that is accessible, but even this is extremely limited and only gives us an very small understanding of what this site contains.

The most recent excavation occurred in 2012 as part of the Sealinks project that also focused on Mantai (Murphy *et al* 2018, 2), the main publication for this was focused on botanical remains that allowed for better dating of the site, confirming it as an Early Historical site but also with a firm presence during the Historic period. The main conclusions of this research were related to the agriculture of different sites during the Early Historic period, but nevertheless evidence for trade between South India and Sri Lanka was also found (Murphy *et al.* 2018, 12).

Figure 27 Stupas at Kantarodai

2.7 Smaller Sites

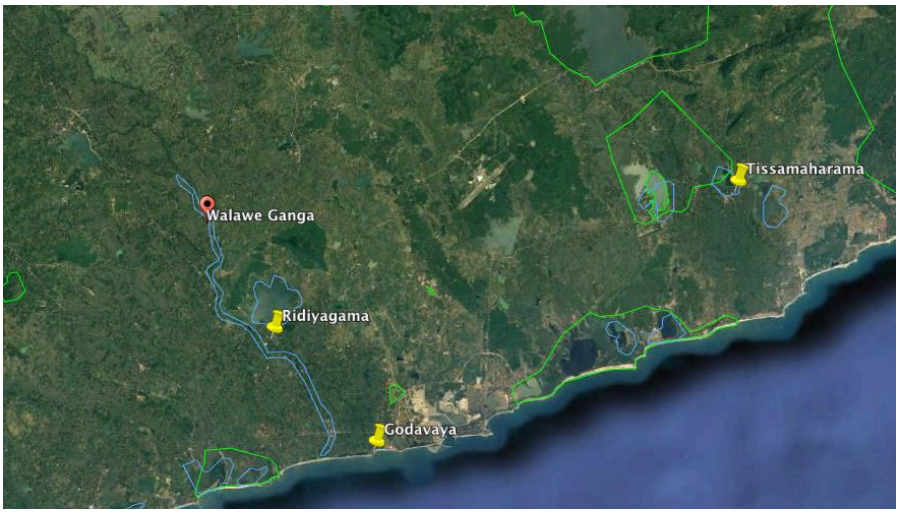

Figure 28. Location of Ridiyagama along the Walawe River

2.7.1 Ridiyagama

2.7.1.1 Site History and Description

The site of Ridiyagama is located 12km inland from the mouth of the Walawe River (*Walawe Ganga*[8]) (Fig. 2, 26). Not much is known about the site and its history. Recent excavations in 1995 (Bopearachi 1999, 13-16) found evidence of workshops for bead making and metalworking in the vicinity. It appears that the site was inhabited as early as the 4th century BCE and continued to be occupied up until the 7th century CE (Bopearachi 1999, 13). It is worth noting that it is located along the same river that ends in the ocean nearby the site of Godavaya at the Southern end of the island. The site itself has been affected by erosion from the river as well as development projects that have partially flooded the area.

[8] *Ganga* is the Sinhalese word for river. Almost all the rivers are called by a name and followed by the word *Ganga*. Sometimes instead of *Ganga* the word *Oya* is used, having the same meaning.

2.7.2 Kelaniya

2.7.2.1 Site History and Description

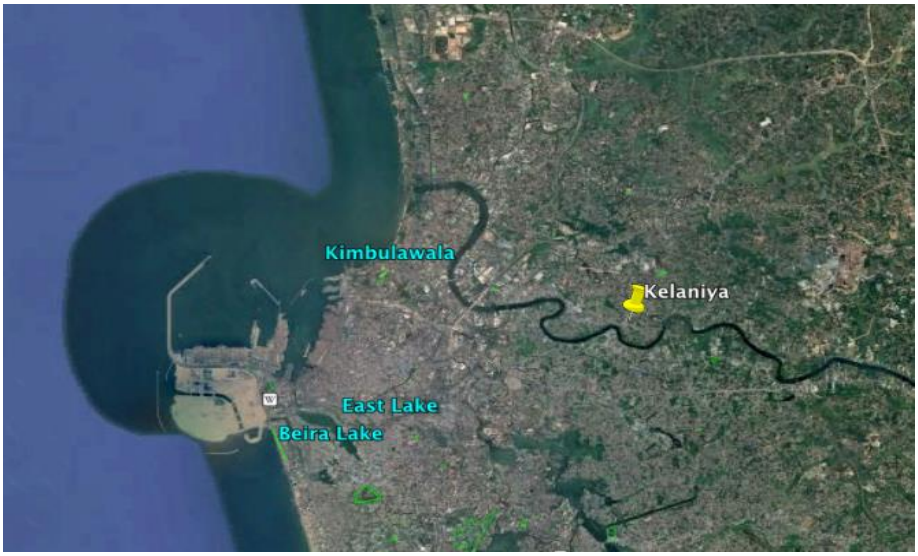

Figure 29. Location of Kelaniya along the Kelani River

Much like the site of Ridiyagama not much is known about the site of Kelaniya. As its name suggests it is located 5km inland, on the right bank of the Kelani River (*Kelani Ganga*) (Fig. 27). In 1997 a campaign was undertaken to see what archaeology may exist in the area (Bopearachi 1999, 5-13). Again like Ridiyagama evidence of workshops was discovered related to metalworking. The occupation of this site is thought to be from the 3rd century BCE until the 11th century CE, with evidence of even earlier occupation as early as the 6th century BCE (Bopearachi 1999, 13). However the dating for this site still need to be further examined to determine a more accurate chronology of occupation.

2.7.3 Nariyagama

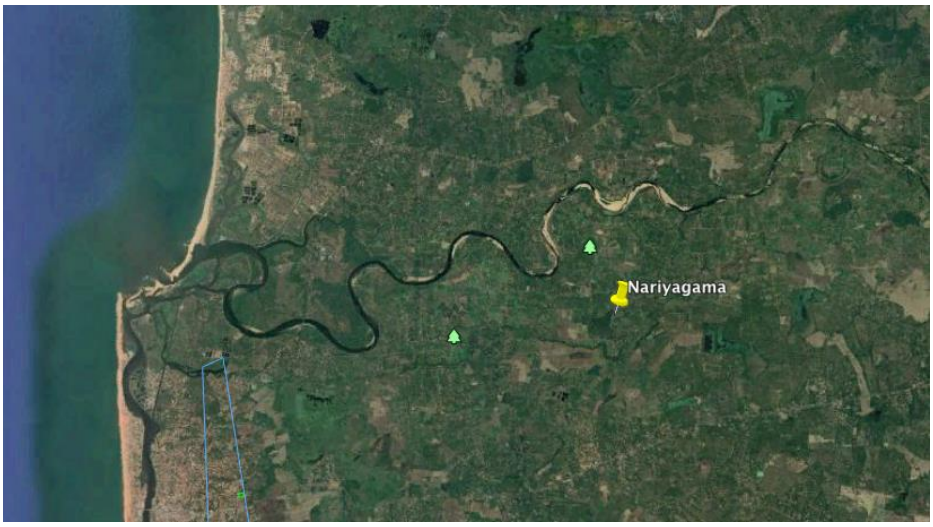

Figure 30. Location of Nariyagama along the Deduru Oya River

Similarly to Kelaniya and Ridiyagama, Nariyagama is an inland site located close to a river estuary (Fig.28). In this case it is located 10km inland from the mouth of the Deduru Oya on the left bank of the river. At the estuary itself, was the ancient port of *Salvatottha* (also known as Chilaw). In 1998 the team led by Dr. Bopearachi surveyed it, as they also did with Kelaniya and Ridiyagama (Bopearachi 1999, 8-9). As with the previous 2 sites, not much is known archaeologically about this site. Aside from the aforementioned excavations, there have been no archaeological excavations that have been made available outside of Sri Lanka. As with Ridiyagama the site has been heavily affected by erosion from the river, causing part of it to collapse into the river.

Figure 31. Remains of the large stupa at Nariyagama

The present day river is only navigable for a short distance inland, but research has shown that in antiquity the river was navigable for up to 30km inland. The area around Nariyagama was also known for producing high quality cinnamon, a highly desired

spice. The site itself also contains a large stupa that is still visible but heavily weathered; it has a diameter of around 30m and is dated to around the 4th century CE (Fig. 34) (Bopearachi 1999, 8). It is believed that this stupa could be an indicator that in antiquity there was an important settlement or town within the area, connected to maritime trade via the river. Alongside the large stupa several structures made from mud bricks were also found as well as evidence again of metalworking (Fig.35).

Chapter 3

3. State of the Research/Archaeological Overview

3.1 Introduction

In order to properly understand the state of research regarding Sri Lanka and its role in the Indian Ocean trade networks, I will provide an overview of all the currently available archaeological data and results that have been published over the last few decades from the sites mentioned in chapter 2. The information is presented according to the different artifact categories. Alongside the artifacts from these sites, I also present other data relating to the topic of trade networks, as well as information regarding the different land routes that would have been used in order to facilitate trade within the island. By providing a general overview of all the data relating to trade here it will be much easier to understand the overall bulk of evidence that exists pertaining to Sri Lanka's role in the Indian Ocean trade networks. Rather than have the information spread out over several publications in different languages, some of which are rather difficult to acquire, this thesis will allow fellow researchers to have a quick overview of the relevant material without having to comb through multiple sources.

3.2 Anuradhapura

Over the last century there have been numerous archaeological investigations at the site of Anuradhapura. Starting in the late 19th century with sporadic excavations of the main monumental structures such as the citadel and large dagobas of Jetavanaramaya and the Abhayagiri vihara. In the 20th century further detailed and scientifically oriented excavations were conducted and are still being conducted to this day. Presenting all the accumulated data gathered over the years on the site would go far beyond the scope of this thesis. Therefore I will present the main data related to regional and trans regional trade with ancient Sri Lanka. 2 of the more availably published excavations and the artifacts recovered from them will be presented here, the excavations at the Abhayagiri Vihara in the 80s (Bouzek *et al.* 1993) and the largest and most complete excavation at Anuradhapura, the excavations at Salgaha Watta conducted in the 80s and 90s (Coningham 1999). Mention will also be given to the excavations at the Citadel of Anuradhapura during the 70s by Dr. Deraniyagala, but unfortunately it will only be a brief descriptions as I was not able to acquire the relevant published reports for that excavation (Deraniyagala 1972, 1986). The relevant data will be presented here by artifact category, within which artifacts from each excavation will be presented.

3.2.1 The Sri Lankan British Archaeological excavations at ASW2

Pottery

ASW2

In the excavations by the British Sri Lankan team in the 80s and 90s large amounts of pottery were recovered. Of the pottery recovered imported foreign pottery also featured prominently. The pottery has been classified according to its assigned provenance, which includes regions such as China, India, Persia, Iraq and Iran. The pottery itself has been split into the categories of glazed and unglazed wares.

Glazed Ceramics

West Asian Ceramics

In the trench at ASW2 approximately 338 glazed ware sherds were recovered. Of these 338, the majority of the sherds belong to the group of West Asian ceramics and the rest belong to East Asian ceramics. Most of the glazed sherds found from West Asia date from as early as the Parthian period through to the 11th century CE. The categories of ceramics from West Asia have been identified at ASW2 in Anuradhapura are Lustre wares, Imitation Lustre wares, White tin glazed wares, Lead glazed wares, Sassanian-Early Islamic wares and Buff wares(Fig.30).

Lustre Wares

These wares originate from the Middle East, specifically from Iraq and Iran. They have ben dated to the 10th century CE. The total number of sherds amounts to 33 sherds. This kind of pottery is also found at Mantai, Siraf in Iran and Kilwa in East Africa (Seely *et al.* 2006, 91).

Imitation Lustre Wares

Only one sherd of this type was found. Thought to be from Eastern Iran, close to the site of Nishapur/Khurasan. Dated to the 9th/10th century CE (Seely *et al.* 2006, 93-94)

White Tin Glazed Wares

A total of 78 sherds of this type were recovered. Dated to around the 9th/10th century CE. Thought to originate from Iraq/Iran. (Seely *et al.* 2006, 94-98)

Lead Glazed Wares

A total of 11 sherds of this type were recovered. They are thought to originate in Iraq/Iran and have been dated to the 9th/13th centuries CE (Seely *et al.* 2006, 98-99)

Sassanian-Islamic Wares

A total of 116 sherds of this type were recovered. Thought to originate from Iraq/Iran. Dating for these is quite varied ranging from possibly the Parthian period up to the early Islamic period. These wares are also found elsewhere in Anuradhapura in the Citadel and at the Abhayagiri Vihara. Most of these sherds belong to large storage jars and have the typical blue color found in these Sassanian-Early Islamic wares (Seely *et al.* 2006, 99-107)

Buff Wares

Consists of a light tan color. A total of 59 sherds of this type were recovered. Dated to the 5th/9th centuries CE. Most of the vessels are jars. On the interior of these wares there can be a layer of black coating. Thought to be bituminous. These wares are also found at Mantai as well as other parts of Anuradhapura. (Seely *et al.* 2006, 107-111)

West Asian Ceramics	Description	Dating	Origin/Provenance	Also found in:	Number of Sherds
Lustre Wares	Smooth yellow ware with white tin glaze	9th-10th CE	Iraq/Iran	Mantai Siraf (Iran) Kilwa (Tanzania)	33
Imitation Lustre ware	Contains design painted onto opaque white glaze	9th-10th CE	Nishapur/ Khurasan		1
White Tin Glazed wares	Smooth yellow earthenware with a white glaze	9th-10th CE	Iraq /Iran		78
Lead Glazed wares	Yellow earthenware with various colored glaze	9th-13th CE	Iraq/Iran	Mantai Kilwa Siraf	11
Sasanian-Early Islamic wares	Blue glazed wares	Varied dating from Parthian period up until Early Islamic period	Iraq/Iran	Abhayagiri Vihara (Anuradhapura) Sirkap Taxila (Pakistan)	116
Buff wares	Unglazed light tan color. Some black coating on interior and exterior	5th-9th CE	Uncertain but most likely from West Asia	Mantai Other parts of Anuradhapura	59
					Total: 338

Table 1. West Asian Glazed Ceramics from ASW2

East Asian Glazed Ceramics

Among the finds of pottery in ASW2, East Asian ceramics were also found. A total of 21 sherds were found from East Asia. The number of sherds of East Asian origin is much fewer than those of West Asian origin, but nonetheless they provide important evidence in linking Sri Lanka with maritime trade with China and the Kingdoms of the East. Several different types of ceramics were discovered with East Asian provenance, Changsha Painted Stoneware, Xing and Ding wares, Yue Green wares, and Coarse Grey Stoneware (Fig. 30). As with the aforementioned foreign sherds from West Asia, there are very few photographs of the actual sherds that are available for use.

