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Sri Lanka and the Indian Ocean Contacts:

Internal Networks and External Connections

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ABSTRACT

This study reconceptualises Sri Lanka's external trade and interactions from the middle of the first millennium BC to the early second millennium AD. Unlike earlier analyses, mine draws on the excavated material culture from three port-cum-urban centres—Mantai, Kantharodai and Kirinda—which were linked to major urban complexes, interior resource bases and Indian Ocean maritime networks. The scale and intensity of their external trade and connectivity, crafts and industries varied greatly over time and location.

My findings illustrate Sri Lanka's earliest cultural-commercial connections with India from the middle of the first millennium BC. By the beginning of the CE, islanders were trading with the Middle East and the Mediterranean in the west and Southeast Asia and China in the east. The Middle East was a particularly strong connection from about the mid-3rd century. Materials from Southeast Asia and China arrive by the late 7th/8th centuries, with the focus of external trade shifting away from the Middle East to the Far-East around the end of the 10th century, lasting until the 12th/13th centuries and beyond.

My findings demonstrate that internal developments in irrigated agriculture, iron technology, crafts, industries and procurement–distribution networks were crucial for external trade and connectivity. Contrary to the traditional view, I identify local agency as an important driving force behind both internal and external trade in ancient Sri Lanka. The island's external connectivity did not depend on a single factor but was based on specific historical realities which were constantly redefined and reformulated in response to the changing dynamics within and outside Sri Lanka.

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To

he who departed even before the arrival

and

my little angel who suffered the most during my long absence from home

ABBREVIATIONS

AD	*Anno Domini*
AGW	Alkaline Glazed Ware
ASCAR	Archaeological Survey of Ceylon Annual Report
ASW2	Anuradhapura Salgahawatta 2
BC	Before Christ
Citadel	Anuradhapura Citadel
CTI	Ceylon Tamil Inscriptions (Velupillai 1971)
'Disturbed'/'D'	Artifacts recovered from the disturbed phases
Div.	Divyavadana (Cowell and Neil (eds.). 1886)
Dv.	Dipavamsa (Oldenberg (ed.). 1879)
ECA	Excavated Ceramic Assemblage
EHP	Early Historic Period
FE	Far-east
GBPP	Gazetteers of the Bombay Presidency – Poona
GBA	Glass Bead Assemblage
Gedige	Anuradhapura Gedige
GTBA	Grand Total Bead Assemblage (from Mantai, Kantharodai, Kirinda)
GTBaA	Grand Total Bangle Assemblage (from Mantai, Kantharodai, Kirinda)
GTCA	Grand Total Ceramic Assemblage (from Mantai, Kantharodai, Kirinda)
GWF	Grey Ware Family
ICA	Imported Ceramic Assemblage
'Imp.Unk'	Imported unknown
'Ind/SL'	Indian/Sri Lankan (ceramic)
IPB	Indo-Pacific Beads
JRASCB	Journal of Royal Asiatic Society Ceylon Branch
KR2	Kirinda Trench 2
KR3	Kirinda Trench 3
KTD	Kantharodai Excavation
LA-ICP-MS	Laser Ablation Inductively Coupled Plasma Mass Spectrometry
ME	Middle East
MHP	Middle Historic Period
Mv.	Mahavamsa
NGW	Non-Glazed Ware
OBA	Organic Bead Assemblage
OGW	Opaque Glazed Ware
PI/ST	Paddle Impressed/Stamped decoration
Raj.	Rajavaliya (Guṇasekara (ed.). 1953)
SBA	Synthetic Bead Assemblage
SCA	Surface Ceramic Assemblage
SEA	Southeast Asia

SLBA	Sri Lankan Bead Assemblage
StBA	Stone Bead Assemblage
Smv.	Sammohavinodini (Buddhadatta (ed.). 1923)
'Surface'	Artifacts sampled from the surface survey
Sv.	Sahassavatthuppakarana (Buddhadatta (ed.). 1959)
Svp.	Seehalavattuppakarana (Buddhadatta (ed.). 1959)
TBA	Total Bead Assemblage
TBaA	Total Bangle Assemblage
TCA	Total Ceramic Assemblage
UCHC	University of Ceylon History of Ceylon (Attygalle (ed.). 1956)
'Unk'	Unknown ceramic assemblage
'Various'	Small pieces of various rim types
Vp.	Vamsatthappakasini (Malalasekara, G. P. (ed.). 1938)

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CHAPTER 1

INTRODUCTION

1.1 General Background

The aim of this thesis is s to re-conceptualize Sri Lanka's external interactions in terms of trade and exchange, from the mid-first millennium BC to the early second millennium AD.[1] Since all such interactions are firmly based on internal dynamics, the research also focuses on local craft/industries as well as manufactured and natural commodities which can be identified to have been traded and exchanged. Textual and epigraphic records testify to the involvement of Sri Lankan state and non-state actors and institutions in both internal and external trade, the analysis of which also forms part of the present study. This chapter sets out the background for my thesis, stressing the significance of Sri Lanka's location at a critical crossroad in the east–west maritime trade of the Indian Ocean during the pre-modern period. This location had a profound impact on the island's historical developments and external connectivity. The chapter identifies issues relating to Sri Lanka's external connectivity and internal developments, lacunae in the previous research, as well as the research questions and objectives of the present work. This chapter also summarises the key methods and approaches adopted, which are examined in detail in Catalogue 1.1.

1.1.1 The island

The island of Sri Lanka is located in the middle of the Indian Ocean between 5–10 degrees north of the equator. It is approximately 430 km long from north to south and 225 km wide from east to west. From sea level, the island's relief comprises three peneplains of elevation

[1] Throughout this thesis, dates or centuries written without BC or AD implies those of the CE while dates and centuries before Christ will be followed by BC. The date ranges that stretch from BC to AD will be mentioned.

rising to over 2500 m at its highest point at Pidurutalagala in central Sri Lanka. The island's climate is dominated by the southwest monsoonal system with the annual rainfall ranging from approximately 900 mm to over 6000 mm. Higher precipitation is experienced on the western slopes of the central highlands, whereas lower values are seen in the north-western and south-eastern lowlands. The average annual temperature varies from approximately 27°C in the lowlands to the 18°C on the highlands which reach a maximum elevation of slightly over 2400 m above sea level (Cooray (1967) 1984; Somasekaram 1988; Deraniyagala (1992) 2004).

The island is situated at a strategic position at the southern extremity of the Indian sub-continent astride a major trans-oceanic seafaring route that operated during the pre-modern period, linking the civilisations of the Mediterranean and the Arabian Gulf in the west and Southeast Asia and China in the east (Bandaranayake 2003:9–10). Therefore, it was almost impossible for the island nation to remain isolated from the contemporary developments that were taking place in the Indian Ocean (Gunawardana 2003:17). The narrow strip of sea across the Palk Strait that separates Sri Lanka (section 1.3) from its neighbour India encouraged passage and communication between the two countries, though this did not prevent the islanders from experiencing an independent cultural evolution (Bandaranayake 1978; De Silva 1987). Nevertheless, Sri Lanka's shores were open to cultures and countries to the east and the west far beyond its immediate neighbours since prehistoric times. Such wide interactions and cultural inputs acted upon its island character and internal dynamics are largely responsible for its cultural-historical development over the *longue durée* (Bandaranayake 1978; Tampoe 1990:173–187). Therefore, any attempt to understand Sri Lanka's external interactions and their impact during the pre-modern period should consider the role of internal dynamics on the cultural evolution of the island.

1.1.2 Rise of civilization

The earliest civilization in Sri Lanka arose in the dry-zone in the middle of the first millennium BC and that lasted until the middle of thirteen century is termed the *Rajarata* civilization (see Indrapala 1971). Anuradhapura and Polonnaruwa were its capital cities. The prime mover and economic basis of this civilization is generally attributed to the development of irrigated agriculture (Parker 1909; Brohier 1934/1935; Siriweera 1994; Myrdal Runebjer 1996; Seevalee 1998) for which extensive physical remains are found in the dry-zone. This 'agro-centric' view, however, undermined the contribution of external contacts and trade to the development of dry-zone civilization. Sri Lanka's geographical position, mid-way on the monsoon-driven trans-oceanic trading routes of the Indian Ocean, made this island more than just a convenient stop-over for re-provisioning. Although Sri Lankan chronicles (section 1.2.2.2) are largely silent about such external trade/encounters, over forty western sources explicitly mention *Tabrabane* (Sri Lanka) (Weerakkody 1997) as an important trading *entrepôt* in the east (Cosmas XI.15–16). Surprisingly, until very recently most discussions of Sri Lanka's external trade and connectivity have been largely based on historical sources (Sirisena 1978; Siriweera 1994; Weerakkody 1986, 1997; Gunawardane 2003). Nevertheless, recent attempts to integrate material evidence such as ceramics (Carswell and Prickett 1984; Carswell 1991, 1996; Pricket-Fernando 1991, 2003a&b; Coningham 1999, 2002, 2006, 2013; Schenk 2001), coins (Boperachchi 1995, 1997, 1998; Boperachchi and Wickremesinhe 1999), iron (Juleff 1996, 1998, 2009) and beads (Hannibal-Deraniyagala 2001, 2013; Francis 2013a) into these discussions have shown great potential for revealing the scope of Sri Lanka's cultural/commercial interactions during the pre-modern period.

1.2 The present study

Anuradhapura, Tissamaharama, Mantai and Kantharodai are often referred to as the sites with the best potential for studying early urbanization and external contacts in ancient Sri Lanka (Deraniyagala (1992) 2004:707). Of these, only Anuradhapura (Deraniyagala 2004; Coningham 2006) and Tissamaharama (Weisshaar et al. 2001) have been subjected to systematic archaeological investigation. While drawing on data from these sites, the present study specifically focuses on Mantai, Kantharodai and Kirinda port/urban sites situated on the north-western, northern and south-eastern coasts, respectively.

The selection of these sites was based on their historical and archaeological significance as well as the interests of the Oxford University based SEALINKS project of Dr Nicole Boivin, as fieldwork for the present study was conducted under this project. Mantai was excavated under the 'Sri Lanka and the SEALINKS' project, in collaboration with the Department of Archaeology, Sri Lanka. Similarly, Kirinda was excavated by the 'Southern Sri Lankan ports' project, under the permit issued to the Central Cultural Fund of Sri Lanka (CCF). These projects are sub-projects of the 'SEALINKS' and the author was a co-director and a collaborator of these projects. Kantharodai, however, was excavated by the Department of Archaeology and the author carried out the flotation sampling for the SEALINKS project. The author analysed the material remains resulting from all three excavations for the present research (see Catalogue 1.1 for details). This thesis is, in a way, an outcome of the attempt to satisfy the interests of the SEALINKS project and the author.