Figure 32. East Asian imported ceramic vessels from Sri Lanka (Unknown context)

Changsha Painted Stoneware

A total of 3 sherds of this type were found from ASW2. Dated to the later part of the Tang period (7th-10th centuries CE). Thought to be from the Hunan province in China. These wares usually have a white slip on the exterior and interior of the vessels. Contains some decorations. Similar sherds have been found at Mantai and Abhayagiri Vihara (Seely *et al.* 2006, 111-112).

Xing and Ding Wares

A total of 10 sherds of this type were recovered from ASW2. Dated to around the 9th/10th century CE. Thought to be from Northern China. This type of ceramic is made of fine white porcelain. Sherds similar to these have also been found at Siraf (Seely *et al* 2006, 112).

Yue Green Wares

A total of 6 sherds of this type have been recovered from ASW2. These wares contain a very thin glaze, almost transparent. Thought to originate from the South Eastern part of China, Zhejiang. This type of ware has been dated to around the 9th/10th centuries CE. This type of ceramic is also found at Mantai, Polonnaruwa, Abhayagiri Vihara and Jetavanaramaya, as well as Siraf (Seely *et al* 2006, 112-113).

Coarse Grey Stoneware

A total of 2 sherds of this type were recovered from ASW2. Thought to be of North Vietnamese or Chinese Origin. These are also possibly what are known as Dusun wares. Dated to around the 8th-12th century CE. This type of ceramic is also found at Mantai, Siraf and Bambhore on the coast of Pakistan (Seely *et al* 2006, 113)

Pottery Type	Description	Dating	Origin	Also found at:	Number of Sherds
Changsha Pottery	Some decorations, white slip on interior and exterior	Late Tang period	Hunan (China)	Mantai Abhayagiri monastery	3
Xing and Ding White Wares	Fine white porcelain, with transparent glaze	9th-10th CE	Northern China	Siraf	10
Yue Green Wares	Green ware, with thin olive glaze	9th-10th CE	Zhejiang (Southeast China)	Mantai Polonnaruwa Abhayagiri monastery Jetavana monastery Siraf	6
Coarse Grey Stoneware	Olive green glaze	8th-12th CE	Chinese or Northern Vietnamese	Siraf Mantai Bambhore (Pakistan)	2
					Total: 21

Table 2. East Asian Glazed Ceramics from ASW2

Unglazed Ceramics

Alongside the glazed imported ceramics there was also a significant amount of unglazed imported ceramics uncovered at ASW2. Within this section I will highlight the main fine wares that are indicative of foreign trade with Sri Lanka. The main categories of the unglazed ceramics of a foreign origin are Grey ware, Rouletted ware (this category consists of Rouletted ware type 1, Arikamedu type 10 Rouletted ware and baby rouletted ware), Northern Black Polished ware and Red Polished

ware. All of the aforementioned categories are considered to be fine wares. Of the fine wares approximately 1274 sherds belong to the category of Rouletted wares, which is the most dominant category (Fig.31).

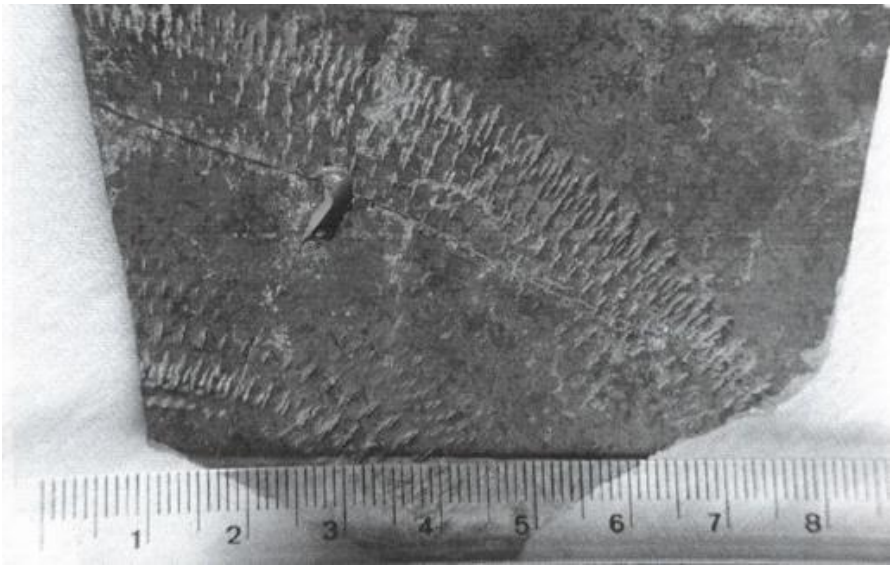

Figure 33. Rouletted ware from ASW2

Greywares

Around 207 body sherds, 14 rim sherds and 2 base sherds of this type of ceramic were recovered from ASW2. This type of ceramic is thought to be the ancestor of Rouletted ware due to their similar characteristics. This type of ceramic has been dated to around 510-340BCE up till 600-1100 CE. Sherds of this type have also been found at Kantarodai (Coningham *et al.* 2006, 128-132).

Rouletted Ware Type 1

A total of 1191 sherds of this type were found at ASW2. Most of these date from the layers around 200BCE-130CE. This kind of ceramic has been found in a number of different sites all around the Indian Ocean. It was also closely linked with mercantile activity throughout the Indian Ocean (Magee 2010). Some of the sites where this type occur in India are Arikamedu, Alagankulam, Uraiyur, Sisupalgarh, Chandraketugarh, and in Sri Lanka at Mantai, Anuradhapura, Kantarodai and

Tissamaharama (Coningham *et al.* 2006, 133-159).

Arikamedu Type 10 Rouletted Ware

A total of 45 sherds of this type were recovered from ASW2 (Fig.32). This type of ceramic is also found at several other sites in the Indian Ocean such as Sembiram (Bali), Chandraketugarh (India), Karaikadu (India), Dharanikota (India) and also at other parts of Anuradhapura itself such as the citadel in Anuradhapura, and the Jetavanaramaya (Coningham *et al.* 2006, 159-163).

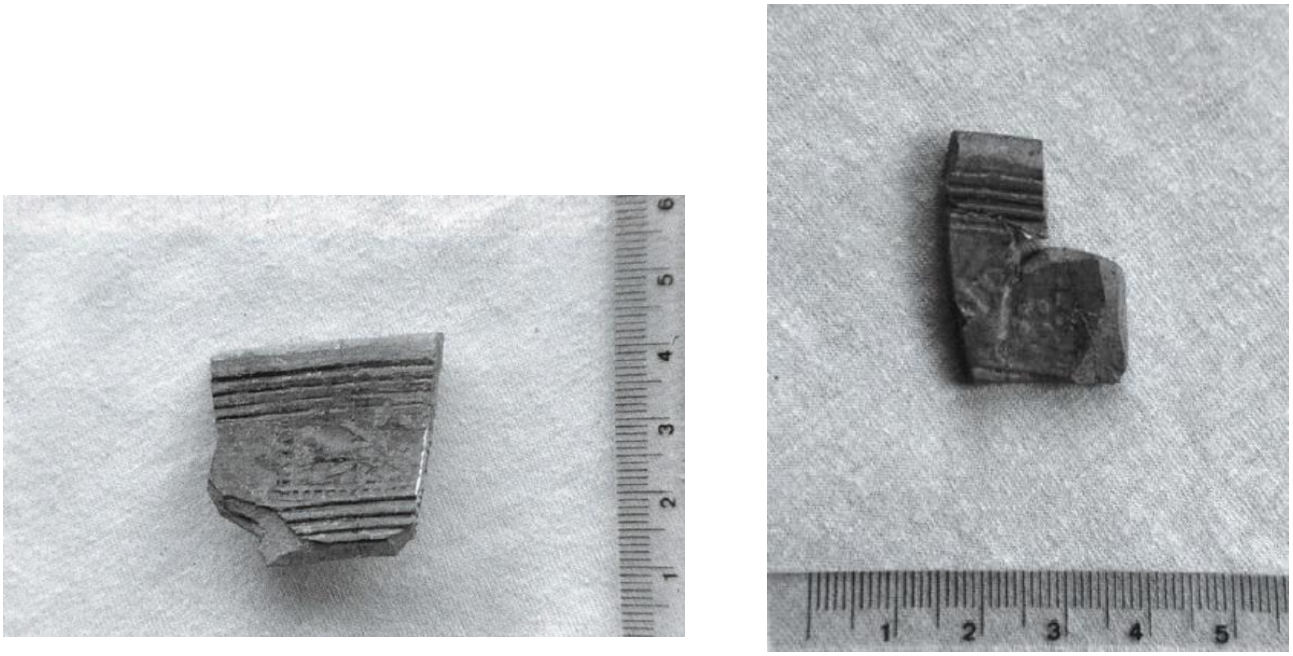

Figure 34. 2 sherds of Arikamedu Type 10 wares from ASW2

Northern Back Polished Ware

This type of ware has been found all over Asia. Stretching from Somnath to Taxila. No exact number of sherds is given, but it is mentioned that sherds of this type were found within the excavations at the citadel in Anuradhapura in the 1970s as well as ASW2 (Coningham 2006, 165)

Red Polished Ware

A total of 92 sherds of this type were found at ASW2. The distribution of this type within the stratigraphy of this type indicated that this was most likely a foreign import since there is no gradual increase and gradual decline of this ware, meaning it would have been manufactured elsewhere and brought to Anuradhapura (Coningham *et al.* 2006, 168-171). This type of ceramic is also found at the Citadel of Anuradhapura, Jetavanaramaya, Mantai, and Tamluk (West Bengal).

3.2.2 Excavations at the Abhayagiri Vihara 1981-1984

Pottery

Unglazed Wares

From the excavations between 1981-1984 only very few unglazed imported ceramics were found at the Abhayagiri Vihara (Bouzek *et al.* 1993, 83). The exact number of sherds from the different types of wares is not given. Among the finds are the usual suspects of pottery relating to trade with the Indian subcontinent, a few sherds of Northern Black Polished Wares were found as well as south Indian imitations of this type, which are more numerous in number than the former category (Bouzek *et al.* 1993, 83). Rouletted wares also make an appearance but in a very limited amount (Bouzek *et al.* 1993, 83). Indian Red Polished Wares also are

present within the dataset, as well as a type of ware that is described as "Red Coated East Roman Wares", however this last type only has very few tiny sherds, which makes it questionable that this is indeed a Mediterranean ware (Bouzek *et al.* 1993, 83). South Indian Fine Polished Wares are also found at the Abhayagiri Vihara as well as Red Painted Wares. Interestingly Kaolin Wares were also found at the site in the form of sprinklers, possibly for religious purposes, this type of ware appears in various regions including Taxila, Cambay and the Ganges Valley (Bouzek *et al.* 1993, 83).

3.3.1.2 Glazed Wares

The set of imported glazed wares is few in number but again show the connections that Anuradhapura had to distant parts of the ancient world (Table 4, 5, 6). Around 111 sherds of foreign glazed wares were found at the Abhayagiri Vihara, of these wares, 51 have a Chinese provenance and 60 have a Near Eastern provenance (Bouzek *et al.* 1993, 87).

The Near Eastern wares consist of wares from several different time periods, 6 sherds from the Parthian period were found as well as 41 from the Sassanian/Early Islamic period and 13 sherds from the Islamic/Samarran period (Bouzek *et al.* 1993, 87-88). The Chinese wares also represent varied time periods, 15 sherds from the Tang period were found, 24 from the Hsing period, 8 from the late Yue period and 4 late Changsha sherds were also found during the excavations (Bouzek *et al.* 1993, 87-89)

3.3.2 Glass Objects

Also among the imported finds from the excavations at the Abhayagiri Vihara are glass objects with a possible foreign origin. The exact numbers of glass objects is not given (most likely only 16) but it is a very small amount compared to amounts found during excavations at Mantai and the Citadel of Anuradhapura. The main categories of imported glass are Late Roman and Islamic glass (Bouzek *et al.* 1993, 97). Also among the finds reported were 6 sherds of Early Roman glass (Bouzek *et al.* 1993, 97). Also present are glass bangles with a possible foreign origin, but this has not been determined, similar bangles have been known to have been produced in Taxila around 500BCE (Bouzek *et al.* 1993, 101). Another category that could contain more imported objects is the beads found at the Abhayagiri Vihara, but the origin of these beads is only speculated and has not been determined (Bouzek *et al.* 1993, 101-106).

3.2.3 The Jetavana Treasure

The Jetavana treasure is a collection of items that were found during excavations of the Northern and Southern frontispieces and the upper stone terrace at the Jetavana Dagoba in Anuradhapura (Ratnayake 2003, 37). The items themselves are luxury items of value that would have been held in high esteem during the first millennium CE.

Among the finds are 600,000 beads made from glass and clay and semi-precious materials such as carnelian, crystal, agate, as well as ivory, shell and bone (Fig.33). Gold and bronze objects were also present in the finds, ivory and bone seals were also found (Ratnayake 2003, 41). Religious sculptures were also found pertaining to Hinduism as well as Buddhism (Fig.34); these sculptures would be made in luxury materials such as marble. Around 150 intact ceramic vessels were also found during the excavations, these also include foreign wares such as Parthian

wares (Fig.35), Sassanian wares as well as Fine Red Polished Wares from India, wares similar to ones found in Afghanistan, and sherds from Chinese and Islamic vessels (Ratnayake 2003, 37-45). Small intaglios made out of carnelian featuring what appear to be Roman heads also make an appearance within the Jetavana Treasure (Fig.36), alongside these other various kinds of objects from different regions were also found such as a bronze lions leg thought to be from West Asia or the Mediterranean, glazed tiles and mosaic ceramic vessels (Ratnayake 2003, 37-45).

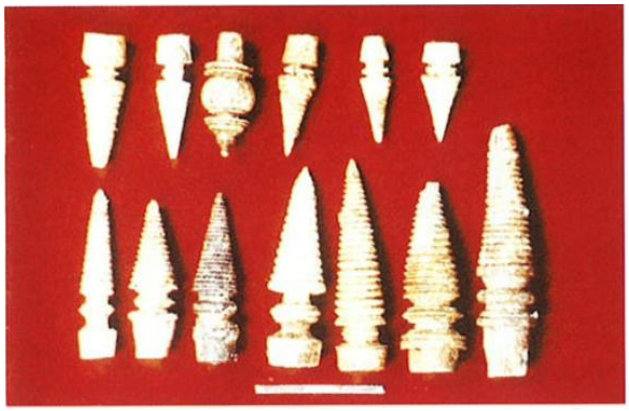

Figure 35. Reliquary spires from the Jetavana Treasure

Figure 36. Parthian vessel from the Jetavana Treasure

Figure 37. Various objects from the Jetavana Treasure

Figure 38. Intaglio with Roman head from Jetavana Treasure

3.3 Mantai

For the majority of its research history the site of Mantai was only sporadically excavated and investigated by archaeologists. The most reliable and complete report to date in from the excavation by Sri Lankan and British archaeologists in the 1980s. Lesser-known early excavations such as those by Hocart in the 20s also helped to bring the significance of this site to light. Presented here will be evidence gathered mainly by the Sri Lankan British team in the 1980s as well as some significant finds from earlier and later excavations. As mentioned previously it must be kept in mind that the stratigraphic sequence at Mantai from the excavations in the 1980s remains incomplete.

3.3.1 The Sri Lankan-British Excavations 1980-1984

Most of the relevant materials come from trench G and H (Fig.17). With Trench G having the earliest reliable occurrence of imported pottery (Graham 2013, 191)

Trench H

This trench is located at the highest part of the mound, which is at the southern part of the mound. Within this trench structures made from mud, cadjun and timber were found. It appears that there had also been instances where the buildings at the site were intentionally leveled in order to form a new layer, upon which new structures would have been built. The later layers consist of more mud brick and stone buildings. Within the older layers of this trench a burnt building was found that was dated to around 200BCE.

Trench G

This trench contained a significant amount of imported pottery from West Asia, the Mediterranean and the Indian subcontinent. This trench was located close to the center of the mound. It also was located within the same area excavated by Hocart in the early 20th century (Graham 2013, 100)

Pottery

Similarly to Anuradhapura, Mantai possesses a diverse range of foreign imported pottery that is indicative of its role as an important trading point within the Indian Ocean. An important note for the presentation of this pottery is that the sherds mentioned here and in Carswell 2013 are only a small fraction of the actual total number of sherds that were recovered during the excavations. The reason for this is that after the excavations were stopped the majority of the sherds were packed and sent to a depot in Anuradhapura where they presumably are to this day (Graham 2013, 191). In 1990, 546 sherds were selected and sent to England for further analysis, it is from these 546 sherds that the evidence presented in Carswell 2013 and this thesis comes from (Graham 2013, 191). The pottery found at the site will be presented here in order of the trenches and trench units that were made by the excavators. Locally made pottery is also presented here but the foreign imports will be focused upon. The total numbers of sherds analyzed are 243 sherds from Trench G and 167 sherds from trench H.

Trench H

Units: 24, 25, 26 (Primary occupation layers)

Consists of 34 rims sherds were found as well as 1 base sherd. These sherds are thought to be mainly from upright carinated bowls.

Unit 27 (Layer on top of primary occupation layer)

Consists of 31 sherds were found within this unit. Again coming mostly from upright carinated bowls. These have been dated to around the 1st and 2nd centuries CE.

Among the sherds was a single sherd of fine ware, which is possibly imported.

Unit 29 (Upper sand layers)
Contained a single rim sherd, which is possibly imported. This group also contained 3 sherds of possibly imported Chinese ceramics. The sherds were creamy white stoneware sherds dated to around the 8th century CE. But these East Asia sherds are most likely intrusive. There were also 2 sherds of a similar type found within the layer containing the burnt house dated to 200CE, which is more evidence that these sherds were intrusive.

Unit 32 (Destruction debris above occupation sequence)
40 sherds were analyzed. Upright bowls are still prevalent in this layer. 2 sherds of fine imported wares were also recovered, these sherds are also similar to some found in the Jetavana treasure (Ratnayake, 2003)

Trench G

Units 48, 49, 50 (Primary Layers)
A total of 21 sherds were found within these units. Of these 21 sherds, 6 are possibly imported.

Unit 53 (Primary Pits) (Fig.37)
A total of 105 sherds were found within this unit. Sherds similar to those found at Tissamaharama were found in this layer. The dating of these sherds is fairly different from the ones found at Tissamaharama, in these units the sherds were dated to 2nd/3rd centuries CE whereas in Tissamaharama the sherds were dated to 4th/1st centuries BCE. Of these 105 sherds 9 sherds were found to be of West Asian origin. 5 of these sherds are Sassanian-Early Islamic sherds with a turquoise glaze, similar to those found at Anuradhapura. However it is also speculated that these sherds may be intrusive (Graham 2013, 202). Within these sherds, some could not be dated; among these are some that have an internal bitumen coating. Sri Lanka

does not have a history of bitumen production and the coating on these sherds implies that they are of foreign origin (Graham 2013, 202). These wares are thought to have been storage jars for liquid and the bitumen coating is thought to be from somewhere between Basra and Al Kuta, however further chemical analyses are still needed to determine the provenance of this internal coating (Graham 2013, 202).

Figure 39. Western Asian ceramics from Unit 53 at Mantai

Units 55, 56 (Pit G271)

Within these units 34 sherds were found. Most of these belong to shallow open bowls. From this group of sherds 3 were found to be hard fired, purple glazed white stoneware from China (Graham 2013, 207). 2 sherds of Sassanian-Early Islamic wares were also found, but these are presumed to be intrusive.

Units 60, 62 (Features G263, G249)

In feature G263, 2 sherds of Chinese pottery were found. These were identified as Dusun wares with high quality external glazing. These wares usually occur from the 8th century CE onwards. In feature G249, 2 large rim sherds were found from vessel

thought to be large storage jars with a West Asian origin. These sherds also contained an internal bitumen coating such as those found in unit 53.

Unit 66 (Latest pit in the sequence)
A total of 96 sherds were found within this unit. The unit is also very similar to unit 53. From the sherds in this unit 2 were found to be of West Asian origin, again having the internal bitumen coating found with the sherds from Units 53, and 62.

Trench H	
Unit 27	1 possible fine ware sherd
Unit 29	1 possibly imported rim sherd 3 sherds of Chinese White Cream Stoneware (Intrusive) 2 sherds of Chinese wares found in layer dating to 2nd C.CE. (Most likely intrusive)
Unit 32	2 sherds of imported fine ware. Similar to ones found in the Jetavana Treasure.
Trench G	
Units 48,49,50	6 sherds possibly imported fine ware
Unit 53	9 sherds of West Asian Origin
Units 55, 56	3 sherds of Chinese wares 2 sherds of Sassanian-Islamic wares (Intrusive)
Unit 60,62	2 sherds from Chinese Dusun Wares. 2 rim sherds of large storage vessel with West Asian origin.
Unit 66	2 sherds of West Asian pottery

Table 3. Summary of Imported ceramics from Trench G and H at Mantai

Indian Imported Pottery

While the finds from Mantai from the 1980-1984 excavations were being prepared for storage, the researchers also decided to look at material found from excavations dating to the 1970s (Mohanty 2013,213). Within this material there was a small amount of Indian pottery that consisted of the usual suspects Rouletted ware, Northern Black Polished Ware, Red Polished Ware, Black and Red Ware and Fine Grey ware. The small amount of these sherds compared to the overall artifact assemblage is indicative of these being imports (Mohanty 2013, 213). The sherds from the previous excavations also help to extend the chronology of Mantai into the later part of the 1st millennium BCE. These sherds are believed to be from the earliest occupation layers at Mantai mound.

Rouletted ware

As with many other sites during the Early Historic Period Mantai is no stranger to Rouletted wares (Fig.38). A total of 12 body sherds were found from the material from the 1970s. These also have a date which is contemporary to other sites where Rouletted ware occurs (Chandraketugarh-Tamluk and Arikamedu) (Gogte 1997, Begley 1991 in Mohanty 2013, 213), indicative of a trading network for this particular type of pottery (Graham 2013, 213)

Figure 40. Rouletted Ware from Mantai

Northern Black Polished Ware

This kind of pottery has also been found at Anuradhapura and Tissamaharama (Deraniyalaga 1992; 1986 in Mohanty 2013, 216; Coningham 2006; Weisshaar *et al.* 2001). Only one sherd was found within the material from the 70s.

Red Polished Ware

30 sherds of this type were found within the dataset (Fig.39). These are dated to the 1st century BCE -3rd century CE. Similar sherds have been found at Tissamaharama (Schenk 2001, 133).

Figure 41. Red Polished ware from Mantai

Black and Red Ware

This type of pottery belongs to the Early Megalithic and Early Historical periods in South Asia. These sherds are thought to be local productions but based off adaptations of the Indian Megalithic ceramic tradition (Mohanty 2013, 220). A total of 6 sherds were found within the dataset.

Fine Grey Ware

More than 100 pieces of this pottery type were found in the dataset from the 1970s (Fig.40) (Mohanty 2013, 222). This type of pottery is also found at Tissamaharama in the levels dating to around the 4th century BCE.

Figure 42. Grey ware from Mantai

Red Polished Ware Kundikas

Kundikas are globular pots also originating in India (Fig.41). These findings are unique at Mantai. A total of 4 sherds were found within the dataset and 1 sherd was also found in the 1984 excavations. Many similar examples of this type of pottery come from Gujarat in India, and this type of ware is dated to around the 2nd-3rd century CE (Mohanty 2013, 223)

Figure 43. Red Polished ware Kundika from Mantai

Inscribed Red Polished Ware

Among the finds from the 1970s a sherd was found having inscribed decorations of the stern of ship on it (Fig.42). The type of ship is thought to be of West Asian origin (Mohanty 2013, 226)

Figure 44. Inscribed Red Polished ware sherd from Mantai

Type of Pottery	**Number of Sherds**
Rouletted Ware	12
Northern Black Polished Ware	1
Red Polished Ware	30
Black and Red Ware	6
Fine Grey Ware	>100
Red Polished Kundikas	5

Table 4. Summary of Indian Pottery found at Mantai

Chinese, Islamic and Other Imported Pottery

It should be noted that the exact number of sherds from China, the Arabian world and other regions is not clear within the chapter in Carswell 2013. Therefore a brief overview of the types of wares will be given here.

Yue Stoneware

A total of 70 sherds were analyzed within the catalog. This type of ware is thought to have been produced in Chekiang in China and has been found throughout the Indian Ocean at sites such as Egypt, Iraq and Iran. (Carswell 2013, 239-246)

Dusun Stoneware

Around 20 sherds are presented within the catalog but there were more found during the excavations that are not presented there. (Carswell 2013, 246-252)

Green Splashed White Ware

35 sherds of this type of pottery are presented in the catalog (Fig.43). The actual number could very well be more. (Carswell 2013, 253-255)

Figure 45. Green Splashed White Ware from Mantai

Changsha Pottery

This type of pottery is also found in Anuradhapura. 111 sherds of this type are presented in the catalog (Fig.44). This kind of pottery was easily available and commonly produced in China. (Carswell 2013, 256-266)

Figure 46. 2 Sherds of Changsha Pottery from Mantai

Decorated Changsha Pottery

A sherd worth mentioning is a sherd belonging to an ewer (Fig.45). This sherd has a depiction of what appears to be a foreigner to China, thought to be a central Asian individual (Linrothe 2013, 267).

Figure 47. Decorated Changsha sherd

Metal Working

There has been evidence for metalworking found at the site of Mantai. Slags found at the site suggest that there may have been Iron and copper working being conducted on the site. Despite the presence of slag, no actual furnaces and architecture linked to metal production/metal working have been found in the excavations at Mantai (Juleff 2013, 278). It has been suggested by Gill Juleff that the iron working complex present in Sri Lanka during the Early Historic/Medieval period may have been responsible for extremely high quality steel used for the forging of the famous *Sarandibi* steel which was referred to by an Islamic scholar called Al-Kindi, who remarked upon this steel's high quality and desirability (Hoyland &Gilmour 2006 in Juleff 2013, 308). Interestingly, evidence for wind-powered furnaces have been discovered in the South of the island at Samanalawewa, which lies within the Ruhuna kingdom, not too far away from Tissamaharama (Juleff 1998), but this will be discussed later on.

The evidence for metal working from Mantai is not substantial enough to reach any firm conclusions regarding the production/working of iron and copper during the Early Historic period. The main evidence comes in the form of slag material as well as a probable iron smithing hearth at the center of the mound, but as Juleff notes it appears that the excavations in the 1980s may narrowly have missed uncovering much more tangible evidence for metalworking in the form of actual furnaces and the workshops used for these processes (Juleff 2013, 307)

Glass Artifacts

In total the excavations during the 1980s unearthed a total of 1278 pieces of glass. It is assumed that the majority of this material comes from the Islamic period (8th-10th C. CE), further dating and determination of provenance has not been possible (Carboni 2013, 313). Pre-Islamic glass account for around 3% of the overall dataset, it is thought that the most likely dating for this small amount of glass would be from the Sassanian-Early Islamic period during the 5th-7th Century CE (Carboni 2013, 316). Within the dataset of glass at Mantai there appears to be a distinct lack of luxury and high value glass products as well as a lack of intact vessels, it has therefore been speculated that what may be being brought into Mantai is glass cullet, specifically for the use of making new glass in regions further east such as Southeast Asia and China (Fig.46) (Carboni 2013, 347-358).