Historically, Mantai, was the main sea port of Anuradhapura, the earliest capital city of Sri Lanka, for over fifteen centuries from *ca*. 600 BC, while Kantharodai with its sea port *Jambukolapatthana*, was the second most important urban settlement and connected by land

to Anuradhapura during the same period (Figure 2.9). It was mainly the ports of Mantai and Kantharodai, that experienced the greatest amount of external connections and trade during the early phase. Being situated close to the tip of the Southern India, it was natural that the earliest maritime contacts with India and mainland South Asia took place through these ports. It is likely that the earliest seafarers from the northern and eastern parts of India navigated along the coast and then crossed the shortest distance across the shallow waters of the Palk Strait, entering Sri Lanka through Mantai and *Jambukolapatthana*. The historical sources testify to the significance of these ports through which most political, military, missionary and cultural exchange took place during the *Rajarata* civilization (Chapter 2.3.1; Catalogue 2.1). There were small seaports, such as Magana and Uratotta, which acted as subsidiary ports to Mantai and *Jambukolapatthana*.

A regional politico-religious centre also existed in southern Sri Lanka with its capital at Magama/Tissamaharama (Weisshaar 2001), which was contemporary with Anuradhapura and Kantharodai. While Godavaya functioned as its main seaport, there were a number of minor ports that were also vital for the emergence of urbanism in the region (Catalogue 7.2.2). Kirinda was one such minor port that was located alongside a monastery dating from *ca*. the 3rd century BC (Somadeva 2006). Being a regional port, it had limited external connectivity but was probably linked to internal networks and channelled local resources to maritime trade.

Ports have been marginal to the study of external contacts and the island's cultural evolution as urban and religious complexes were the main attraction for scholars. This study, in contrast, envisages that they were an integral part of Sri Lanka's historical development. They were vital nodes with larger inter-regional networks that included urban centres such as Anuradhapura

and non-urban resource procurement and productions sites. Consequently, the port of Mantai—the key site studied here—along with those at Kantharodai and Kirinda, are the focus of the present study.

The final aim of this study is to understand the internal networks and external connectivity of pre-modern Sri Lanka in light of the material and textual evidence, which takes place within the broader Indian Ocean cultural matrix. The latter half of the first millennium BC witnessed unprecedented changes in the socio-political structures of the entire Indian subcontinent. In Sri Lanka, the emergence of fortified settlements, complex irrigation systems, secular and religious architecture, the intensification of local craft and maritime trade and the consolidation of centralized polities, as well as the expansion of dominant ideologies, are the key elements in cultural development (Coningham 1999, 2006; Prickett-Fernando 2003a&b; Deraniyalaga 2004; Somadeva 2006; Karunarathne 2010). This phenomenon has been equated to the 'formation of state-level society' (Karunarathne 2010:1) and the processes involved in this will be examined at Mantai, Kantharodai and Kirinda and placed into context with findings from across the island and selected key sites in the Indian Ocean.

1.2.1 Periodization and chronological timeframe

Historians, largely influenced by political factors, have made several attempts to demarcate historical developments in Sri Lanka (Codrington 1926; Mendis 1932, 1935; UCHC 1959–60; Gunawardana 2008). Since this is an archaeological study, the most convenient chronological framework is one based on material remains, drawing from historical analysis. Thus, the cultural sequence proposed by Deraniyagala (2004) is adopted in this study with input from the historical periodizations suggested by Bandaranayake (1990) and Gunawardana (2008).

However, based on Mantai chronology, I divide Deraniyagala's Middle Historic Period into three continuous sub-phases (Chapter 2.6.1).

The time period of the present work begins in the mid-1st millennium BC when Sri Lanka's first archaeologically and historically observable regular external interactions/maritime trade began, which coincides with the earliest occupation levels at the sites studied. The temporal focus ends in the early second millennium AD and coincides with the collapse of the island's earliest civilization and that of Mantai. I argue that the collapse of Mantai is not tied to the Chola attack in 997 as speculated by many (e.g., Carswell et al. 2013), but with that of the collapse of the *Rajarata* civilization in the middle of the 13th century, as Mantai continued to serve as the main seaport for the two capital cities (Anuradhapura and Polonnaruwa) of this civilization.

1.2.2 Evidence for Indian Ocean trade and interaction

Archaeologically visible early evidence of population movements and possible trade-exchange links between Sri Lanka and the Indian Ocean coincided with the introduction of the Proto-historic Early Iron Age cultures from India, dated to *ca*. 900 BC (Begley 1981; Seneviratne 1984; Deraniyagala 2004) or to 1300 BC (Somadeva 2006). This study integrates material and historical evidence to assess such external trade and other forms of interaction.

1.2.2.1 Material evidence

The primary evidence of this study is the material remains of external contacts. Until very recently, however, the main foci of historical and archaeological studies were the spectacular ruins of the *Rajajata* and *Magama* (Tissamaharama) with ancient port sites largely ignored.

Ancient seaports are of prime importance for understanding the external interactions of the island since they act as frontiers and gateways. Sri Lanka has numerous bays and anchorages all along its shores; most of which were probably used for sea voyaging and some of them for regular international trade and contact. The Godavaya inscription (second century BC), for example, mentions the revenue collected from foreign traders (Paranavitana 1983:101). Numerous historical references to ports such as *Mahatittha* (Mantai),and *Jambukolapatthana*also confirm this (Chapter 2.3).

Limited investigations conducted at ports have demonstrated the potential of these sites to provide information about connectivity and commerce. This led to the choice of Mantai, the main site studied here, and of Kantharodai and Kirinda, which are used for comparative purposes (Chapters 5 and 6).[2] Mantai was excavated for several seasons in the 1980s (e.g., Carswell and Prickett 1984) with work here being abandoned abruptly before its conclusion due to security concerns.[3] Archaeological investigations have also been conducted at the port sites of Godavaya (Roth et al. 2001), on the southern coast, with limited investigations at Kantharodai (Begley 1967) and Kuchchaveli (Solheim & Deraniyagala 1972) on the northern and eastern coasts, respectively.

[2] Originally, it was planned to present field studies undertaken at Mantai, Kantharodai and Kirinda for the present work as three independent case studies and to observe their individual characters. Nevertheless, the reconstruction of long sequence at Mantai was considered the primary task. The scale of the analysis of the diverse material from Mantai and the limitation in word length for this thesis did not allow the other two sites the be presented as full case studies. Hence, it was later decided to use Mantai as the key site and to include the other two sites as reports in the catalogue and to draw from them for discussions in Chapters 5 (ceramic) and 6 (Non-ceramic material).

[3] Both Mantai and Kantharodai have been inaccessible for three decades (until 2009) due to the separatist war in northern Sri Lanka.

Of the excavated material remains, ceramics are the most common imports to survive in the archaeological record in Sri Lanka (Prickett-Fernando 1990:151–180, 2003a:53–76; Schenk 2001; Coningham 2006). Prickett-Fernando (Ibid.) identified 23 foreign ceramic types imported before AD 600 and mentions at least 16 additional types that come in during the following millennium. Ceramics are also accompanied by glass vessels from Rome, Byzantium and Syria (Coningham 2006; Somadeva 2006:54).

In this study, over 48,300[4] ceramic sherds, representing both indigenous and non-indigenous wares, were recovered from limited excavations conducted at Mantai, Kantharodai and Kirinda. These sherds were statistically and typologically analysed. They represent seven different geographical regions[5]: the Middle East, India, Southeast Asia, China and Sri Lanka; unknown overseas regions ('Imp.Unk') and unknown regions ('Unk'). The majority of imported wares are luxury tablewares, presumably imported for the use of an elite class or for religious purposes, and large storage jars used as containers, which indicate the arrival of large cargoes since the beginning of the CE.

The vast majority of the ceramic assemblages from the three sites are local wares, reflecting flourishing local industries. Despite clear variations in fabric, firing and inclusions, local wares share clear similarities in their forms, surface treatments and decorations. I attribute the diversity and similarities to regional variations and to sharing of a common ceramic tradition among closely related–possibly kinship based–potting communities, some of who claim ancestry to South India. Based on the distribution of regional luxury/ritual wares, I identify

[4] Excluding 65,797 small sieved sherds from Kirinda (Chapter 5)

[5] See Catalogue 3.1 for the definition of geographical regions.

internal trade-exchange networks alongside those of semi-precious stone procurement networks (Chapter 5.4.1).

After ceramics, coins are the next most common evidence for the existence of external interactions in Sri Lanka. Bopearachchi's (1997, 2001) exhaustive studies exemplify the range and diversity of such interactions, particularly with the Mediterranean and India. Our imported assemblage from Mantai, Kantharodai and Kirinda comprises coins originating from India and the Roman world dating from the 2nd century BC to early 6th/7th century AD (Chapter 2.7.2).

Sri Lanka is considered to be one of the four major centres of the Indo-Pacific bead trade and is credited with being self-sufficient in the production of beads (Francis 2002:129, 136–138). Mantai is said to have traded beads with the entire known world (Francis 2013a:349). My findings clearly illustrate that Mantai manufactured and traded glass beads throughout its occupation (2nd century BC–12th/13th century AD). While it specialized in glass bead production, it also had a small stone bead industry with rocks and semi-precious stones derived from various local and foreign sources. Glass beads seem to have been made in quantities at the vicinity of Kirinda from *ca*. the late 3rd–9th century. Glass bead production at these sites exceeded local requirements and was intended for maritime trade, with evidence found at sites such as Siraf (Persian Gulf), Beranike (Red Sea) and possibly at Unguja Ukuu (Zanzibar Island, East Africa) (Chapter 6.4.3.4).