Figure 48. Glass sherds from Mantai

Beads

Among the finds from the excavations in the 1980's a significant category related to foreign trade is beads (Fig.47). Beads were traded widely throughout the ancient world and are good indicators of trade relations and craftsmanship between different regions. The beads from Mantai have shined a spotlight on the site for being connected to "virtually the whole known world" either through direct or indirect trade (Francis 2013, 349). Another important aspect with this, is that Mantai was also a production center for bead making as evidenced by the artifacts that will be mentioned here. Alongside the information that has been acquired on Mantai's role in the Indian Ocean trade networks through these beads, the beads also give valuable information on an important link within the trade of the famous Indo-Pacific Beads.

Both local and foreign beads were found during the excavations, the foreign beads were identified from the different exotic materials used within them and different manufacturing techniques. Local beads were identified through the presence of glass waste produced from the manufacturing of beads at the site (Francis 2013, 349).

The exact number of beads is not clear, but it is noted that the overall assemblage is not very large. But the beads that were found on the site provide useful information on the diversity of regions involved in the trade networks that functioned during the Early Historic period at Mantai. Beads from paces such as India, Medieval Islamic states, the Roman Empire and South East Asia have been found at

Figure 49. Beads from Mantai

Mantai (Francis 2013, 349). It is worth noting that 87% of the beads found were made at Mantai itself, and that 82% of the beads found are Indo-Pacific beads, known throughout the ancient world (Francis 2013, 350).

Beads from the Early Historic period that were imported were also found during the excavation of the mound (Fig.48, 49). Among the finds were Roman beads, similar to ones found at Arikamedu (India), Klong Thom (S. Thailand), and Oc-eo (Vietnam) (Francis 1987; Srisuchat 1987 and Malleret 1962 in Francis 2013, 352). It is also noteworthy that Mantai's location close to pearl banks and coral reefs allowed it access to these natural resources, coral beads found at Mantai have been hypothesized to have had a connection with Greek merchants, since the coral beads found at Mantai are of a precious variety and that variety does not occur at Mantai, but this is still to be confirmed (Francis 2013, 352).

Alongside the Roman beads, beads imported from India were also present at Mantai. Among the finds were 2 glass beads from Arikamedu, 3 opaque green beads that are "typically" Indian, blue and white beads from the Gangetic Valley as well as beads thought to be from Brahmapuri and Rajghat. Most of the Indian beads found at Mantai were found in the layers dating to the Early Historic period in trench G and H (Francis 2013, 253-255).

Figure 50. Colored Beads from Mantai

Figure 51. Green Beads from Mantai

Also found in the excavations at Mantai were beads from the Early Medieval period. These beads are thought to come from the Middle East, which at the time had a large role in the Indian Ocean trade networks. Mantai's position at the center of the Indian Ocean would have given it a distinct advantage as being a middle man for beads travelling from west to east and vice versa (Francis 2013, 355).

Also from the Early Medieval period are beads imported from Southeast Asia. The exact origin of these beads has not been determined, but comparative sites with similar beads have been found throughout Southeast Asia such as Sungai Mas (Malaysia), Laem Pho (S. Thailand), Guang Zhou (China), Dvaravati (Thailand) and Konju (Korea) (Francis 1985, 12 in Francis 2013, 357-361).

Alongside all the imported beads found at Mantai, evidence of bead manufacturing was also uncovered. Fragments of tools used to make beads were found as well as waste associated with glass bead making was found (Francis 2013, 362-367). In essence what we see at Mantai in terms of beads is a thriving center for imports and exports. Indo Pacific beads possibly manufactured at Mantai could have made their way across the globe to the aforementioned sites, evidencing Mantai's role in a very large network of trade.

3.3.2 Sealinks Project Excavation 2009-2010

In recent years the site of Mantai has been investigated only sporadically, one of the latest archaeological investigations took place in 2009-2010 by the Sealinks Project (Bohingamuwa 2017, 28). Despite the project only conducting limited amounts of excavations, the results of which are yet to be published, a "considerable" material pertaining to international trade was recovered during this excavation (Bohingamuwa 2017, 28). The materials recovered include West and East Asian as well as Southeast Asian ceramics and beads, the total amount of which, including local materials are 11,418-12,171 ceramic sherds/wares and 1432-1580

beads[9] (Bohingamuwa 2017, 28; Kingwell-Banham *et al.* 2018, 1558-1560). From the total ceramic assemblage 77.7% were identified as having a Sri Lankan origin and 20.9% were identified as imports (Kingwell-Banham *et al.* 2018, 1560). The dating of these wares based of radiocarbon dates acquired from the excavation spans the period from the 2nd century BCE up until the 12th century CE (Bohingamuwa 2017, 28). It should also be noted that there was an "unprecedented" increase of Middle Eastern ceramics that occurred during the 8th-9th century CE, the main types of these ceramics are storage vessels as well as luxury table wares (Bohingamuwa 2017, 34).

Alongside the ceramics and beads that were found during this excavation, botanical evidence for trade was also recovered. The botanical remains that are relevant to this thesis are food items thought to be imported from West Asia to Sri Lanka, wheat has been recovered in "small but notable" quantities, alongside this grape seeds were also recovered, both wheat and grapes are not grown in South Asia and the lack of wheat husks also suggest that the grains were brought in after they had been processed and were ready for consumption (Kingwell-Banham *et al.* 2018, 1563-1568). Evidence to support Mantai's position within the global spice trade during the mid-1st millennium CE was also found in the form of black pepper recovered from the excavation (Kingwell-Banham *et al.* 2018, 1567).

[9] The exact amount of beads and ceramics recovered from the Sealinks excavations at Mantai differs between the 2 articles by Bohingamuwa and Kingwell-Banham, therefore both figures of each material type are given here.

3.4 Tissamaharama

Unlike the sites of Anuradhapura and Mantai, the site of Tissamaharama has only been investigated very sporadically over the last century. The only detailed excavations were conducted by the Sri Lankan-German project during the 1990's. Therefore this section will consist primarily of the results from the aforementioned excavation. It should be noted that exact quantities of imported/foreign pottery is not given within the literature, however types and general amounts are given and these will be presented here.

3.4.1 Sri Lankan-German Excavations

Pottery

Fine Grey Wares (FGW)
Within this group there are 6 different variants, including Wheeler type 10 (Fig.52), Rouletted ware (2 sherds mentioned) (Fig.53), Wheeler type 18, and Plain Grey Ware (Fig.54) (37 samples mentioned), "Hellenistic Pottery (4 sherds mentioned), Northern Black Polished Ware (2 sherds mentioned) (Schenk 2001, 128). These types occur in small amounts at the site (Schenk 2001, 126). The Fine Grey Wares are the oldest type of ceramic imports found at Tissamaharama, the earliest dating being from the Plain Grey wares that appear around the 4th century BCE (Schenk 2001, 128). The Rouletted Ware began its appearance at the site around the 3rd century BCE (Schenk 2001, 128). One noteworthy sherd within this group is a Wheeler Type 10 sherd with a peacock motif stamped on the exterior; this type of ware has parallels that can be found in Taxila (Schenk 2001, 132).

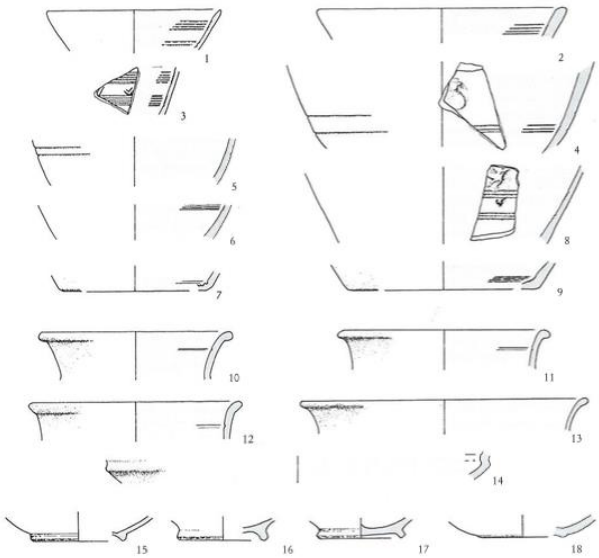

Figure 52. Wheeler Type 10 from Tissamaharama

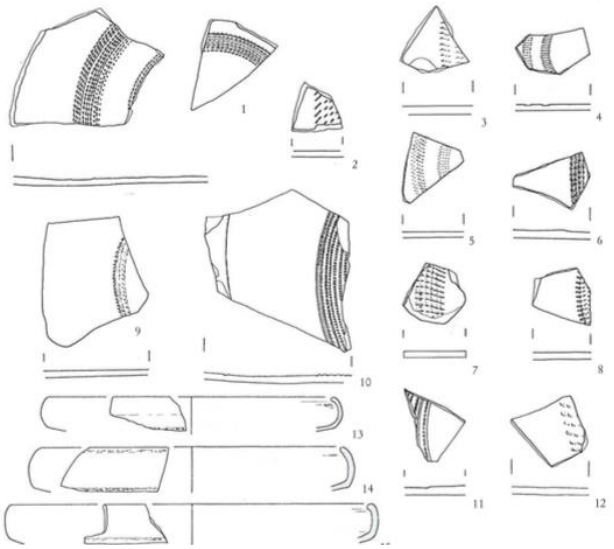

Figure 53. Rouletted Ware from Tissamaharama

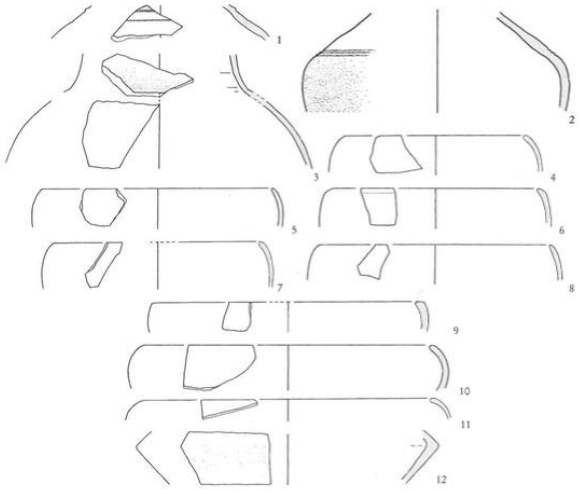

Figure 54. Grey Ware from Tissamaharama

Red Polished Wares (RPW)

A total of 47 sherds of this type were found during the excavations (Schenk 2001, 73). These wares usually come in the form of spouted jugs and sprinklers, and have been dated to around the 1st/2nd century CE (Schenk 2001, 73). Through thorough analysis, around 4 variants of RPW have been determined (Schenk 2001, 73), but for the purposes of this thesis I will refer to the general category of RPW.

Red on White Painted Wares (RWPW)

Several vessels of this type were found in 1998 in association with a brick house located in Tissa 3. The vessels were still in situ and have been dated contextually to the 4th-5th centuries CE (Schenk 2001, 73).

Glazed Wares, Celadons and other similar ceramics

Only a small number of these wares were found during the excavations. The sherds from these are only briefly mentioned and are described as including thick sherds with yellowish beige clay and with a blue green glaze (Schenk 2001, 74).

Beads

During the excavations from 1992-1996 a total of 4813 beads were found at Tissamaharama, of that total figure 679 were found in the court gardens of the citadel during 1995-1996 (Hannibal-Deraniyagala 2001, 204). The beads have yet to be studied in depth in order to determine their provenance, but there does not seem to be any evidence for local bead manufacturing at Tissamaharama yet, the only evidence in terms of manufacturing is evidence of modification, not production and there is a high likelihood that if there was any production occurring, the workshops for this production would be located outside of the main site (Hannibal-Deraniyagala 2001, 225-226)

Metal Working

During the excavations in the 1990s evidence for iron, copper and bronze working was discovered at Tissamaharama. A number of small hearths and ovens were uncovered, but these are not thought to have been used for industrial production of metals, but at the same time large battery furnaces have been found for the purposes of smelting copper and bronze, these furnaces are unique to Tissamaharama (Fig.55) (Steinbring 2001, 41).

Alongside evidence for the working of iron, copper and bronze, evidence for gold working has been found at Tissamaharama, although the evidence for this is very small to begin an argument for large scale working of gold for international trade (Rehren 2001, 253).

Figure 55. Battery Furnace at Tissamaharama

3.5 Kantarodai

Archaeological evidence for trade at Kantarodai is somewhat difficult to quantify due to the absence of an official report on the site. However, based on various small articles published over the last few decades there has been some limited publication of the kinds of artifacts related to trade, which were found. Rouletted ware (Fig.56) is one of the main indicators that Kantarodai was part of the Indian Ocean trade networks. Alongside the rouletted ware one incised piece of rouletted ware with the name *Datta pata* was also found, indicating a possible foreign merchant from India (Thiagarajah 2016, 78-79). A sherd of Roman type ceramics was also found (Fig.57), but its provenance is yet to be determined (Begley 1970, 25). Alongside the Rouletted ware, small plaques with the image of the goddess Lakshmi were found in association with the rouletted ware (Fig.58), similar plaques have been found at sites such as Tissamaharama (Begley 1970, 25).

Despite the lack of specific data regarding artifacts assemblages at Kantarodai, from the material that has been published it appears that there is a substantial amount of material that was collected during excavations of the site (Begley 1967, 25).