Beads and semi-precious stones are among Sri Lanka's most archaeologically visible exports. Scientific analysis has revealed possible export of Sri Lankan garnets to Oman (Hannibal-Deraniyagala 2003:365–378) and Ankor Borei, Cambodia (Dussubieux 2001; Carter 2012). Sri

Lankan gem stones fetched a high price in western markets (Hourani 1963:71). Meanwhile, the carnelian beads found at Anuradhapura closely match examples from Thailand (Theunissen et al. 2000). The *stupa* type bead—argued as being of Sri Lankan origin (Chapter 6.4.3.5)—is commonly distributed in Southeast Asia. Similarly, cornaline d'Aleppo, a Southeast Asian bead type, occurs in contexts dated from the mid/late 6th to almost the 12th/13th century in our excavations at Mantai and Kirinda (Ibid.). Beads, consequently, illustrate Sri Lanka's early commercial exchange with Southeast Asia, which are hitherto unknown. Based on epigraphic and iconographic evidence, I argue that Buddhist religious networks were partly responsible for initiating interaction between the two regions (Chapters 5.4.2.4, 6.4.3.4, 7.3.4).

Based on my typological and statistical analysis of beads, I argue that Mantai specialized in a few selected bead forms, primarily intended for maritime trade. The limited scientific analysis conducted on beads illustrates the trading of Mantai beads at international markets. Kirinda also specialized in a few bead forms; however, it is likely to have catered to a local clientele. Although only 3.7% of the total bead assemblage is imported, they are derived from the Roman world, the Middle East, India and Southeast Asia.

Mantai also has clear evidence for glass and chank bangle production. It is almost certain that chank bangle production was intended for maritime trade. Although no archaeological evidence is reported from outside Sri Lanka, I argue that Mantai bangles were probably exported to the same markets, such as Siraf and Beranike, to which beads were exported (Chapter 6.4.3.4). Only a few pieces of bangle could be identified as being imported, possibly from the western word.

Sri Lankan exports also included pearls, forest and agricultural products and above all, high quality iron and steel (Chapters 6.6.2 and 7.2.5). Juleff's studies (1996, 2009) of Sri Lankan metal industry and her comparisons with the technologies of East and Southeast Asia have demonstrated the evolution and transfer of iron technology between regions. The sites investigated for this study, particularly Mantai, have some evidence for iron production.

The items imported to Sri Lanka during the same period include intaglio seals, lapis lazuli, carnelian, carvings of Amaravati marble and ivory, Nestorian crosses, glass vessels, ceramics, metal objects, red corals and animals such as horses (Prickett-Fernando 2003a). While ceramics are the largest category of imports in our assemblage, a limited number of foreign beads, bangles, red corals and plant remains were also recovered. Consequently, the analysis of material illustrates complex trade-exchange networks based on imports of luxury and utility items and exports of beads, pearl, and semi-precise stones between Sri Lanka and various regions in the Indian Ocean at least since the final centuries BC (Chapter 7.2.2).

The material evidence is not merely supplementary to the historical sources, as they also provide contradictory evidence and thus open up a range of new issues for discussion. Hence, integrating the two sets of information is essential.

1.2.2.2 Historical evidence

Historical sources for interactions between Sri Lanka and wider Indian Ocean are both inscriptional and literary. The earliest evidence for writing in *Brahmi* script on the island is dated to 600–500 BC (see Deraniyagla 2004:740–741) There are over 4000 recorded

inscriptions from Sri Lanka (Paranavitana 1970). They refer to ship captains, mariners, merchants, horse traders and members of trading organizations indicative of wider external interactions. There are numerous references to voyages made across the Palk Strait with *Kaveripatthanam* and *Kantakasolapatthana* the most frequently referred to ports in India (Gunawardena 2003:17–18). An inscription in Abhayagiriya records a mariner named *Kārava* (*JRASCB* xxxv:54–56) and the Tonigala inscription cites two seafarers (Paranavitana 1930:108–109). Some inscriptions also mention regions to which mariners sailed, for example, the Andiyagala inscription refers to *Bhojakataka* (*Vidarbha*), India (Paranavitana 1970: cxxviii) and the Maligatenna inscription discusses a mariner who went to western India (Gunawardena 2003:18). The Perimiyankulama inscription (first century), reveals a sailor named Naga who works for Ayi Sayi, identified with the Aji Saka of the Javanese tradition (Paranavitana 1983:63, 66-note 1). Most of these records are dated to *ca*. the 3rd century BC. Several also record different foreign nationals such as *Kambojas*, *Yavanas* and *Damedas*, some of whom are referred to as traders (Paranavitana 1970; Chapter 6). The epigraphic evidence from Mantai indicates the presence of various foreign nationals and the functioning of the port city (Chapter 2.7.3). These inscriptions reveal the nature of the island's external contacts with the wider Indian Ocean, and hence form an important part of the present study.

Literary Sources

Literary sources of both local and foreign origin documenting external contacts are wide-ranging. Indigenous historical narratives are vital sources of information and hence are re-assessed in Chapter 7. Sri Lanka is one the few countries in South Asia with a long and continued historical tradition (Allchin 1958:179–201; Bandaranayake 2003) represented by the main chronicles *Dipavamsa* and *Mahavamsa*, which are generally dated to the 4th and 5th

centuries, respectively, and their commentaries.[6] The chronicles reveal more information about Sri Lanka's religious and cultural interactions and are less explicit about the diplomatic, political and economic affairs. Nevertheless, descriptions in the Chronicles such as the laying down of the foundation stone at Ruwanweli *stupa* during the reign of Dutthagamini (161–137 BC) provide insights into the extensive diplomatic and cultural relations that Sri Lanka maintained (*Mv*.29:29-48). Further information is found in other chronicles and commentaries such as *Vamsatthappakasini* (*Vp.*), which mentions Sri Lanka's contacts with the Roman Empire during the first century. King Bhatikabhaya (AD 35–63)[7] sent an envoy to Rome and obtained large quantities of (red?) coral (*Vp*. xxxiv:74). The *Supparaka Jataka* mentions persons specialized in piloting (*Niyyama jetthaka*; Fausboll 1963:134–143). An artistic representation of a sea-going vessel with a high prow and a single mast appears in association with the oldest form of *Brahmi* scripts in the Duvegala inscription (Paranavitana 1970: plxxv). The manufacture and navigation of a three-deck (*Tibhumikam*) vessel built at the port of *Jambukalapatthana,* is recorded in the *Sammohavinodani* (*Smv.*:445–446) during the reign of Vatthagamini (103–77 BC).

Foreign literary sources

Of the Asian historical traditions, Chinese and Indian works are the most useful for this thesis. Chinese writings record religious, cultural and diplomatic relations with Sri Lanka from the 1st century. These interactions become more intense at the beginning of the 5th century with

[6] It is, however, agreed that these canonical works are compiled based on earlier written records called *Seehalatthakatha* (Buddhadatta 1959; see also Geiger (1930) and Law (1947). *Chulavamsa*, the other main chronicle is the continuation of the *Mahavamsa*. *Vamsattappakasini* (Malalasekara 1938) is the commentary of the *Mahavamsa* and dated to the 7th century.

[7] The date assigned to King Bhatikabhaya (AD 35-63), in this instance, is adopted from Abeydheera (2009:162) who dealt with this issue extensively (Chapter 7.2.3.1)

eleven religious missions recorded during the following two centuries (Werake 1984:23–26), such as the arrival of the Chinese monk, Fa-Xian (337–422) on the island in 412 and the establishment of a Buddhist nuns order in China by Sri Lankan Buddhist nuns in 426. Nandi, a Sri Lankan mariner who transported nuns to China in 426 and 429, sailed from Mantai and is said to have been very experienced in long trading voyages (Grimes 1941:76–79; Buddhadatta 1959:160–162).

Mediterranean sources are more explicit about Sri Lanka's significance as a trading centre. There are over 40 references (Weerakkody 1984, 1986:447–454; Prickett-Fernando 2003a:53,) and 68 names assigned to Sri Lanka (Silva 2011:13–15) in western writing during the pre-modern period. Western geographers, mariners and writers recognized Sri Lanka's significance as early as the 1st century, as is made clear from Ptolemy's account of the island's trade with the west (Kiribamune 1987:67). Descriptions pertaining to the island are found from Onesicritus (second part of the 4th century BC), Megasthenese (early 3rd century BC) to Cosmas (6th century). Of all of these, it may suffice to mention the description of Cosmas Indicopleustes (XI.15–16), as according to him '*Sieledība*' (ancient Sri Lanka) was situated at the centre of the Indian Ocean and was the 'great emporium' connected to trading marts all over the world (Chapter 2.3.1.5; see Weerakkody (1986, 1997).

The historical context of Sri Lanka's external connectivity is traceable from traded and exchanged commodities, which comprise of imports and exports as well as items which were subsequently re-exported (Chapter 7.2.5). The latter category reflects the transhipping trade from which Sri Lanka seems to have benefitted immensely.

1.3 Sri Lanka in the wider Indian Ocean

In order to put the evidence that form the basis of this thesis into its broader contexts, it is necessary to analyse our finds in relation to the developments that were taking place in the wider Indian Ocean. Sri Lanka's location at a strategically important position in the Indian Ocean and its proximity to mainland South Asia were crucial external factors that influenced the long-term cultural evolution of the island.

Sri Lanka is situated about 50km off the southern tip of South India. The Palk Strait that separates Sri Lanka from India is so shallow that a drop of eleven metres in the sea level would create a land bridge between the two countries (Deraniyagala 2004:484) facilitating direct human contacts. The island was connected to the South Asian mainland via the Palk Strait many times before its final separation 7000 years ago (Kennedy 2000; Deraniyagala 2004:167–168), which was sufficient for Sri Lanka to evolve as an independent geo-political and cultural entity. Neither the narrow strip of sea that separated the island from the subcontinent nor the vast ocean around the island, created a barrier to the movement of people, ideas and commodities. The paradox of the sea, as Braudel (1972) pointed out, is that it acts both as a facilitator that connects regions/peoples and as a great divider, which is certainly true for Sri Lanka.

Considering the position of Sri Lanka in a pre-modern global and navigational context, the island seems to have enjoyed a number of geographical advantages such as being the southernmost point of mainland Asia, being situated almost on the equator where navigational winds and monsoon effects changed direction, and being located at the mid-way point between Rome and China (Silva 2011). The result was that a wide range of external

interactions and influences were inevitable for Sri Lanka and as such, the external interactions and cultural evolution of the island should be viewed in relation to the trade and commercial networks that were in operation in the wider Indian Ocean and the social and cultural evolution of South Asia as a whole.