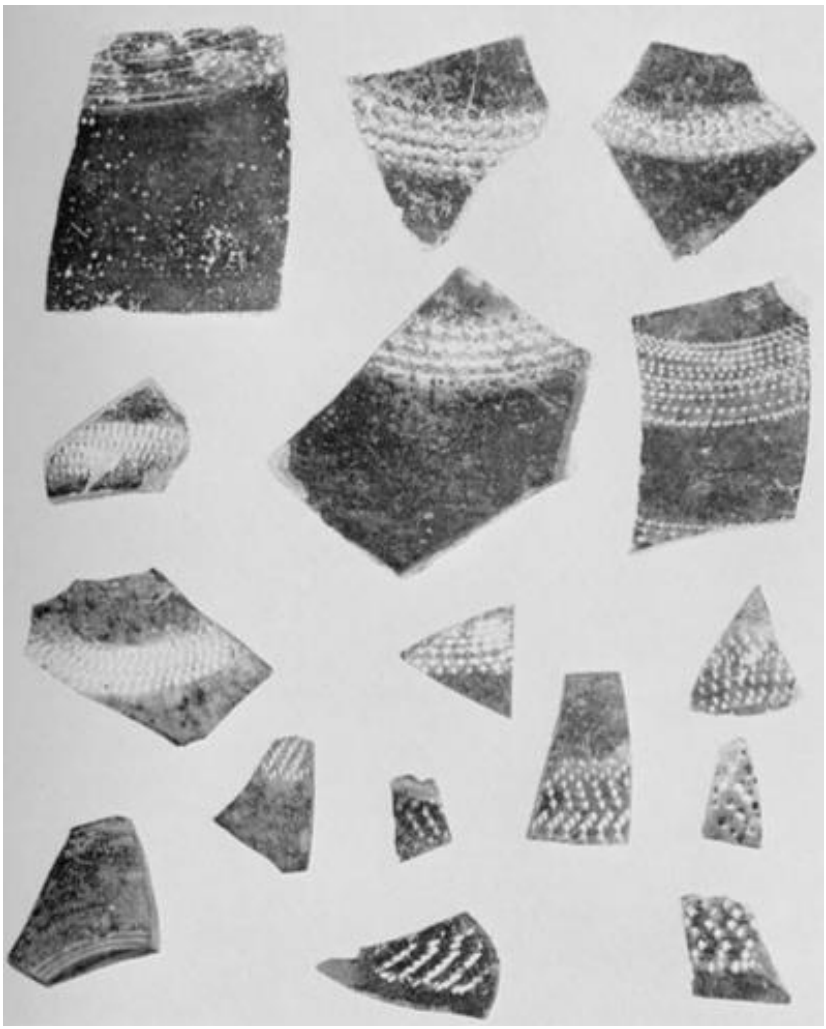

Figure 56 Rouletted Ware from Kantarodai

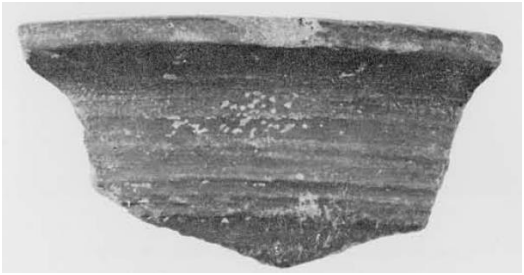

Figure 57 Rim sherd of Roman type ceramic from Kantarodai

Figure 58 Lakshmi plaque from Kantarodai

3.6 The Godavaya Shipwreck

Through the use of marine archaeology, it has been possible to survey the shipwreck off the coast of Godavaya. From these surveys several artifacts of interest pertaining to trade were gathered. Glass ingots (Fig.59), stone querns (Fig.60), ceramics (Fig.61), and copper objects were all found within the site of the shipwreck (Muthucumarana *et al*. 2014, 46). Some of the stone objects have inscriptions and engravings carved into them, these inscriptions use the Brahmi script and the symbols have been determined as Hindu symbols associated with the Hindu deities Shiva and Vishnu (Bopearachi *et al.* 2016, 421). Black and Red ware ceramics have been found on the surface of the shipwreck, indicating a connection with India where this type of ware also occurs. The ceramics indicate that this ship is from around the 2nd century BCE (this dating was also later substantiated by C14 dating taken from wooden samples recovered from the wreck), making it a very rare discovery of maritime trade during the Early Historic Period (Bopearachi *et al.* 2016, 421-424). Marks on the ceramics also have parallels that can be seen in South India in Tamil Nadu, suggesting a link between the Ruhuna kingdom and Tamil Nadu (Bopearachi *et al.* 2016, 424).

The glass ingots found on board the ship have been analyzed and scholars believe that they indicate that the ship was actually from South India and most likely bound for the port of Godavaya before meeting its unfortunate demise.

Figure 59. Glass ingots from the Godavaya Shipwreck

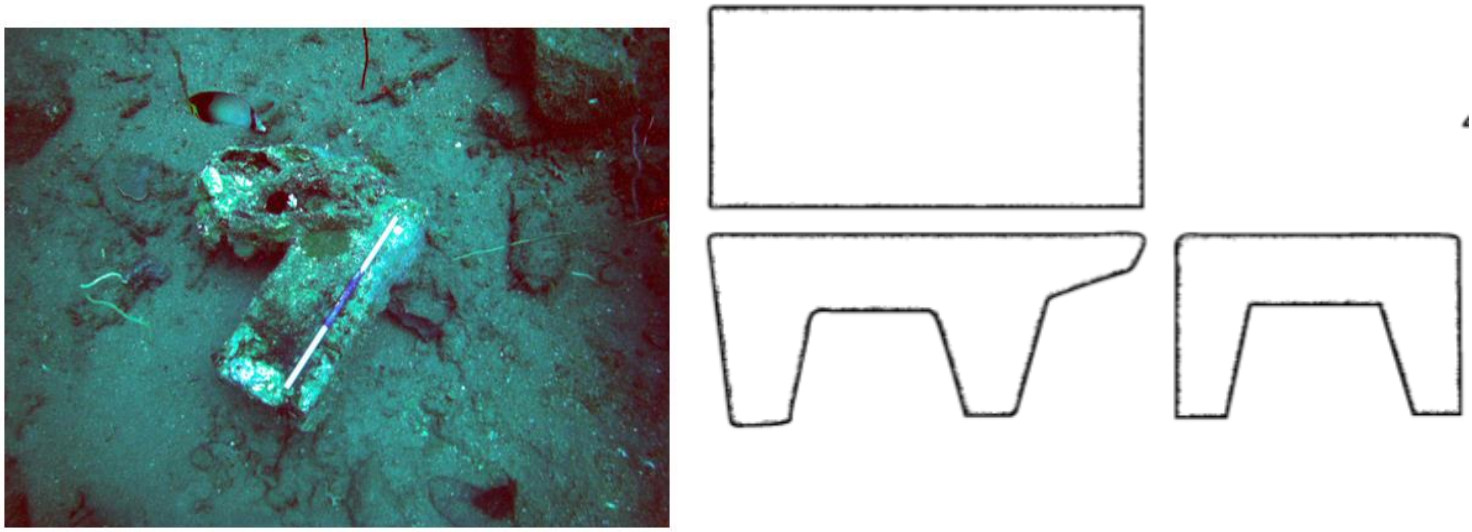

Figure 60. Stone querns from the Godavaya shipwreck

Figure 61. Ceramic bowl from the Godavaya shipwreck

3.7 Smaller Sites

3.7.1 Ridiyagama

Ridiyagama has only been briefly investigated along with Kelaniya and Nariyagama. Among the evidence for trade, approximately 30 furnaces have been found (Fig.62, 63); some of these furnaces are up to 4.5 meters in length and usually 0.9 meters in width (Bopearachi 1999, 14). It is thought that these furnaces were used either for the production of iron or for the roasting/preparation of ores for further use elsewhere, alongside this cementation structures have been found, presumably add carbon to iron for the production of steel, and it is believed that the steel produced here was made for export, similarly to the steel produced at Samanalawewa located further upriver on the Walawe Ganga (Bopearachi 1999, 15-16). Iron working was not the only craft that was evident at Ridiyagama, evidence of copper working as well as glass working has been found as well (Bopearachi 1999, 16).

Another significant category of finds is the beads found at Ridiyagama (Fig.64). Around 150 beads made from various and sometimes semi-precious materials were found at Ridiyagama, and it is due to the large variety of bead types that various origins are suspected for these beads (Bopearachi 1999, 16). And of course ceramics make an appearance as with all the other aforementioned sites. The main type of ceramics related to trade found at the site is Black and Red Ware, the exact number of ceramics is not given, but a strong link with East India is mentioned within the report made by Dr. Bopearachi, and a dating of these ceramics has allowed for a date for the site around the 4th century BCE (Bopearachi 1999, 20).

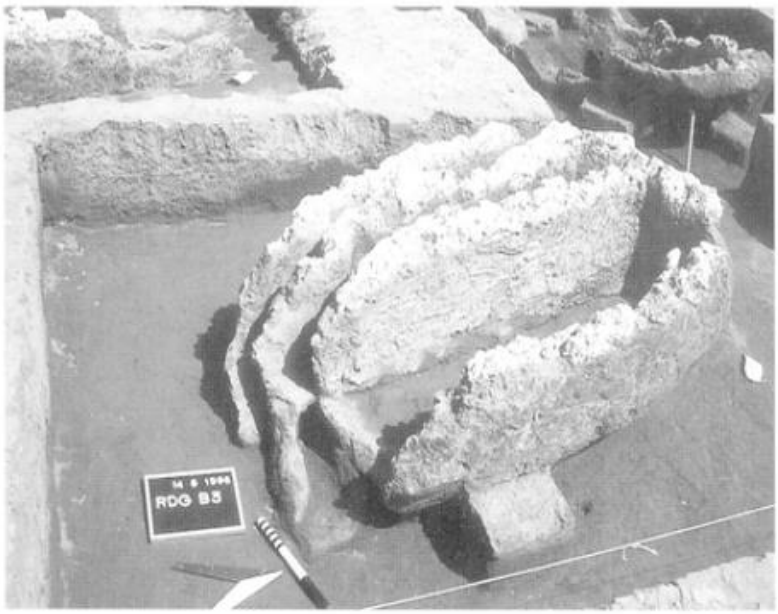

Figure 62. Battery furnace at Ridiyagama

Figure 63. Battery furnaces at Ridiyagama

Figure 64. Beads from Ridiyagama

3.7.2 Nariyagama

The limited excavations conducted at the site of Nariyagama found the remains of a relatively large stupa with a diameter of 30 meters (Fig.31) (Bopearachi 1999, 8). Alongside the large stupa evidence of metal working was found in the form of metal slags, scoria fragments and furnaces, also noticeable was differences within the soil itself, showing evidence for exposure to high temperatures (Bopearachi 1999, 9). Ceramics recovered from the site give it a date 4th-5th century CE; this dating is also supported by the dating attributed to the stupa, which is also from the 4th century CE (Bopearachi 1999, 8). The ceramics themselves are Black and Red Wares; the exact number of sherds found is not given.

3.7.3 Kelaniya

From the excavations at Kelaniya evidence for metal-working was found in the form of iron slag as well as a work area, labeled as an "artisanal zone", alongside the metal slag remains of glass production were also found (Bopearachi 1999, 12). Interestingly within the ceramic finds at the site sherds of Rouletted Ware were found (Fig.65) (Bopearachi 1999, 13). Alongside the Rouletted ware, Black and Red Ware sherds were also found at Kelaniya, similarly to the sites of Nariyagama and Ridiyagama. From the evidence gathered a date was given for the occupation period of the site, this site in particular had quite a long span of occupation, ranging from the 3rd century BCE up until the 11th century CE (Bopearachi 1999, 13).

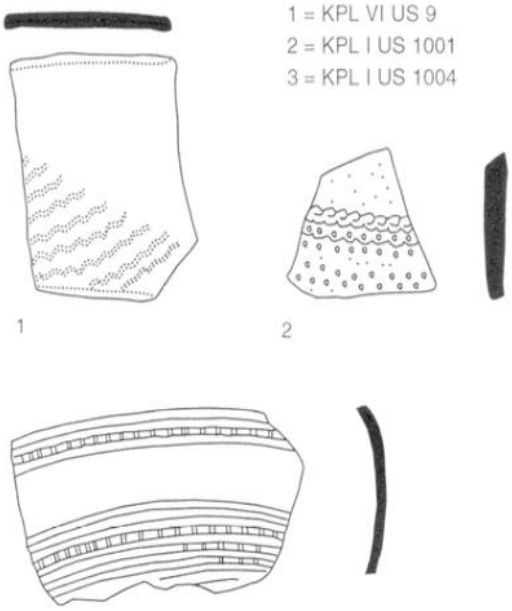

Figure 65. Rouletted ware found at Kelaniya

3.8 Highways and Road Systems

Alongside the material evidence for trade such as ceramics and beads, it is also important to present evidence for the possible ways in which these materials would have actually moved throughout Sri Lanka. Port sites at the coastline could always be connected via maritime routes, but not much is known about inland routes of transport and riverine trade routes. It is presumed that goods travelled inland via rivers, but recent research has also put forward evidence of overland highways that connected the main urban center of Anuradhapura with the port sites of Mantai and Tissamaharama as well as smaller sites throughout the island (Vidanapatirana 2012). It is worth noting that the main evidence for these connecting routes comes from historical texts and references from colonial officers who noticed these ancient road tracks when colonial administration was moved further inland and into the ancient landscape of Anuradhapura (Pybus 1762; Marshall 1846; Cave 1886; Ievers 1886; Bell 1890, 1892, 1893; Still 1907; Hocart 1924, 1930; Paranavitana 1944; Knox 1960 in Vidanapatirana 2012, 89). For the purposes of this thesis I use Anuradhapura as a center point from where these routes spread out from, highways running North, East, West and South were the main routes of transport leading to and from the main gates of the ancient capital, a total of 6 highways all connecting the aforementioned gates have been identified (Vidanapatirana 2012, 92-96).

Anuradhapura to Mantai (Fig.66)

From the main city of Anuradhapura, a road ran through the western gate and headed northwest along the left bank of the Malwatu Oya up until it reached the port of Mantai (Vidanapatirana 2012, 103). The road itself is thought to have also crossed points where bridges were present (Fig.67), allowing for people to cross the river and perhaps where goods brought along the river could have been unloaded or loaded for shipment to and from Mantai (Vidanapatirana 2012, 103). Mantai being the major trade hub that it was, allowed it to have well organized road networks inside as well as outside the city, which allowed for the movement of goods, evidence of a large gate approximately 15 meters wide, at the eastern part of the city had been uncovered in the 1950s by the Archaeological Survey of Ceylon, supporting the notion that large amounts of goods and people were moving through the city (ASCAR 1950, 15 in Vidanapatirana 2012, 104).