1.4 Indian Ocean trade and communication networks

The Indian Ocean is the third largest ocean in the world. It is bordered on the north by the Indian subcontinent and the Arabian Peninsula; on the west by eastern Africa; on the east by Indo-China, the Sunda Islands and Australia and on the south by the Southern Ocean. The Indian Ocean is characterized by certain homogenous elements such as the monsoons, which determined the navigational calendar, the availability of numerous ports, and ethnic, linguistic and cultural diversity (Guha 1988). Of these, the monsoon system, a pattern of seasons rather than a mere wind system, was one of the crucial factors that enabled cultural and commercial communications in the Indian Ocean (Prange 2008:1382) for which reason it has been credited as being "one of the most benign environments for long-range voyaging" (Fernandeze-Armesto 2006:39).

The Indian Ocean is credited as being the oldest ocean to have been traversed by humans (Pearson 2003:3).[8] It is argued that by the third millennium BC, regions between the Persian Gulf and Western South Asia were linked through trading networks, and the trade between Oman and the Harappan culture was seaborne and direct (e.g., Vogt 1996; Ray 2003:82–89).

[8] However, the Indian Ocean's historical significance and cultural dynamism were only realised very late. It were the 'geo-historical perspective' of Braudel (1972) and the influential Annales School regarding the Mediterranean world, along with the World Systems approach of Wallerstein (1974) that inspired the renewal of interest in the Indian Ocean in recent years (Vink 2007:43; see Chaudhuri 1985,1990; see also Chandra, ed., 1987; Dasgupta, ed., 2001; McPherson, 1993; and Pearson, 2003; 2005;Frank 1998,

These maritime networks continued during the second millennium BC and were integrated with inland networks. Although the Harappan urban centres were declining by around 1900 BC, cultural continuity is clearly visible in the archaeological record (Shaffer and Lichtenstein 1999:255–256; Thapar 2000:10; Ray 2003:98) and is traceable in Gujarat and Ganga-Yamuna doab to a period as late as 1300 BC until it merged with the so-called 'second urbanization' (Kenoyer 1997:53, 1998:174). External trade and contact, with which we are concerned here, also seems to have persisted, as is evident from recent archaeological findings such as an Indus seal in a Kassite context at the sites of Nippur and Failaka, and a seal with whorl motif at Bet at Dwaraka (see Chakrabarti 1995:138–139).

The 'Bay of Bengal Interaction Sphere' (Gupta 2005:21–30), which included Sri Lanka, was another important region in the maritime history of the Indian Ocean. While the earliest dates for trans-oceanic maritime interactions in this region are still debated (e.g., Ray 1990; Higham 1991:330; Bellwood 1992:55–136; Glover 1996:129–158; Gupta 2005), sometime in the mid-first millennium BC may be considered as an agreeable chronological watershed. Such early interactions were expanded and intensified towards the closing of the first century BC and proliferated in the early centuries AD (see Ray 1988, 2003; Gupta 2005). The demand for eastern spices, among other things, is considered to have contributed to the linking of 'Bay of Bengal Interaction Sphere' to the 'Persian Gulf trading spheres' (Boivin et al. 2009) and eastern Africa, and from there to the Mediterranean world (Gupta 2005:22). Around the BC–AD transition "two major maritime networks became closely aligned....: the spice networks to the western world and the maritime networks from South Asia through South-East Asia to the Far-East" (Gupta 2005:25). Western literature testifies to the increasing interactions between the Mediterranean and the Indian Ocean regions, including Sri Lanka, the Malay Peninsula

(Chryse) and China (see Hourani 1963:35). Thus the Indian Ocean developed into a trans-regional trade and commercial network creating a single geo-cultural entity comprising Africa, the Mediterranean, the Middle East and the Far-East (see Wallerstein 1980, 1989; Gills and Frank 1993).

In keeping with an emerging interest in the Indian Ocean the cosmopolitan nature of trade during ancient and medieval times has been widely discussed in terms of its development, the complexity of its commercial networks, port cities, merchant groups and polities as well as the involvement of religious movements such as Buddhism in these interactions (Ray 1994; Liu 1998; Sen 2003). The Indian Ocean is considered "not only as a means of connecting regions but constituted *in toto* a zone of connections created by cross-cultural exchanges and the movement of goods, ideas and people" (Prange 2008:1383). Indian Ocean commercial networks were determined by both the economic and political situations of the major marketplaces, most of which were situated far away from the sea (Ibid.:1384) and in addition, this long distance trade facilitated multiple exchanges that transformed the Indian Ocean into a unified space (Beaujard 2005:411).

Sri Lanka sits right in the centre of these Indian Ocean interaction networks. The uniqueness of its geographical position offered the island a distinctive prospect of segregation and integration with countries and cultures in the Indian Ocean. This connectivity was facilitated by the availability of numerous bays and anchorages all around the coast and a variety of natural commodities as well as luxury and utility products that demanded high value in markets within and beyond the Indian Ocean. Historical records, both local and foreign,

archaeological, epigraphic and numismatic sources of evidence, amply demonstrate Sri Lanka's active participation in this global network.

1.5 Research issues

The extent to which external and internal factors were responsible for the cultural-historical development of Sri Lanka is the relevant issue to the present discussion. The influence of India arising from its geographical proximity and trade with the island is considered as the key external stimulant on the islands' culture. Related to this is the agency of maritime trade also needs to be addressed here. Internally, the role of the island's character and its irrigated agriculture are the main dynamics that will be discussed.

1.5.1 External factors

The traditional view pertaining to the external influences on Sri Lanka's cultural-historical evolution may be illustrated by the following quote: "The history of small islands is often the story of the adaption to external influence. Sri Lanka is no exception" (De Silva 1987:7). Such influence has been considered almost unavoidable due to the island's geographical location (Ibid.; Gunawardana 2003:17–35). A consideration of the external factors in Sri Lankan history has been part of the historical and archaeological discourse from the 19th century. However, a number of issues related to the external connectivity and trade, such as the agency behind trade and the scale and intensity of interactions with different regions, remain unanswered. Although some scholars (cf. Liyanagamage and Gunawardena (1961) 1987; Bandaranayake 1978:73; Gunawardana 2008) have long ago expressed their dissatisfaction over traditional approaches and conventional methodologies adopted in the study of Sri Lanka's external

contacts (below)[9], they continue to distract historical discourse. Therefore, a critical analysis of Sri Lanka's external contacts requires the application of fresh theoretical and methodological approaches. At the global level, world system analysis (Wallerstein 1980, 1989) has widely been applied in historical/archaeological investigations, with studies of the commercial networks of South Indian merchant guilds and Buddhist and Persian/Islamic networks being most relevant to my work (cf. Indrapala 1970, 2003; Dewaraja 2003a; Ray 2003). Furthermore, ingrained perceptions, such as over emphasising the influence of India and the 'hydraulic character' of the earliest civilization of the island, are impediments to making meaningful assessments of Sri Lanka's contacts with the external world and their impact on the island civilization.

1.5.2 Indianization[10] of the island culture

The overarching obsession with India has obstructed an objective assessment of the significance and impact of wider Indian Ocean contacts that Sri Lanka maintained during pre-modern times. Maloney (1970:604), for example, mentions that the "sea traffic emanating from distant parts of India impinged on Ceylon to such an extent that it transformed the culture of that island and brought it within the orbit of Indian civilization".. The 'Indo-centric' ideology observed in the 19th and 20th centuries' writing is a clear manifestation of colonial historiography (Bandaranayake 1978:85), which continues to persist (cf. Gunawardana 2008).

[9] Sri Lanka's external encounters were studied under set themes such as cultural, economic and commercial, military, political and diplomatic relations (Bandaranayake 1978:73). While such divisions are helpful in dealing with enormous and often disorganised information (Ibid.), they hardly help us to understand the nature and patterns of international relations in pre-modern Sri Lanka. Nor do they help us visualize the impact of these interactions on the island's cultural evolution in relation to contemporary developments in the wider Indian Ocean.

[10] The 'Indianization of Southeast Asia' is an idea which develop in 1960s to explain the expansion of Indian culture outside its mainland (e.g., Coedes 1968). Such mono-causal explanations of cultural developments, however, have long been rejected (e.g., Stargardt 1990, Hodder 1986).

However, "while the island's proximity to India brought it within easy reach of influences... [its] civilization... was not a mere variant of an Indian prototype but something distinctive…" (De Silva 1981:4). Sri Lanka's interaction with multiple cultures and countries since prehistoric times existed alongside a geopolitical independence. Therefore, this thesis argues that the island's culture cannot be seen as a "microcosm of India" (cf. Meyer 1996:395–398) or a transplantation of an Indian prototype, but a local evolution within the dynamics of its distinctive island conditions against a background of wide-ranging international interactions.

1.5.3 Agro-centrism

Sri Lanka's first civilization has frequently been characterised as a hydraulic civilisation (Leach 1959; Gunawardana 1971; 1978a&b; Fernando 1982; Seevalee 1998), with irrigation being its special feature (Parker 1909:347; Seneviratne 1989:17). The major factor believed to have acted as a catalyst for this first period of urbanization was irrigated paddy cultivation. Striking evidence of magnificent artificial irrigation works constructed during pre-modern times and the extent of paddy cultivation found in the dry-zone, as well as the volume of historical references cited, serve as a justification for this claim (see Brohier 1934/35). Undoubtedly, irrigated agriculture played a crucial role in the economic and social aspects of the Sri Lanka's ancient civilization. Nevertheless, the influence of irrigated agriculture should be neither approximated to that of an 'Oriental Despotism'[11] (Wittfogel 1957) nor equated to a 'Hydraulic Society' (Leach 1959) in their literary sense (see Habib 1969; Gunawardana 1982; Seevalee 1998) as other internal dynamics and external trade played an important role as well (below).

[11] The 'oriental despotism' is the model, which was developed by Karl Wittfogel (1955; 1957) to explain the development of hydraulic civilizations in the ancient world. It is characterized by the 'total concentration of power' in a monarch who ruled through 'an agro-managerial bureaucracy' (see Wittfoget 1974 (1955):17; Gunawardena 1971:13). This model; however, has been challenged, for example, in the light of Sri Lankan evidence i.e., Sri Lanka's dry-zone civilization that come closest to his model (Leach 1959; Needham 1969; Gunawardena 1971; Seevalee 1998).