Figure 66. The reconstructed route from Anuradhapura to Mantai (Mahatittha)

Figure 67. A stone bridge across the Malwatu Oya

Anuradhapura to Tissamaharama and Godavaya (Fig.68)

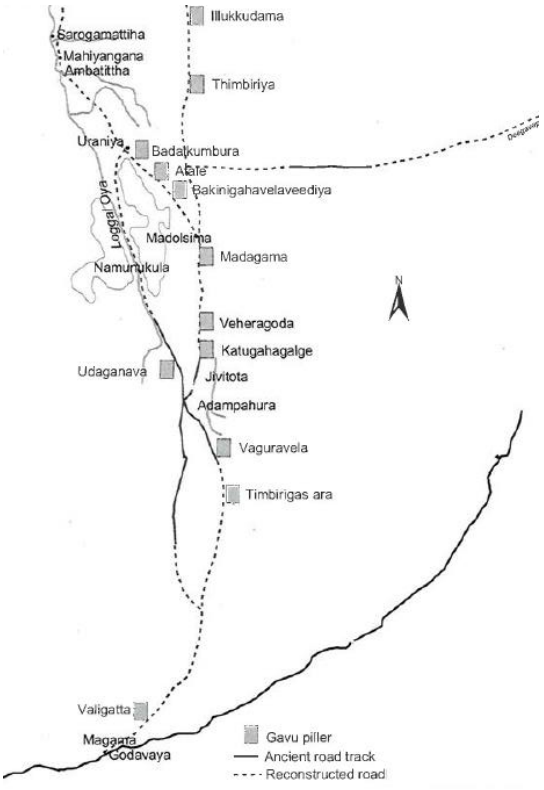

Figure 68. The reconstructed route from Anuradhapura to Tissamaharama and Godavaya

The main highway from Anuradhapura to Tissamaharama is well attested in historical texts, in the *Mahavamsa* when king Duttugāminī reclaimed Anuradhapura from South Indian forces, he used the main highway to move his troops from the south to the north (Vidanapatirana 2012, 106). The road to Tissamaharama began from the southern gate of Anuradhapura and progressed steadily south, passing through several ancient villages and stone bridges much like the road leading to Mantai, at certain points it would also have crossed over other large rivers such as the Mahaweli river, Sri Lanka's longest river (Vidanapatirana 2012, 106-107) Evidence for functional river crossing infrastructure can be found in inscriptions that mention ferry taxes (ASCAR 1953, 38; Paranavitana 2001, 88-89 in Vidanapatirana 2012, 107). Stone road markers (mile stones) have also been found that mark the way from Anuradhapura to Tissamaharama, and these stones are also found all the way down to the ancient port of Godavaya (Vidanapatirana 2012, 109)

Chapter 4

4. Suggested Methods and Techniques for Sri Lankan Archaeology

4.1 Introduction

Throughout the last century of archaeological research in Sri Lanka, there have been numerous methods and techniques applied towards the gathering of archaeological data, many of these have become standard techniques such as archaeological surveys, excavations and data archiving. Despite the benefits of these techniques, the can be time consuming and costly. In a country such as Sri Lanka, where funding for archaeological research is somewhat limited, improving remote research techniques could vastly benefit the simple archaeologist who does not have access to funding to organize and run a whole excavation campaign or a survey campaign. Therefore within this chapter I provide suggestions for the improvement of archaeological research that can be implemented in Sri Lanka while keeping in mind the conditions prone to archaeological research within Sri Lanka.

The use of satellite imagery and remote sensing has been used for a long time in archaeological research, but these remote techniques can be limited in terms of their feasibility and usefulness when confronted with landscapes and terrains that are heavily forested or ones that have been heavily developed. With these conditions in mind, especially for sites such as Anuradhapura and Kantarodai or for potential sites along the rivers, which are subject to forestation covering significant parts of the surrounding areas. Forest cover is a major issue when attempting to conduct remote sensing in Sri Lanka, and it is for this reason that the first techniques I would highly recommend for the gathering of archaeological data as well as new site identification is LiDAR. LiDAR (Light Detection and Ranging) is a

form of scanning that uses lasers to measure the elevation of objects in a landscape. It is usually in the form of aerial scanning. LiDAR scanning is able to penetrate forested areas and reveal what lies beneath the forest canopy. As such, it is an ideal tool to use when surveying the landscape for new sites, which in the context of this thesis would be connected with the inland trading networks that existed within Sri Lanka during the 1st millennium CE. Within this chapter I provide a comparable case study from Cambodia on the implementation of LiDAR on the area surrounding the Ancient site of Angkor. This case study will show the benefits that can be obtained by using LiDAR as a surveying technique; afterwards I present evidence that this technique can be implemented in Sri Lanka on archaeological sites.

Alongside the suggested technique of LiDAR, I also present suggestions to tackle the issue of data archival and accessibility of information for results from previous and future excavations/surveys. These suggestions come in the form of widely accessible databases that incorporate data from all excavations that take place in accordance with the Sri Lankan Department of Archaeology.

4.2 The Case of Angkor

One example of where LiDAR has been successfully applied to a densely forested area can be seen at the ancient city of Angkor in Cambodia (Fig.69). Angkor was the capital city of the Khmer empire from the 9th to the 15th century CE. Within the last 2 decades LiDAR has been used to map the area surrounding Angkor and has revealed a very different image of the ancient landscape of Angkor than was previously assumed (Evans *et al*. 2013). The results from the aerial survey revealed that the city of Angkor was much larger than presumed and well-structured in terms of road networks and infrastructural systems. To summarize,

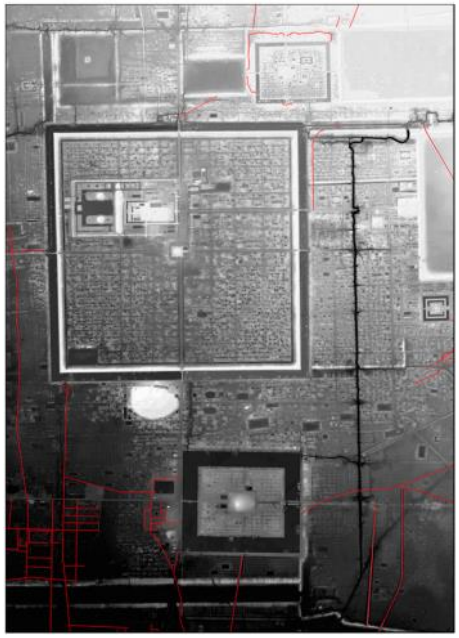

Figure 69 Digital terrain model of Angkor

the results revealed a whole new archaeological landscape that had not been recognized through previous aerial surveys or through ground reconnaissance.

Through the application of LiDAR new information on the anthropogenic impact on the surrounding landscape of Angkor was gained. This was only possible due to the ability of LiDAR to penetrate dense forest foliage and create an elevation model of the structures beneath. The effectiveness of LiDAR in gathering this new information is very clear in this case study. Decades of previous archaeological research have now been supplemented with this new information to reshape the ways in which scholars see the organization of the Khmer Empire within the landscape.

4.3 Previous Applications of LiDAR in Sri Lanka

With the archaeological overview of the previous chapter in mind, I now provide suggestions for the next step in research into Sri Lanka's role in the Indian Ocean trade networks. It is important to remember that very few if any such overviews as seen in chapter 3 exist that are available to scholars, therefore having all the aforementioned data in one place is extremely helpful when looking at the larger picture of trade networks, providing a firm basis from where further research can be conducted. Within this thesis I will touch upon what I believe is the next logical step for this further research. This next step includes the application of remote sensing techniques as well as widely accessible databases onto which data from archaeological projects can be shared throughout the wider academic community. One of the main issues facing the study of trade networks within and outside of Sri Lanka is the fragmented state of research, and the lack of knowledge on where exactly these trade networks were in operation. In order to solve these issues, I suggest the following techniques, use of LiDAR aerial surveying and the construction of a national database for the storage of basic archaeological data.

LiDAR is not new to Sri Lanka, nor would it be considered an extremely innovative technique, it has been used before in Sri Lanka for archaeological research, however the data related to this research has been inaccessible during my own research, and whatever data is available provides more of a summary of what was done rather than presenting the data itself and what new scientific knowledge was gained through these endeavors.

Around 2017 LiDAR was used by the University of Moratuwa and CSIRO in Australia for the digital documentation of known archaeological sites such as Sigiriya, Dambulla, Thuparamaya, Pollonaruwa, Galle and several other archaeological sites. The project was called "Digitizing our Heritage" (roar.media). This endeavor was mainly aimed at recording architectural features using ground LiDAR, digital recording of these sites would allow for further preservation of the sites and very small details that could only be captured through digital recording techniques. Despite the success of this project, very little information is available on the use of LiDAR for the purposes of site detection in areas previously unexplored by archaeologists. The implementation of LiDAR as a tool for large-scale aerial survey in Sri Lanka is something that already have been implemented, but the publication of data is a serious hindrance for the dissemination of usable information for scholars throughout the world.

Alongside the archaeological implementation of LiDAR in Sri Lanka, there have also been instances where development organizations have utilized it as a tool to help with the development of various regions in Lanka. A good example of this can be seen in the LiDAR survey of the ancient city of Anuradhapura and the surrounding areas by the French development organization Agence Française de Développement (AFD). During their project they undertook surveys based around the ancient city of Anuradhapura to help with the urban planning of the site to maximize the utility that both locals and tourists could gain from the site (AIUDP 2018) (Fig.70, 71). The results of this project are difficult to access and may not be available for the general public, but it stands as a testament to the feasibility of this technique in terms of actually mapping out archaeological landscapes within Sri Lanka and ascertaining useful information from these surveys.

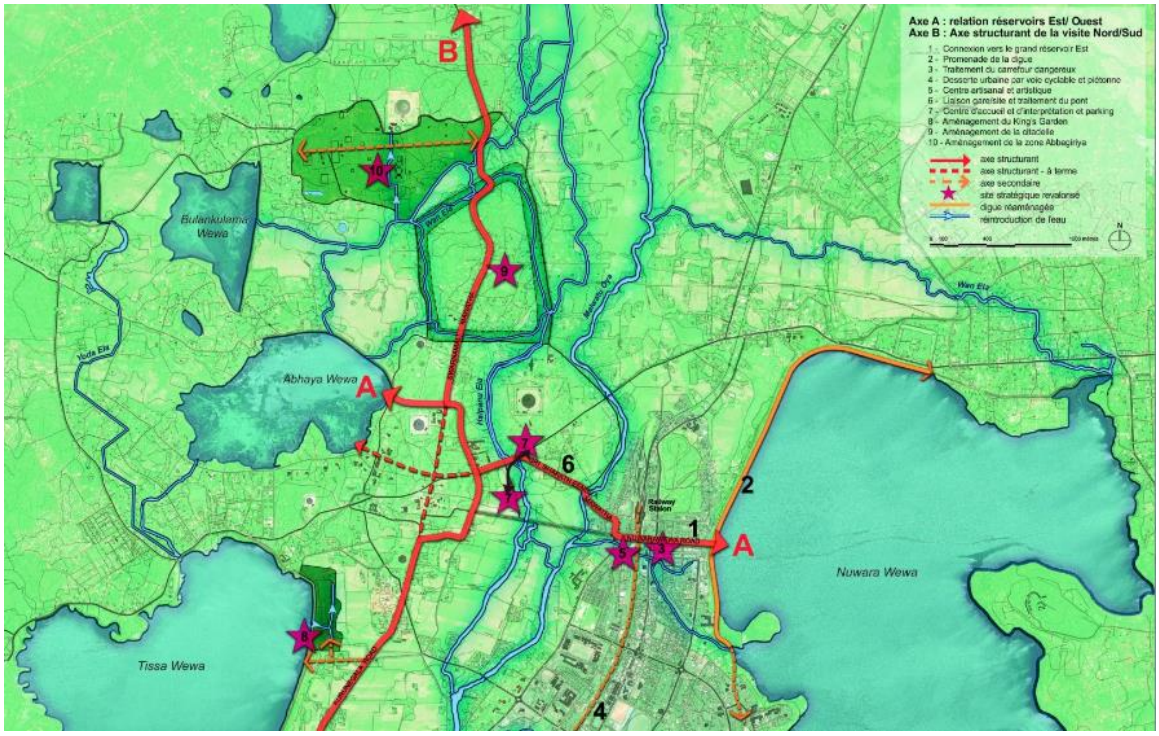

Figure 70 Map made of Anuradhapura using LiDAR

Figure 71 Map of Abhayagiri Vihara split into zones

4.4 Application of Databases

As mentioned in the first 2 chapters of this thesis, one of the main problems that I have encountered when gathering information on archaeological research in Sri Lanka is the lack of cohesion and accessibility of data published by scholars. The problem itself is multifaceted with many issues resulting in this lack of accessibility and scattered information. In order to tackle part of this issue I would suggest the use of a national database that can be accessed by both Sri Lankan and foreign scholars. To the best of my knowledge such a database does not exist currently, this is not to say that databases containing archaeological data do not exist in Sri Lanka or have not been used before by archaeologists for the storage of data, but one that is widely used by scholars to conduct research on the island, that is accessible to everyone has yet to be created.

There are a lot of benefits to be gained through the creation of such a database, one of the main ones being the availability of data from many different locations in Sri Lanka that may have ancient connections to each other but have not been properly looked at in this perspective. Another major advantage that such a database could provide is simply the preservation of archaeological data, which may otherwise be lost deep in a depot or archive somewhere.

A good case study of such a database can be seen in the Netherlands with the use of the national database for archaeology known as ARCHIS. ARCHIS is a widely available database that is used throughout the Netherlands for archaeological research. The basic explanation of ARCHIS is that it is a database where all excavations/projects that are conducted in the Netherlands enter the basic results of the endeavor into the database and thereby make the results of the endeavor available to the wider academic community. Basic data such as site locations, maps, artifacts and artifact locations are all available, with many different facets such as differences in time periods, artifact types, elevations and much more. The database is easily accessible and available to scholars, access ma require some payment depending on the situation, but even this obstacle can easily be overcome.

4.5 Limitations

Despite the benefits and advantages of using LiDAR for identifying archaeological landscapes, there are some issues that come with it. These are both technical and logistical. One of the main issues to keep in mind with this technique is the adjustment of instrumentation required to properly penetrate forest coverage. Not all LiDAR can actually penetrate forest cover since the density of the foliage can sometimes be too dense even for LiDAR. But in these cases the best method is to adapt the instrumentation to fit the environment it is being used in. A good example of this can be seen in Peru where areas thought to be unusable for LiDAR were able to provide interesting results due to researchers adjusting their instrumentation and adapting their flight parameters to better suit the environment (Van Valkenburgh 2020, 76).