In Chapters 4 and 6, I argue that both agricultural products and natural products such as gems and pearls, local crafts such as beads as well as fine quality steel were prime attractions for foreign traders. For Nicholas (1961), it was the wealth acquired in trade that was invested to boost irrigated agriculture. Consequently, the application of mono-causal concepts such as 'agro-centrism'- that considers irrigated agriculture- as prime movers for the growth of Sri Lankan civilization (Parker 1909:347; Seneviratne 1989:17; Wicramasinghe 1995:195) has led some to disregard equally crucial stimulants such as external trade and interactions. This situation needs to be rectified and a more nuanced and multi-faceted interpretation be proposed.

1.5.4 'External factor' vs. 'internal dynamics' and the agency of external trade

There has been a lack of attention to internal dynamics within the historical discourse of the island. Nevertheless, resource distribution and exchange systems (Seneviratne 1985a, 1996), technological innovations in metallurgy (Juleff 1996, 1998, 2009; Thantilage 2008) and hydraulic engineering/irrigated paddy cultivation (Parker 1909; Brohier 1934/35; Gunawardana 1971, 1978a&b) were clearly the launch pads of early urbanization, trade and exchange with the Indian Ocean. For Bandaranayake (1978:86–87), external factors are 'subordinate' to the 'law of the internal dynamics' in historical developments, though they play an important role.

This leads to the issue of the factors responsible for the emergence of early civilization in Sri Lanka and, more specifically the agency of foreign contacts and trade relations with which we are concerned. From the time of Wheeler (et al. 1946; 1954, 1955:174–175) Roman/western agency in trade and commerce was contrasted with the 'leisurely and un-enterprising' Indian

subcontinent. A colonial view, this idea of the 'passive and unchanging' east was brought to history by external forces (see Pearson 2003:2). The traditional view of eastern societies is that they were primarily agricultural and self-sufficient, which was also responsible for their disregard of maritime trading networks and their contribution to urbanization in South Asia (Ray 1994:1). With regards to the agency of external trade, Sri Lanka was considered as a transhipment port where traders from east and west dominated the indigenous society, which played only a subordinate role (Hourani 1963:43–44). Such external trade and exchange is considered to have played only a marginal role in the emergence of the dry-zone civilization where irrigated agriculture provided the vital economic base. Nevertheless, such speculations, primarily based on historical evidence, are the manipulations of 'armchair archaeologists' (Deraniyagala 2004:713) and require re-evaluation, which is the aim of this thesis.

1.6 Research Questions

This thesis is concerned with several major research questions that can be characterised as:

1. How was Sri Lanka connected to the Indian Ocean network of communication, trade and commerce during the period between the mid-first millennium BC to the early second millennium AD?
2. How significant were these external interactions in the long-term evolution of pre-modern Sri Lanka?
3. What was the nature of such interactions and how did they change over time? Is it possible to isolate a prime mover or dominant agency involved in these interactions?

   What role did the indigenous people play in Indian Ocean trade?
4. Can the development of the island be equated to that of 'Indianization'?

5. What role did internal dynamism (local crafts, industries, agriculture and related internal networks) play in the development of the island's first urban civilization? To what degree is the 'agro-centric' view of the island's first civilization true?
6. Is it possible to isolate internal networks and external connections based on traded/exchanged commodities and historical sources relating to these items? How significant were these networks for the cultural-historical development of pre-modern Sri Lanka?
7. What was the objective position of Sri Lanka in the Indian Ocean's trade, commerce and communication networks during the pre-modern period?

1.7 Objectives

The objectives of the present study are:

1. To re-assess the material and textual evidence relating to Sri Lanka's external trade/interactions and internal networks during the mid-first millennium BC to the early second millennium AD;
2. To contextualise the interaction between Sri Lanka's external influences and internal dynamism and their impact on the island's long-term cultural evolution;
3. To study ports, peripheries and resource bases to discern their connectedness with the urban centres and the external world;
4. To assess the nature of Sri Lanka's local crafts and industries and to re-assess internal networks and external connections based on trade in such local products;
5. To examine politico-religious and secular non-state structures that served as a supportive system and stimulant for external intercourse;
6. To re-assess the 'hydraulic' character assigned to the island's dry-zone civilization;

7. To determine the agency of Sri Lanka's Indian Ocean contacts, trade and commerce, and cultural evolution;
8. To contextualize the island's objective position in the Indian Ocean's trade, commerce and communication networks.

1.8 Methodological perspectives

The methodology adopted in the present study is multi-disciplinary. Information gathered through the analysis of material remains is integrated with and contrasted against historical sources. Traditional approaches to historical analysis largely examine the state-mandated formalized interactions at a regional level. Such approaches, which seek to discern the big picture, obscure informal, non-state, micro-regional scale interactions of equal significance. Therefore, this study attempts to break down the body of historical evidence into broader geographical regions first and then to a micro-regional scale. Literary information is also compared to, and integrated with, data gathered from the epigraphic and material evidence.

The majority of archaeological remains utilised in this thesis that reflect external interactions are ceramics and beads, which are subjected to typological and statistical analyses. Beads are also scientifically analysed (Catalogue 4.2) for provenance determination and the exchange of technology between regions. Archaeobotanical remains recovered from Mantai and Kantharodai are also used for understanding external interactions. The basis of my artefact analysis is that human actions have material consequences (Somadeva 2006:30) and their patterning may reflect changes in human behaviour. Quantifying material culture and observing statistical patterns may help us to understand such human behaviour and the changes that take place in societies at large. The material evidence is integrated with historical

information for ascertaining the nature and pattern of Sri Lanka's interactions with varied geographical regions in the Indian Ocean.

1.9 Structure of the thesis

The thesis is organised into eight different chapters, including the present chapter. Chapter 2 presents the historical/archaeological background of Mantai and establishes a chronological framework based on our excavations, radiocarbon dates, historical evidence and other archaeological finds such as inscriptions and coins. Chapters 3 and 4 analyse ceramic and non-ceramic materials excavated from Mantai. The objective of these two chapters is to provide adequate statistical data on the ceramic and non-ceramic artefacts recovered from our excavations and to place them within a reliable timeframe for identifying emerging patterns and changes over time. A lack of clear and adequate quantitative detail of assemblages of artefacts, their chronologies and their spatial distribution across sites/regions are among the main obstacles to establishing connections. Therefore, throughout this thesis, emphasis is placed on clarifying these issues.

In Chapters 5 and 6, I integrate ceramic and non-ceramic artefacts from Mantai with those from Kantharodai and Kirinda, details of which are included in catalogues 2.5, 2.6, 7.1-and 7.2 due to exigencies of space. In these chapters, I also compare my findings with those of Anuradhapura and Tissamaharama. While Mantai was the main seaport attached to the Anuradhapura capital, Kantharodai and its main seaport *Jambukolapatthana* were also invariably connected to Anuradhapura and most probably to Mantai. Although Kirinda as a regional port had a much later beginning than that of Tissamaharama, it was probably connected to Tissamaharama, demonstrating that all the main ports and urban centres were connected to each other in varying degrees. Thus, material culture at a given site is likely to

have parallels at the other sites, which is particularly true for ports and their related urban centres such as Mantai and Anuradhapura.

Ceramic and non-ceramic finds have parallels elsewhere in the Indian Ocean, indicating the movement of goods, peoples, ideas and technologies. Chapters 5 and 6 consequently also attempt to look at the regional context for our finds in order to contextualize the connections through these materials. Similarly, the establishment of the historical context for artefacts and sites are considered as another important step before attempting at further interpretations. Therefore, throughout chapters 3 to 6, an attempt is made to build biographies of artefacts and sites and place them in time and space. While these artefacts are part of the same cultural-historical trajectory of the island and some of them could have even reached the island together as a 'package'[12], reconstruction of their individual histories reveals interesting patterns.

In Chapter 7, the island's external connectivity, trade and exchange is established based on commodities, the historical context of which are established based on historical sources and archaeological findings across sites. This chapter identifies various categories of commodities, the different roles Sri Lanka played in international trade, internal networks, actors/agents and institutions involved with internal and external trade as well as geographical regions of external interactions.

[12] Goods, natural or manufactured, traded/ exchanged together as a group are considered tentatively as a 'package' in this study.

The concluding chapter provides a synthesis and interpretions of what is already discussed and draws some general conclusions based on preceding accounts. The chapter also draws some general conclusions based on preceding accounts.

While details necessary for the discussion are included within the chapters, additional details, given in footnotes, and catalogues.

CHAPTER 2

THE MANTAI PORT CITY

With brief introductions to

KANTHARODAI AND KIRINDA

The aim of this chapter is to establish archaeological and historical background of Mantai, the key site studied in this thesis. However, it also briefly introduces Kantharodai and Kirinda, the other two sites investigated for the present work. Full details of the latter two sites are included in the catalogues 2.5 and 2.6

2.1 Mantai: Introduction

Located on the north-western coast of Sri Lanka, Mantai was the island's main sea port for more than 1500 years and played an important role during the country's Early to Middle Historic Periods (*ca.* 500 BC to *ca.* AD 1250). Situated at a geographic nexus in the Indian Ocean, the site provided a key point of maritime connection between the eastern and western regions of the Indian Ocean as well as with mainland South Asia (Figures 2.1 and 2.2). Mantai was an almost unavoidable port of call in Indian Ocean trade and navigation during pre-modern times. Owing to this role, the site has been described as being capable of providing "an indispensable key to the chronologies and cultures of the whole Indian Ocean and supply[ing] the first real archaeological link between the Near East, India and China" (Carswell and Prickett 1984:21; Whitehouse 1991; Graham 2013a:132).

During its zenith, Mantai was a well-planned city surrounded by a double moat, which is still topographically visible in the landscape (Figures 2.3, 2.11 and 2.12). The moat encloses an area of about 50 hectares and gives Mantai a horse-shoe shape in plan. The archaeological

site is located about 250m from the present coastline and the occupational deposit at the centre of the mound is over 10m thick. This port city is referred to in the literature and in inscriptions by several names, including *Mahatittha*, *Mahatottha*, *Maha Tirtha* in Pali and Sanskrit; *Mahatota*, *Mantai* and *Mahavoti*, in Sinhala and *Mathoddam* in Tamil (Paranavitana and Codrington 1934:32, 246, 252).[13] The meaning of these terms, in general, is 'great port'.



Figure 2.1: Arial view of Mantai and the excavated trench 2009/10

2.2 Geographical setting

Mantai is located in Mannar District, in the North-western province of Sri Lanka. It was once situated at the mouth of the Aruvi Aru River (lower reach of Malwatu Oya) and opposite the Palk Strait (which separates Sri Lanka from mainland India) and the Arabian Sea (Figure 2.4 and 2.5). The port was strategically located to take advantage of riverine access to the ancient capital, Anuradhapura and the trade routes between India and the Indian Ocean world (Figures 2.6 and 2.7). The Aruvi Aru River currently flows about 18km south of the site, but

[13] These terms, Mantai (the modern name) and Mahatittha (the most frequently used term in historical sources) in particular, are used interchangeably in the thesis.

would once have provided a direct route to Anuradhapura, which is situated about 80km southeast of Mantai for traders, travelers, scholars, missionaries and invaders from various parts of the Indian Ocean. Although no clear physical evidence of an ancient highway is visible today, attempts have been made to trace this road, which was known as the North-western Highway. The location of inscriptions, drip-ledged caves, ancient settlements and irrigation works have been cited for the evidence of this road (Nicholas 1963; Vidanapatirana 2012; Bandaranayake 1988).

Mantai's location adjacent to the Palk Strait gave the port, and its users, the shortest possible sea route from Sri Lanka to India. The strait is shallow enough that a land bridge could have formed between the two countries during periods of low sea level (Deraniyagala 2004:484), suggesting that it has been a key route for human contact and migration throughout Sri Lanka's history of human occupation. This zone was a main point of attraction for ancient seafarers because of its proximity to the famous pearl banks (Ibid.:484), and was almost certainly also a factor influencing Mantai's location. The site is also proximal to the seas north and south of Mannar Island, where chank shells (*Turbinella pyrum*) were abundant. Pearls and chank shells as well as their products were highly valued by maritime traders (Nicholas 1963:74).

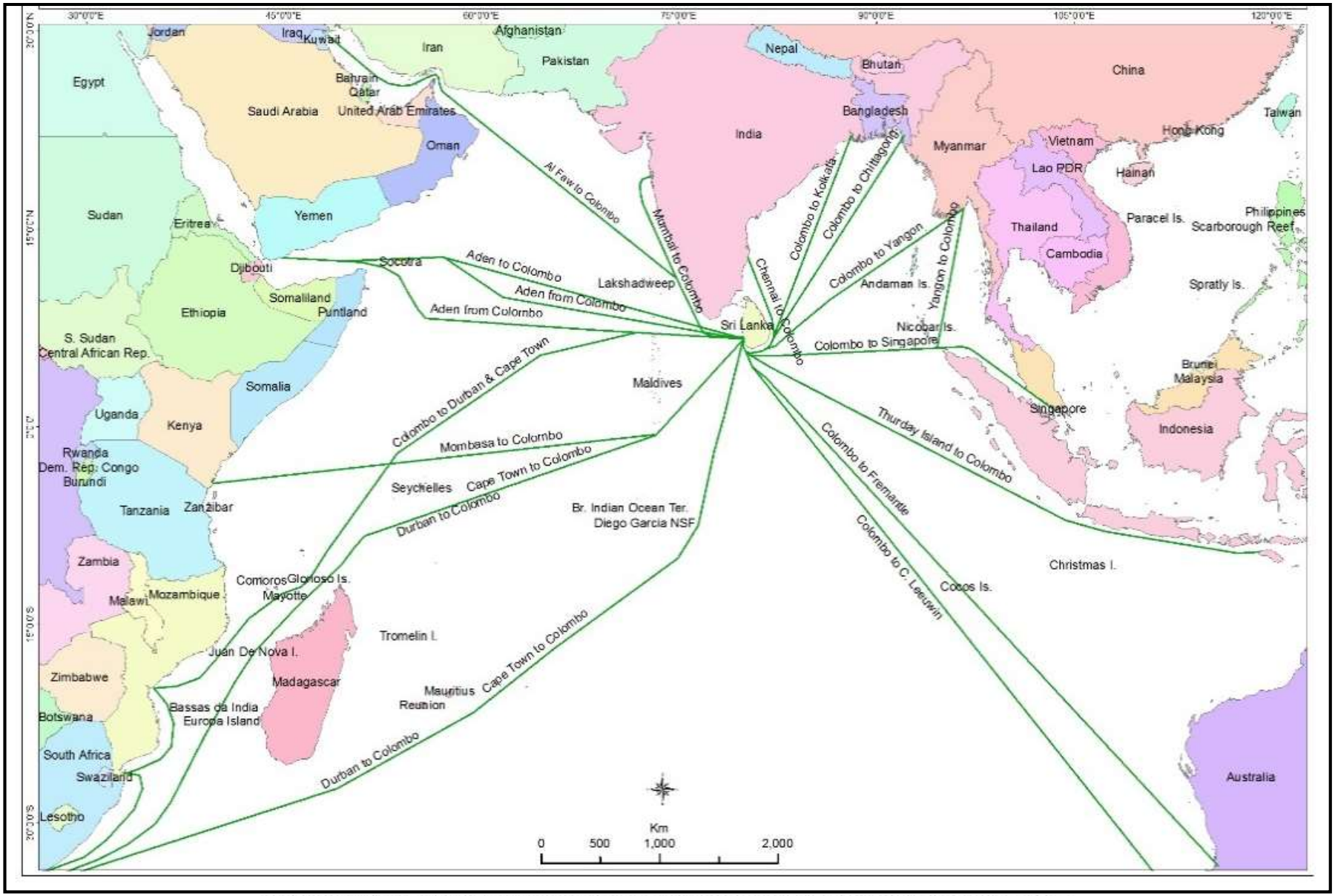


Figure 2.2: Sri Lanka's modern connectivity with the Indian Ocean (after Somasekaram et al. 1988)

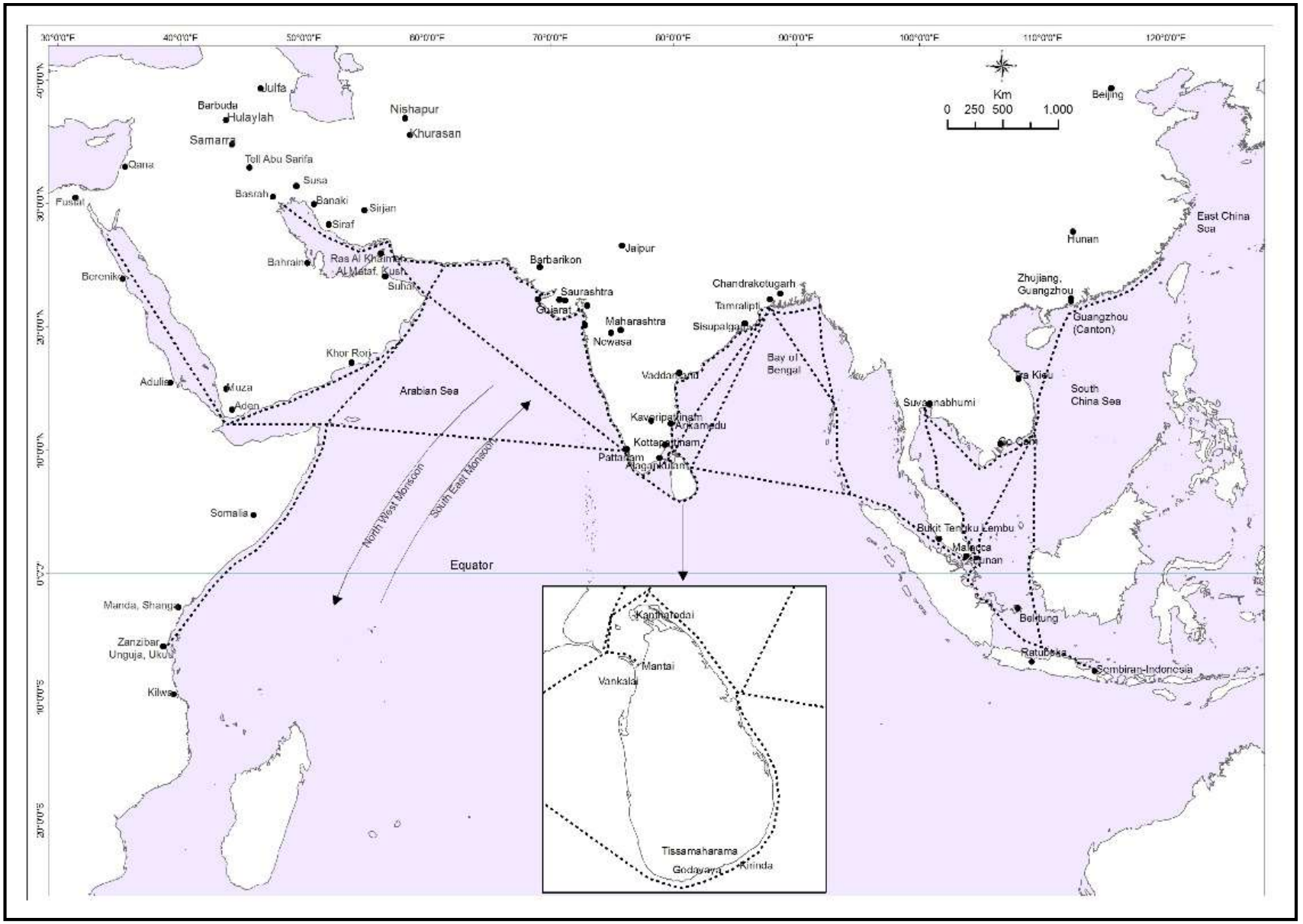


Figure 2.3: Sri Lanka's past connectivity with the Indian Ocean (Bohingamuwa 2016)



Figure 2.4: Satellite image of Mantai (Carswell et al. 2013:88; pl.2.1)

Mantai's local environment is heavily influenced by its geographical setting in Sri Lanka's semi-arid lowlands (below 900 MSL, referred to as ecozone-A by Deraniyagala (2004:2, Map 1; Figure 2.10) of the dry zone. Annual rainfall in this region is relatively high, ranging between 760 and 1270 mm (Deraniyagala 2004:2 and 2013:121), although the majority of this falls during the heavy rainfall season (November to February). The mean temperature is 28°C and like the rest of the semi-arid zone, the summers are marked by extended droughts caused by the south-west monsoonal winds (Deraniyagala 2013:125). The topography of ecozone-A is fairly uniformly flat and largely governed by the sub-terrain vegetation (Katz 1975:87 cited in Deraniyagala 2004:486). The main soil types associated with this ecozone are Red Yellow-Latosols, which are highly permeable, causing a scarcity of water in the terrain (Deraniyagala 2004:83; 502). The natural vegetation of the island's dry zone is very much an adaptive product of the varying rainfall pattern. The typical ground cover of the dry zone is scrub forest

interspersed with thorny bushes, while cactuses grow in semi-arid areas. The vegetation cover becomes thick and green during the heavy rainfall period (Cooray 1984; Somasekaram et al. 1988; Deraniyagala 2004).