From a logistical standpoint, LiDAR also faces the issues of permits and expenses for the application of it in certain countries. Whether LiDAR can be used for the research at all depends on the laws and regulations of the country in which it is being used. On top of that, LiDAR scanners themselves are fairly expensive, so the funds needed to purchase one or hire a company that owns one would have to be accounted for with any research project attempting to implement it. One last limitation is the depth of the features that the LiDAR would be trying to locate, if the depth of significant architectural features is too deep then the LiDAR will not be able to identify them, but this is an issue that can only be tackled through good planning and pre-fieldwork research into the state of sedimentation and soil accumulation for any given research area.

4.6 New Possibilities

Despite its limitations which can be overcome with proper planning and organization, LiDAR remains a very useful potential technique that can be applied within Sri Lanka for gathering more information on the networks linked to Indian Ocean trade. When looking at Sri Lanka on a map or on Google Earth, it is very easy to notice that there is a significant amount of forest coverage across the island, by implementing LiDAR as a technique to identify new sites that may be linked to trade networks there is enormous potential for understanding the ways in which these networks were connected throughout the island and how they functioned as individual sites as well as a whole network, and what the impact would have been on the surrounding landscape. In particular I believe this technique would be extremely useful in identifying waypoints for merchants and traders along the river routes heading to and from Anuradhapura.

We know that LiDAR has already been applied in Sri Lanka for archaeological preservation through digital recording of sites. The next step to take with its implementation will also be to actively use it within projects that are conducting fieldwork. As a tool for landscape archaeology, it is extremely useful for determining site locations, patterns of settlement and differences in settlements that can only be seen through aerial surveys.

Chapter 5

5. Discussion

5.1 Introduction

In the last 2 chapters I have provided an overview of the archaeological data that is available regarding the topic of Sri Lanka's role in the ancient Indian Ocean trade networks, as well as suggestions for the next steps that need to be taken for research into the aforementioned topic. By providing an overview of all the available relevant research that has been done on this subject has allowed for a firm base to be constructed from where further research into this topic can be conducted. Rarely has this information been all compiled in one place, and having this work will be useful for the next steps that will need to be conducted for the progression of this research. Within this next chapter I present the preliminary observations that I have made throughout my research on this thesis using the overview that I have made, I also discuss the benefits that such an overview can provide and coupled with the suggested techniques, how the next steps in research Sri Lanka's role in the ancient Indian Ocean trade networks can be taken. I also discuss how the techniques I have suggested can be effectively implemented in order properly understand the wider context of this research in terms of Indian Ocean trade networks as a whole.

5.2 Preliminary Observations

Already from this overview certain patterns have emerged in relation to Sri Lanka's role in the trade networks of the Indian Ocean. One very noticeable development is the lack of large port sites on the eastern coast of Sri Lanka. In Medieval times the port of Gokanna was known as the main port connected to the ancient capital of Polonnaruwa, but as yet there have been very few large ports associated with the Anuradhapura kingdom found on the Eastern coast of the island. This could be due to numerous reasons, either through the lack of archaeological research conducted in the area also due to a long lasting civil war that only ended in 2009, this had prevented research along the eastern part of the island for almost 30 years, or it could be due to other reasons that are linked with decisions made in the ancient past that resulted in the eastern coast being more or less ignored by merchants. This last reason makes very little sense since the mentions of trade with eastern kingdoms such as China and Indonesia are very prevalent in the ancient texts of Sri Lanka. In any case it would appear that there is more work to be done along the eastern coast.

Another interesting pattern that is worth researching is the connection between the steel production centers in places such as Samanalawewa and the riverine trade routes in the south of the island. The presence of wind-powered furnaces that could produce high quality steel has already been discussed in depth by scholars (Juleff 1998), but the purpose of this steel and who used it remains a matter of speculation. It is noteworthy that by looking at all of the data from the region in the south of Sri Lanka as well as further west, that metalworking appears to be a prevalent theme at many of the sites that have been discussed within this thesis. The presence of furnaces that indicate metalworking along the Walawe River at Ridiyagama reveals that there was indeed some kind of production or alteration of metal taking place at these sites. The fact that Samanalawewa is located relatively close by to Ridiyagama along the Walawe River cannot be seen as mere coincidence. The ancient mentions of *Sarandibi steel* (Hoyland &Gilmour 2006 in Juleff 2013,

308) being famous for its quality could also be a potential clue that steel produced in Sri Lanka was highly regarded and desired in distant regions. The furnaces found at Samanalawewa may have been the initial production center for the raw steel that could have been altered along the river routes at places such as Ridiyagama, but this needs to be verified through further research. All of the evidence for metalworking in Sri Lanka coupled alongside the evidence for glass manufacturing at Mantai as well as some of the smaller sites along the rivers, it seems that Sri Lanka was not merely an exporter of perishable goods such as spices and timber, but was also a production center for items that ended up as far as Merovingian graves and traded widely throughout the ancient Indian Ocean.

5.3 Specialized Research

One of major benefits of creating the overview of archaeological material is that scholars will now have an idea of what material is actually present that can be linked with foreign trade relations with Sri Lanka. Previously this knowledge was usually limited to the projects that discovered the material or from sporadic publications of some of these materials that were analyzed. With an overview it is possible to have a clearer idea of which material is present and what would be best to focus on. Specific artifacts from different sites can now be linked to each other to provide a more cohesive and larger understanding of the ways in which materials were transported and distributed throughout Sri Lanka, both as exports and imports. Alongside the overview, the suggestions for the application of accessible databases would enable to specialized research of specific artifacts that can reveal more about the trade connections that Sri Lanka had during the Early Historic period, studies have already been done on artifacts such as the bitumen coated pottery sherds that have been determined to have Persian origins (Stern *et al.* 2008). Some other examples of where specific archaeological material has been used for research into the wider Indian Ocean trade networks can be seen in the geochemical analyses of Rouletted Wares from India (Ford *et al.* 2005). These

instances of research where specific material can be analyzed can lead to much broader interpretations that can help provide a fuller and more complete picture of how these networks would have operated in the ancient past, but in order for this research to be conducted, the material must first be known to exist, and that is where these databases can provide a solid base from which scholars can expand the research by making the connections between artifacts and trade networks, which leads into the next benefit that an overview coupled with specific applied techniques can bring to this research, which is pattern recognition.

5.4 Pattern Recognition

One of the most important parts of researching trade connections is understanding the full scope of interaction taking place within a network. If we do not know where goods and people travelled through, then it becomes almost redundant to try and reconstruct these networks. By understanding when and where individuals as well as materials travelled to, we can begin to reconstruct a full picture of what ancient trade networks were like and how they operated. In this respect, having an overview of all the different sites and the materials that have been found there allow scholars to look at each individual site in the context of the larger network that it was a part of. Almost all of the sites that I have mentioned in this thesis (specifically chapter 3) have been analyzed in isolation, only being linked with other sites both within Sri Lanka and outside of it very briefly, either through recognition of similar artifact assemblages or through historical texts that mention trade connections between the sites. However, by looking at all the sites and understanding the dispersion of artifacts coupled with the suggestion of a widely accessible database, much deeper research can be conducted to see the extent of the aforementioned trade networks.

Essentially, by allowing the information provided through a proper overview of sites and artifacts on an accessible database to be researched using specialized

techniques such as geochemical analysis as well as other techniques that provide accurate provenance of the artifacts, a further step can be taken to analyze these sites in connection with one another. A good example can be seen with glass beads that were manufactured in Sri Lanka that were found in Zanzibar (Wood *et al.* 2017). By understanding that these beads are originally from Sri Lanka, and knowing that certain sites such as Mantai were producing these beads, research into exactly where these beads were manufactured and how they arrived in Zanzibar can be conducted, resulting in a much strongly based interpretation of the artifacts. The use of an accessible database within Sri Lanka could allow for patterns of internal trade to be recognized, allowing for the recognition of specific trade routes for specific materials but also for the recognition of patters for external trade with distant regions. Scholars from outside Sri Lanka could use this database in order to compare their materials with the materials found within Sri Lanka and new patterns and connections of trade could be recognized, widening our understanding the trade networks of the Indian Ocean as a whole.

5.5 Limitations

It is important to keep in mind that the suggestions I have laid out within this thesis require application in order to fully understand the benefits that they will bring to research on trade networks. Without proper application, these suggestions are merely theoretical and hold no practical value to archaeology. Something else that is worth discussing here are the limitations for the application of these suggestions. When looking at the suggestion for LiDAR to be used for the purposes of site identification in order to enable further pattern recognition, there is always the inherent difficulty of funding, gaining the means with which a LiDAR scanner can be purchased and properly implemented aerially. When it comes to archaeological research, funding has always been scarce and archaeologists must usually make the most out of small budgets. In countries such as Sri Lanka, funding for this kind of research may be much more limited than elsewhere such as Europe.

So in terms of procuring a good LiDAR scanner as well as a drone or aerial vehicle to attach it to, there may be difficulties financially. However, with the rapid increase of technical advances made within the last 2 decades, technology gets cheaper as it ages, with more and more effective tools being developed each year, even an expensive LiDAR scanner from 2020 will be significantly cheaper in 2025, allowing for archaeological data at acceptable resolutions.

With the application of widely accessible databases, the costs of setting up such a database that is continually maintained will need to be taken into account and will most certainly be a limiting factor. However, with a minimal fee for access to this database, these costs should be minimized or covered. One of the main limiting factors that I believe will be an issue when putting this suggestion into action will be dealing with individual scholars, and their willingness to place their data on a database accessible to all scholars. Within any field in academia there is sometimes a sense of ownership that scholars have over the data that they acquire through their research, and this sense of ownership can sometimes hinder the continuation of research of certain topics by people other than those who possess that data. This is not to say that all scholars are opposed to making their data accessible, but there may also be limitations for them due to the rules and regulations of the institutes that they work for. However, aside from the restrictions created by the institutions, there also needs to be a large shift in the way that data is disseminated. In terms of archaeological research in Sri Lanka, the Department of Archaeology has the responsibility of giving researchers permission to conduct certain excavations and surveys, one thing that could be done is a stipulation where each project that is given permission should be required to submit their basic data to a national database, allowing for the data to be secured and not left to rot in some archive where it will never see the light of day. Examples where this kind of mandatory submission of data could have massively helped with the interpretation of archaeological sites is the case of Kantarodai, decades have passed since research was conducted on the site and to this date there is still no official report or overview of finds and features, and this for a site that has been called one of the 4 most important archaeological sites in Sri Lanka (Perera 2013, 64). There is no easy way

to understand all the difficulties involved in the dissemination of archaeological data, but a widely accessible database is a good starting point from which, scholars can continue to do their research while allowing for further specific research to be conducted by others at the same time, increasing the amount of scientific output and expanding our knowledge of the ancient past.

5.6 Noteworthy Observations

Throughout my research for this thesis, I encountered several different observations that I believe should be mentioned here for understanding the topic of Sri Lanka's role in the Indian Ocean trade networks. These are observations that come from looking at both the archaeological overview in chapter 3 as well as the suggested techniques in chapter 4.

Firstly, the evidence for Sri Lanka's role as an important node in the Indian Ocean trade networks is certainly evident, as seen in chapter 3. There is simply too much evidence to dismiss Sri Lanka as a mere bystander to the trade that was flourishing during the 1st millennium CE. However, there is still some information that is needed in order to fully understand at which point in time Sri Lanka became a proper participant in these trade networks. From archaeological materials found at Tissamaharama there appears to be both an early and a later phase of interaction between Sri Lanka, India and the Mediterranean. Another aspect that raises several questions is the period in which Tissamaharama fell into disuse, so far a date of around the 5th century CE has been given for this decline in activity, but this also coincides with the rise of foreign trade that Sri Lanka experienced, which makes one wonder what led to Tissamaharama being abandoned when it could have been a major trading point for ships arriving from Southeast Asia as well as East Asia. The choice of using the Palk Straits is always a factor, but knowing that trade still occurred in Tissamaharama prior to its abandonment, why would the trade have

gone to the southern part of the island at all? In this respect, there are still many unanswered questions that need to be resolved before the full picture of Sri Lanka's role in these trade networks can be seen. In order to do this, much more archaeological research is needed in the southern part of the island, but also as I have mentioned before, in the eastern part of the island.

Another noteworthy observation would be the assumption that there was a community of foreign merchants either Mediterranean or Persian that were based in Mantai and Anuradhapura (Carswell 2013, 48; Prickett-Fernando 2003, 111). This idea has been mentioned throughout the literature I have reviewed yet the actual archaeological evidence for this is extremely limited. As researchers we must be cautious about making large statements without the proper evidence to support it. Historical texts may mention these foreign communities within Sri Lanka, but up until now even direct trade with the Mediterranean has not been fully proven. There are certainly Mediterranean artifacts present in Sri Lanka, but this does not necessarily mean that Mediterranean merchants travelled all the way there, bringing the goods with them. The goods may just as easily have been transported via merchants from other regions to the west that had direct contact with the Mediterranean world, and through exchanges the items eventually ended up in Sri Lanka. A good example of a somewhat unfounded assertion is that of direct Roman trade with Lanka based off the presence of Roman coin hoards found in the South of the island (Bopearachi 1999, 25-27). Assuming that simply the presence of some Roman coins in a hoard consisting also of local imitations of Roman coins is evidence of direct trade with the Roman Empire is simply not valid and the archaeological evidence for large-scale trade with the Mediterranean is fairly limited. As observed by Coningham *et al*, the fact that there are particular artifacts that are associated with specific groups of people present in Sri Lanka, does not mean that that these groups were necessarily based in Sri Lanka in the ancient past (Coningham *et al* 2017, 28).

There has been some thought given to this issue, especially to the idea of statements that aggrandize the history of Sri Lanka in terms of trade with foreign regions, it has been called "Implicit Cosmopolitanism" (Darley 2017), this term

encompasses more than simply aggrandizing the past based on limited evidence. However, despite the fact that there is enough evidence to support the position that Sri Lanka was connected to various other regions through trade, more consideration must be given when analyzing the evidence towards the extent to which it was involved with foreign trade, and this can only be done through a bottom up approach where we first look at what evidence is present and what context this evidence is found in, from there further analysis using solid scientific techniques can provide insight into the nuances of how Sri Lanka was positioned within the larger network of Indian Ocean trade as well as how foreign materials travelled along these networks to end up at their final destinations.

5.7 Future Research

This thesis has taken the next step in understanding Sri Lanka's role in the Indian Ocean trade networks, but there remains a lot of work to be done to continue the research on this topic. Firstly, by no means is the compilation of data within this thesis definitive, a trove of information remains elusive, either due to never being published or being published in languages other than English. Collecting this scattered information remains critical to the progress of this research, however, collection is not the only necessary action to be taken with this elusive data, compilation of the data as well as the publication of it on a platform that is accessible to the wider academic community will be imperative. The suggestion of a national database would enable this step, allowing all the relevant information to be found in one place.

Alongside the practical improvements that need to be made in order to further the research, knowledge regarding certain internal dynamics within ancient Sri Lanka also needs to be developed to achieve a better understanding of the topic as a whole. In the Early Historic period in Sri Lanka during the 1st millennium CE there existed not only one homogenous kingdom on the island. There were 3

kingdoms, the 2 main ones being the *Rajarata* Kingdom, which consisted of the northern regions of the island where Anuradhapura was the capital, and the *Ruhunu* Kingdom, which consisted of the southern regions of the island and where Tissamaharama was the capital, the 3rd kingdom was located in the center/west of the island, consisting mainly of the mountainous hill country, it was called the *Maya* Kingdom. It is still unclear as to what the relations were between these kingdoms and how they interacted with each other, from historical records there appears to have been a peaceful relationship between the *Rajarata* Kingdom and the *Ruhunu* Kingdom, since both of these kingdoms were contemporary with each other and some form of relationship be it hostile or peaceful would have existed. In terms of trade networks, it would be extremely useful to understand the internal dynamics at play between these kingdoms, were they trade partners? Did each kingdom have its own trade networks that operated in isolation or did they interact to their mutual benefit? What are the differences in terms of trade goods that are found in these kingdoms? These are but a few of the questions that remain unanswered due to the lack of research on this topic. Therefore it is important to keep in mind that when analyzing the trade networks that operated in ancient Sri Lanka, that we must also realize that there were intricate dynamics at play that would have certainly affected the ways in which these networks operated.

Another aspect for future research will need to focus on the hinterland of Anuradhapura. There have already been surveys conducted by scholars on the hinterland (Coningham *et al.* 2013), but these did not produce any results pertaining to trade networks. However, in order to fully understand where foreign goods ended up and were sent to, it is imperative that a deeper focus is put on the hinterland of the ancient kingdom This also fits into the research of the spaces in between major settlements and ports that provide a bigger and better picture of what these trade networks were composed of. When I refer to research into the hinterland I refer mainly to settlements outside the main confines of the walled city of Anuradhapura, there were most certainly large settlements in the nearby vicinity, as seen in the layout of Anuradhapura, the city was constructed according to a specific design with its different zones. Identifying the major points of settlement

within the hinterland of Anuradhapura could allow for possible research into potential areas where foreign goods were previously thought to have been absent in. To this end, the suggestion of LiDAR for the identification of sites in between major settlements and ports would also be effective in properly surveying the hinterland.

An important point to keep in mind when discussing future archaeological research in Sri Lanka is the part that politics plays in any research done on ancient sites. Sri Lanka only emerged from a decades long conflict in 2009 between the Sri Lankan government and the Liberation Tamil Tigers Elam (LTTE). Prior to and during the civil war, archaeology has been a point of tension between ethnic groups on the island. It could be argued that for a long time archaeological research in Sri Lanka tended to prioritize the Buddhist Sinhalese archaeology over the Hindu Tamil archaeology. In more recent times steps have been taken to try and resolve this issue, but there still remains much to be done. Keeping this in mind, when looking at trade networks that involve multiple ethnic groups and communities that interacted through trade, it is crucial that scholars are aware of certain biases and are able to study the material as objectively as possible. However, the publication of contentious reports and articles can be a difficult and prolonged process. It is not within the scope of this thesis to offer a solution to these problems related to political identity, but it is worth keeping in mind that when researching these trade connections there can be unexpected issues that are not related to archaeology.

One point that I can make within this thesis is that the past is not a black and white picture when it comes to ethnicities and identities. Sri Lanka has been a melting pot for cultures from all over the Indian Ocean, and it is in this diversity that Sri Lanka has its roots. Through the study of trade networks more of these interconnections between cultures can be brought to light and from these connections there can hopefully be more understanding as well as appreciation for the wonderful mosaic that is Sri Lanka's ancient past.

Chapter 6

6. Conclusion

Throughout this thesis I have covered several different facets of the research pertaining to Sri Lanka's role in the Indian Ocean trade networks. To begin with I presented a small summary of the geographical and historical reasons for Sri Lanka's involvement in the aforementioned trade networks, I then proceeded to provide an overview of all the main research that has been done on the main ports of trade as well as their connections to the ancient capital of Anuradhapura. I then provided suggestions for the continuation of this research using databases and digital techniques such as LiDAR, following this I have given a discussion of the different issues that scholars face when researching this topic and the different studies that have already been done as well as studies that would be necessary in the future Within this final chapter I shall discuss how I have answered the research questions posed in the introduction chapter, and conclude this thesis.

The main research question that I posed was "What can we learn about the integral role of Sri Lanka as part of the Indian Ocean trade networks, based on the archaeology present at these main sites (Anuradhapura, Mantai, and Tissamaharama)?". Throughout this thesis I have given examples of archaeological data that has been gathered that evidence Sri Lanka receiving foreign imports as well as producing goods for export to foreign lands. The main evidence for this data can be found within chapter 3 in the overview of archaeological data that has so far been published. As I have mentioned in previous chapters, by gathering all the available relevant data and compiling it all in one place it becomes much easier to see the extent to which Sri Lanka was involved with the trade networks operating in the 1st millennium CE. From the evidence that has been gathered here it is apparent that Sri Lanka was most certainly an active point in the Indian Ocean for trade, goods from Eastern Asia, Western Asia, and the Mediterranean have all been found

at several different locations in the island. Alongside this, goods from Sri Lanka have been found in locations as far as Zanzibar. Evidence for the production of high quality goods such as iron and steel have also been found in association with areas connected to trade networks as seen with the case of Samanalawewa, Ridiyagama and Tissamaharama. The presence of luxury goods in the ancient capital of Anuradhapura is further evidence that ancient Sri Lanka was a player in the trade networks of the Indian Ocean, whether it was a major player or a powerful player is something that further research can reveal, but for the moment we can say with a relatively safe degree of certainty that Sri Lanka played a role in these trade networks, evidenced not only by the archaeological material presented here, but also from historical mentions as seen in chapter 2.

The sub question for the main research question that I posed in chapter 1 was "What can we learn from port sites?". From the evidence gathered in chapter 3 and the historical mentions in chapter 2, it has become evident that the main port of Mantai in the northern part of Sri Lanka was a major point in Sri Lanka for foreign goods to enter the country as well as a major point where exports would have gone through. The limited accessibility of the Palk Straits that allow merchants to cross from the eastern coast of India to the western coast and vice versa, allowed Mantai to become an important stopping point for merchants travelling through the area. In addition to understanding that the location of ports played a role in their importance, it also appears that port sites were not just places where goods were traded but they were also places where goods were actively crafted, the best example being Mantai and the production of glass beads there. The indo-pacific beads that were produced at Mantai were distributed widely throughout the Indian Ocean with examples of these types being found as far as Southeast Asia and Western Asia (Francis 2013, 357-361). Interestingly, there is much less definitive evidence for foreign trade in the southern part of the island where the major ports are suspected to have been at Godavaya or Kirinda, both of which are located very close to Tissamaharama. However, this also stems from the fact that very few excavations have been properly published on these port sites. The site of Tissamaharama however, provides evidence that much like Mantai certain goods

were being manufactured at the site itself. The furnaces discovered at Tissamaharama were used either for the production of metals or for the alteration of metals brought in from somewhere else, but where the products ended up is still a mystery that only further studies will answer.

The Second sub question for my main research question was "what can we learn from the archaeological record?". The answer to this question is also linked to how I answered the first sub question, by compiling the available evidence in chapter 3 of this thesis, some interesting results were found. One of these results is the absence of contemporary port sites on the eastern coast of Sri Lanka during the first millennium CE. This is not to say that there are no ports on the Eastern coast, as mentioned before the port of Gokanna was the main port associated with the ancient capital of Polonnaruwa during the medieval period in Sri Lanka. But significant ports associated with the ancient capital of Anuradhapura on the eastern coast are conspicuously absent; this is strange considering the amount of historical mentions there are, that suggest that Eastern Asia and Sri Lanka were connected through trade. Alongside this noticeable absence of ports on coast of the island, the archaeological record has also revealed issues that need to be resolved, namely the differences between the north and the south of the island, where evidence for foreign trade is abundant, but the time periods for this trade vary, the reason for this is worth researching. The archaeological record has also shown that far flung claims of the grandeur of Sri Lanka's Early Historical period should be scrutinized and carefully reviewed, since the evidence certainly points to Sri Lanka being part of the Indian Ocean trade networks, but a crucial central point that is indispensable for the entire operation? Probably not. At least, there is not nearly enough evidence to suggest so.

The second research question that I posed was "What modern techniques and methods can scholars use to achieve a better understanding of Sri Lanka's role in the Indian Ocean trade networks?". Within chapter 4 I presented some examples of techniques that could greatly benefit the study of Sri Lanka as part of the Indian Ocean trade networks, I proposed the use of accessible databases as well as the application of LiDAR for the detection of inland sites. In chapter 5 I discussed the

benefits and drawbacks of these specific techniques, unfortunately due to the restrictions of COVID19 I was unable to see how these techniques fare when applied in reality, but to compensate for this I used the case study of Angkor and of the use of ARCHIS in the Netherlands to give an idea of how these ideas have been applied in other circumstances.

The first sub question to this second research question was "What can be hypothesized as an efficient working methodology based on this thesis?". I would advocate that the steps I have mentioned in chapter 4 are the next steps to be taken in order to consolidate the already present material on this topic. The scattered state of publications hinders any thorough research on this topic. Scholars may only have a partial understanding of the topic due to other relevant information simply being lost in an archive. Therefore starting with a proper accessible database would be the first step in continuing this research, followed by consolidating the knowledge of how the island of Lanka itself functioned internally in terms of trade, which is where LiDAR comes into play, allowing for the identification of sites and pattern recognition, coupled with information from excavations and artifact assemblages there can be great strides made in understanding exactly who was involved in these networks, where the goods came from and where they went afterwards as well as what contributions Sri Lanka made to the overall network throughout the Indian Ocean.

The second sub question for the second research question was "what techniques can be applied to enable efficient storage and dissemination of data?" The answer to this question lies in chapter 4 and 5 where I elaborated on the use of databases and possibilities for further research conducted not only by Sri Lankan scholars but by scholars around the world that have an interest in this topic. Another key opportunity that accessible databases provide is the opportunity for scholars to have comparative material that they can use for their own research, which might not even be on this topic, but on a related topic. A good example for this is analysis on certain items of trade that would connect 2 different regions, by having access to comparable material from different sites; scholars are more likely to find previously unknown connections between sites. As discussed in previous

chapters it is through the availability of the data to academic communities throughout the world that increases the likelihood of further previously unknown research, the database itself is merely a tool in this respect, but allowing it to be used widely is the key to fully utilizing the tool itself.

Throughout this thesis I have covered several different facets of research on Sri Lanka's position in the ancient Indian Ocean trade networks, and we have seen the ways in which this research can continue. It is important that while keeping in mind new techniques and methodologies, that the purpose of this research at its very core is also taken into consideration when conducting new research. The main purpose of this bottom up approach is to create proper bases of knowledge from which we can operate. For much of Indian Ocean archaeology, sites are studied in isolation and often viewed as individual sites, whereas the reality is far more convoluted and harder to discern. When faced with scattered and sporadic evidence for trade, it becomes difficult to ask broader questions regarding the wider networks of trade that operated in the ancient Indian Ocean, and it is by looking at all the available evidence for phenomena such as trade and connectivity, and working from the ground up that we can actually ask these broader questions as well as answer them, and in turn gain a far more secure understanding of what the ancient past was truly like for the people involved in all of its different facets. It is through arduous collection of all relevant data that the full picture of trade throughout the Indian Ocean can be reconstructed in its entirety, with a realistic portrayal of the myriad of cultures that would have been involved within these networks. The whole field of Indian Ocean archaeology still has a long way to go, but with more and more solid work that encompasses all the available evidence, and not just evidence related to specific societies and social classes, a past that for millennia has been shrouded in the darkness of mystery may finally be illuminated.

Abstract

The study of Indian Ocean archaeology has often focused on individual sites and has tended to focus primarily on connections between major port sites without the inclusion of smaller sites and the spaces in between these major sites. Within this thesis I focus on the role of Sri Lanka within the broader context of the Indian Ocean trade networks. Sri Lanka has long been thought to have been a central point within these aforementioned trade networks due to its geographical location at the "center" of the Indian Ocean, coupled with its natural topography that made it an ideal safe port of call for ancient merchants. However, most of Sri Lanka's prominence in this context is based off historical texts and sporadic archaeological evidence from major sites such as Mantai and Anuradhapura. This research will focus on a wider range of sites and archaeological evidence in order to see what exactly was Sri Lanka's role within the broader Indian Ocean trade networks. In order to accomplish this I will create an overview of all the available evidence such as archaeological reports, scientific articles and publications related to this topic. Following this I will also provide suggestions for the continuation of this research so that it may benefit the wider academic community. These suggestions will include the application of digital techniques in the field such as LiDAR, in order to properly understand the spaces in between the major sites so that a more complete picture is gained rather than one that focuses mainly on famous urban sites. Alongside this I will also discuss methods to properly store and disseminate the data related to this research in a way that makes it more accessible to the wider academic community. Through the creation of an overview of all the available material as well as the aforementioned suggestions, I will provide a framework for the next steps to be taken in terms of research into Sri Lanka's role in the Indian Ocean trade networks.

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