Figure 2.5: Modern fisheries harbour at Mantai

The Mannar region is only differentiated from that of the rest of the dry zone by the presence of baobab (*Adansonia digitata)* trees. This plant, which is native to Africa, is thought to have been introduced by Arab sailors to feed camels. The oldest surviving baobab tree in Sri Lanka is estimated to be approximately 723 years old and thirty-four out of forty surviving baobab trees in Sri Lanka are on the island of Mannar (Vandercone et al. 2004).

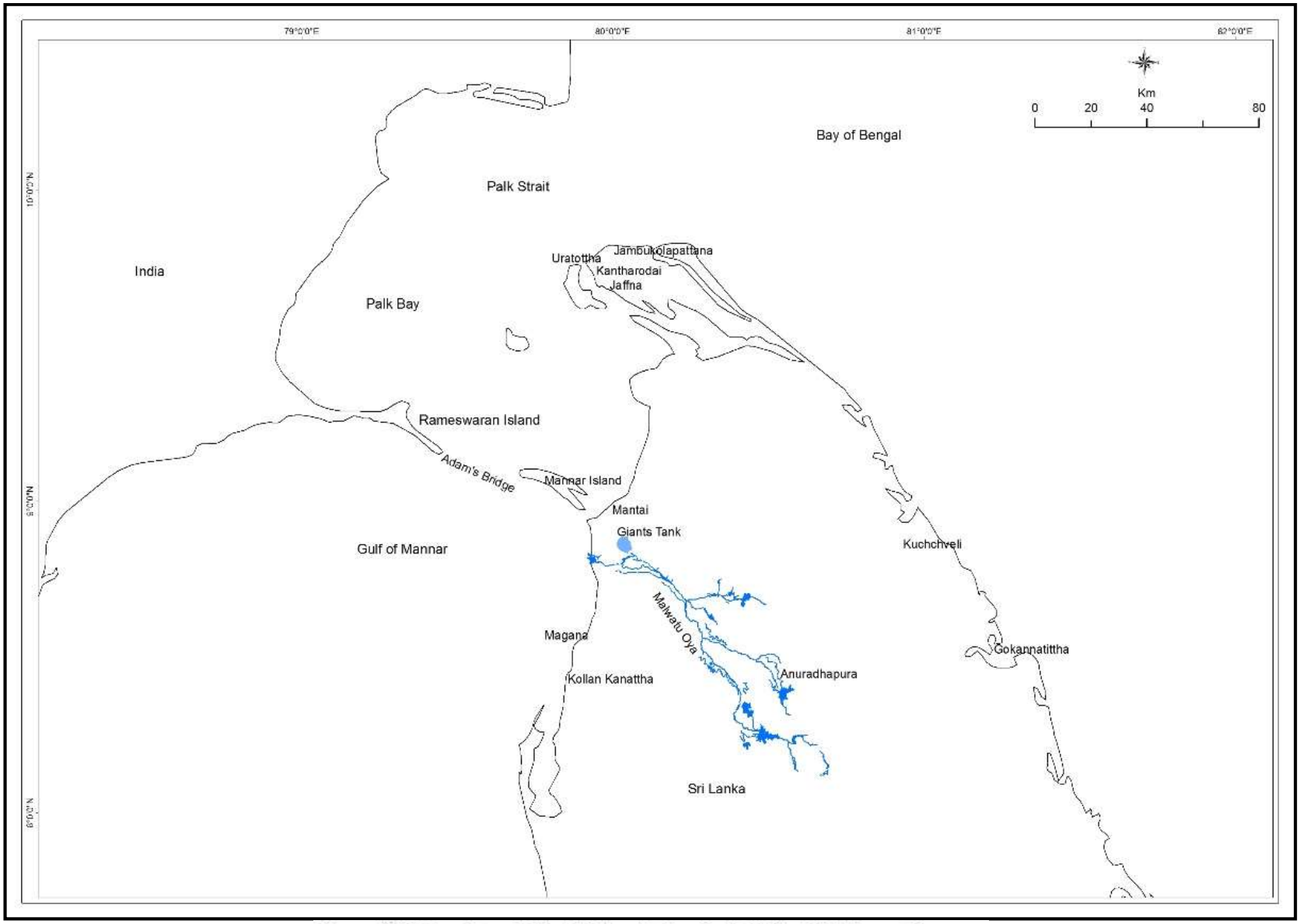


Figure 2.6: Location of Mantai in relation to Palk Strait & Anuradhapura (after Carswell et al. 2013:24; Figure 1.2)

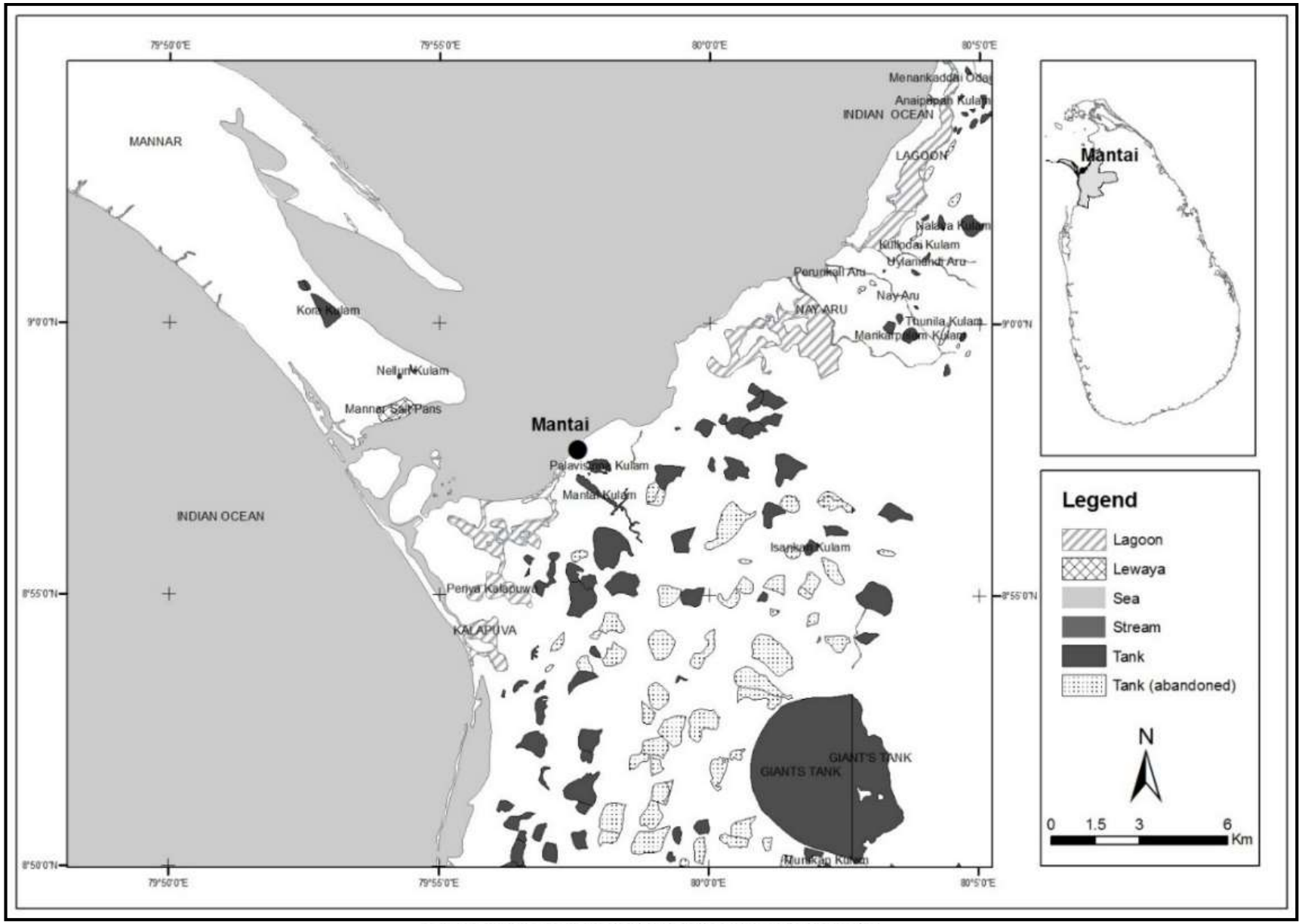


Figure 2.7: Location of Mantai (Courtesy SEALINKS)

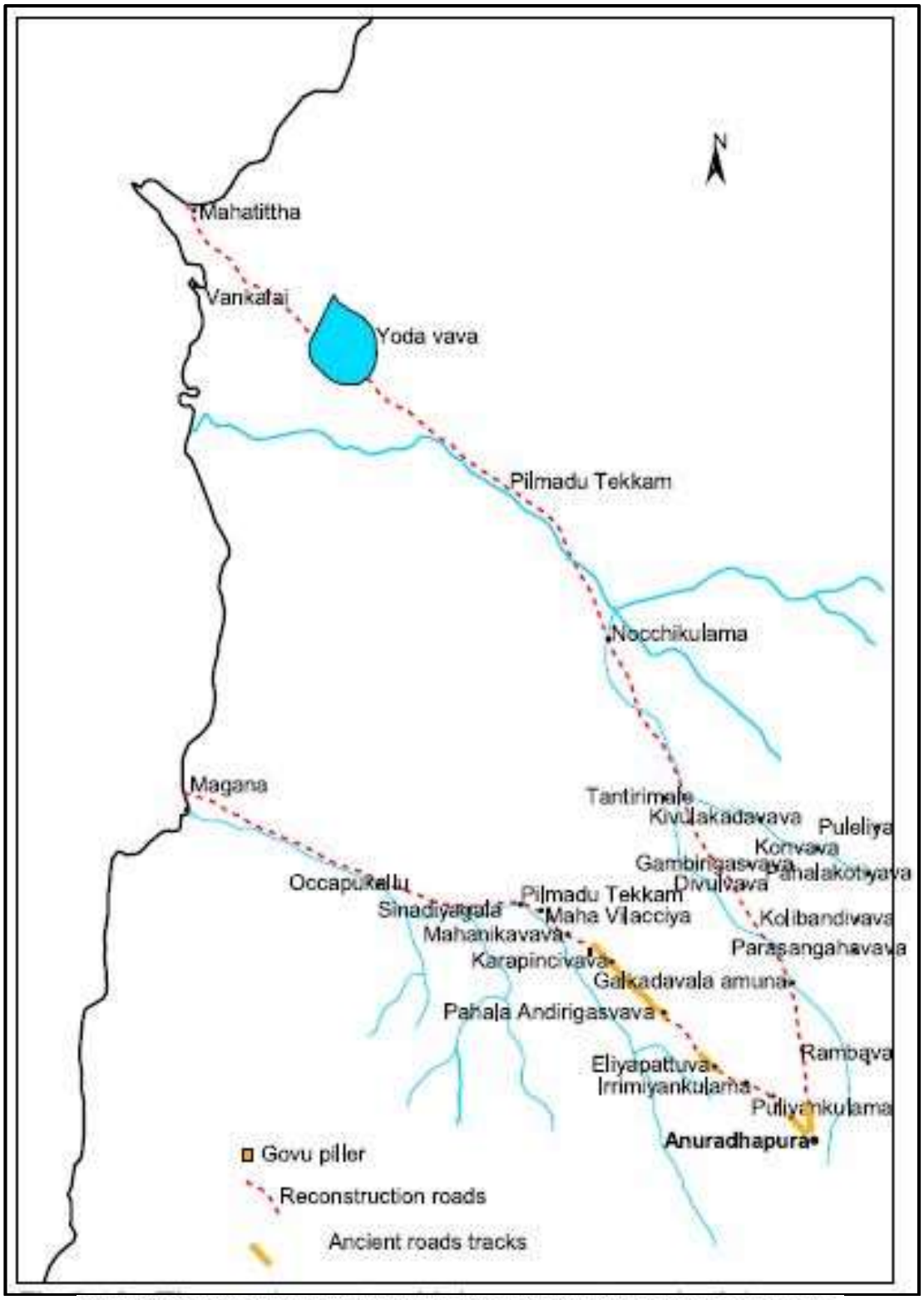


Figure 2.8: North-western highway connecting Mantai with capital Anuradhapura (Bohingamuwa 2016, modified after Vidanapatirana 2012:104; Figure 12)

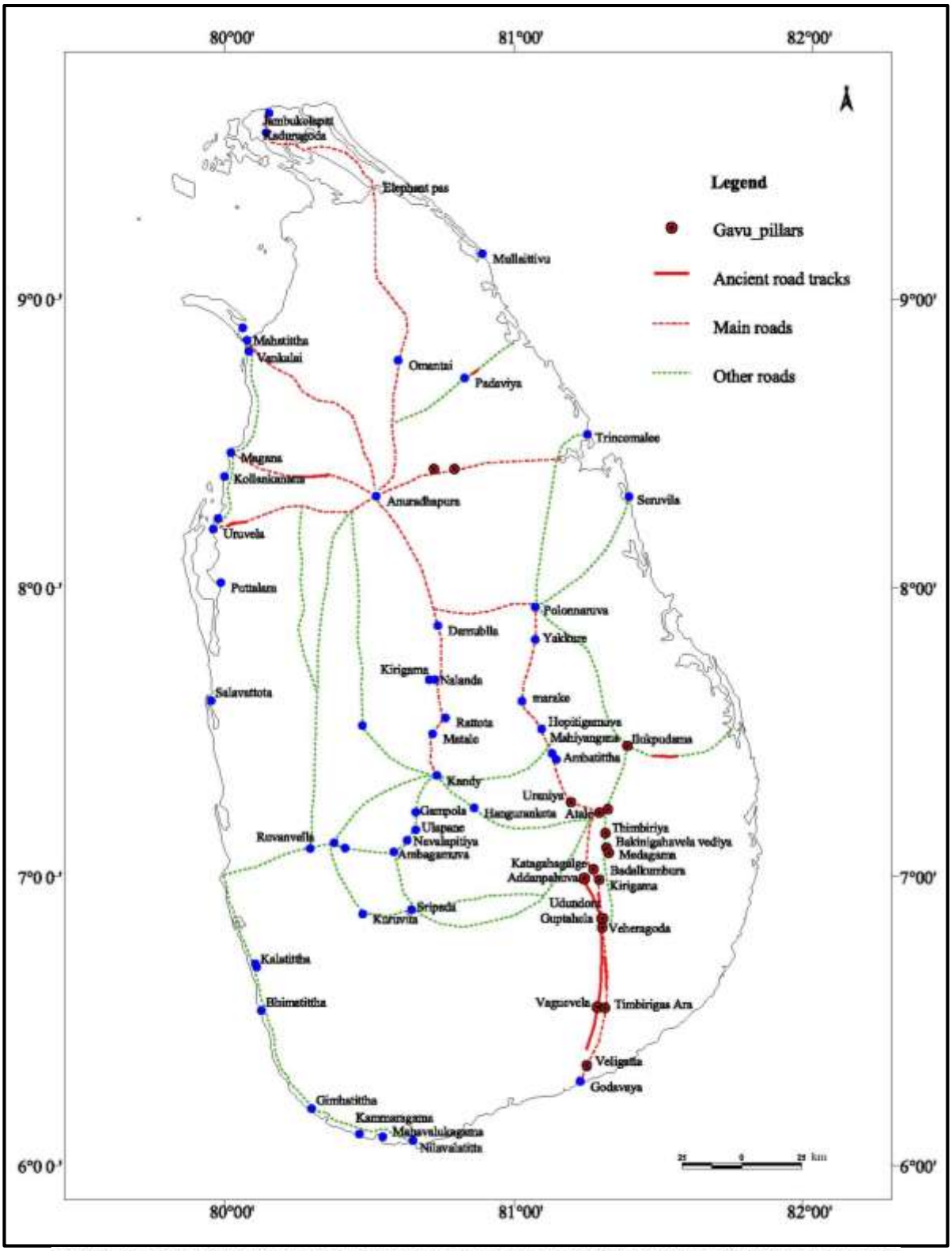


Figure2.9: Probable ancient road network, major and ports (Vidanapatirana 2012:118; Map 4.4)

2.3 Historical sources

This section evaluates historical records relating to Mantai (Mahatittha) in order to reconstruct the historiography of the sea port and its interconnected regions over time. Historical references are recorded chronologically in Catalogue 2.1 to summarize changing patterns in the site's usage and role. This section subsequently summarizes thematic issues and broader historical patterns, which are summarised in Table 2.1, and are also further discussed in Chapter 7. It is hoped that, once reconstructed, the cultural sequence of the site and radiocarbon dates will provide an archaeological framework to test the historical narratives outlined here.

2.3.1 Historical references to Mantai

Jambukolapatthana, the seaport connected to Kantharodai (Catalogue 2.5-Kantharodai[14]; Figure 2.9&2.29), and *Mahatittha* are the most frequently referenced ancient Sri Lankan ports in the Chronicles—*Dipavamsa* (*Dv*) and *Mahavamsa* (*Mv*)—though their earliest mention is difficult to determine. It is, however, hypothesised that they might have been referenced much earlier than the so-called Aryan colonization of the 6th century BC (Perera 1952). Of the two sites, *Mahatittha* is the first port to be referred to by name in the *Mahavamsa*, which relates that the South Indian consorts of Vijaya, the first king of Sri Lanka, landed at this port and proceeded to *Tambapanni* (*Mv.*7:49–58). In recognition of the arrival of the royal consort and her entourage at this port, it came to be known as *Mahatittha*, the great port (*Mv.*7:58). From this first reference through to the conquest of Chandrabanu, a Javanese prince, in 1268, the *Mahatittha* is mentioned numerous times in various local and foreign records as well as in inscriptions. Table 2.1 (below) summarises these historical events, providing insights into

[14] Report on Kantharodai is given in Catalogue 2,5&7.1.

the nature of interaction. It records, however, only the number of direct references to each theme specified. The intensity and impact of contacts referred to need to be evaluated based on thorough studies of the historical sources.

Table 2.1: Summary of the number of historical references, both local and foreign, to Mantai; based on Catalogue 2.2 (Historical record on *Mahatittha* (Mantai)

Period	Political	Religious	Trade/ Economic	Military	Administration	Remarks/regions of contacts
500- 0 BC	2	-	1	3		Initial marital/ political contacts with South India, followed by South Indian invasions
AD 100-200	1	-	2	3		Western knowledge of Mantai as a trade centre; Southern Indian invasions
AD 200-700	4	6	8	-	1	Mantai is linked to Eastern and Northern Indian ports/trade centres; South-East Asia (e.g., Tamralipti and Suvannbhumi); frequent visits to China: e.g., visit of Buddhist nuns; Nandi, the mariner goes on 4 yearlong foreign trade journey; Vajrabodhi notes 35 Persian ships at Mantai; Cosmas: Mantai, the greatest trade centre in the Indian Ocean
AD 700-900	3	-	-	4	1	Political and military contacts with Pallava kingdom; Chola invasions
AD 900-1250	7	3	2	12	3	Political, trade, and religious contacts with India, South-East Asia and Middle East; Chola invasions
Total	**17**	**9**	**9**	**22**	**5**	

2.3.1.1 Historical summary

According to the historical records (Table 2.1 and Catalogue 2.1), Mantai operated as an important port of contact for various purposes and played a crucial role in the history of Sri Lanka at least from about 500 BC up until the end of the 13th century AD. This is in contrast to the popular belief that the port city lost its significance after the 7th century, when Sri Vijaya became an important centre of commerce (see Kiribamune 1991; Siriweera 2003:121) and that it "came to an abrupt conclusion" after the Chola attack in 993 and "never recovered" (Carswell et al. 2013:11–12).

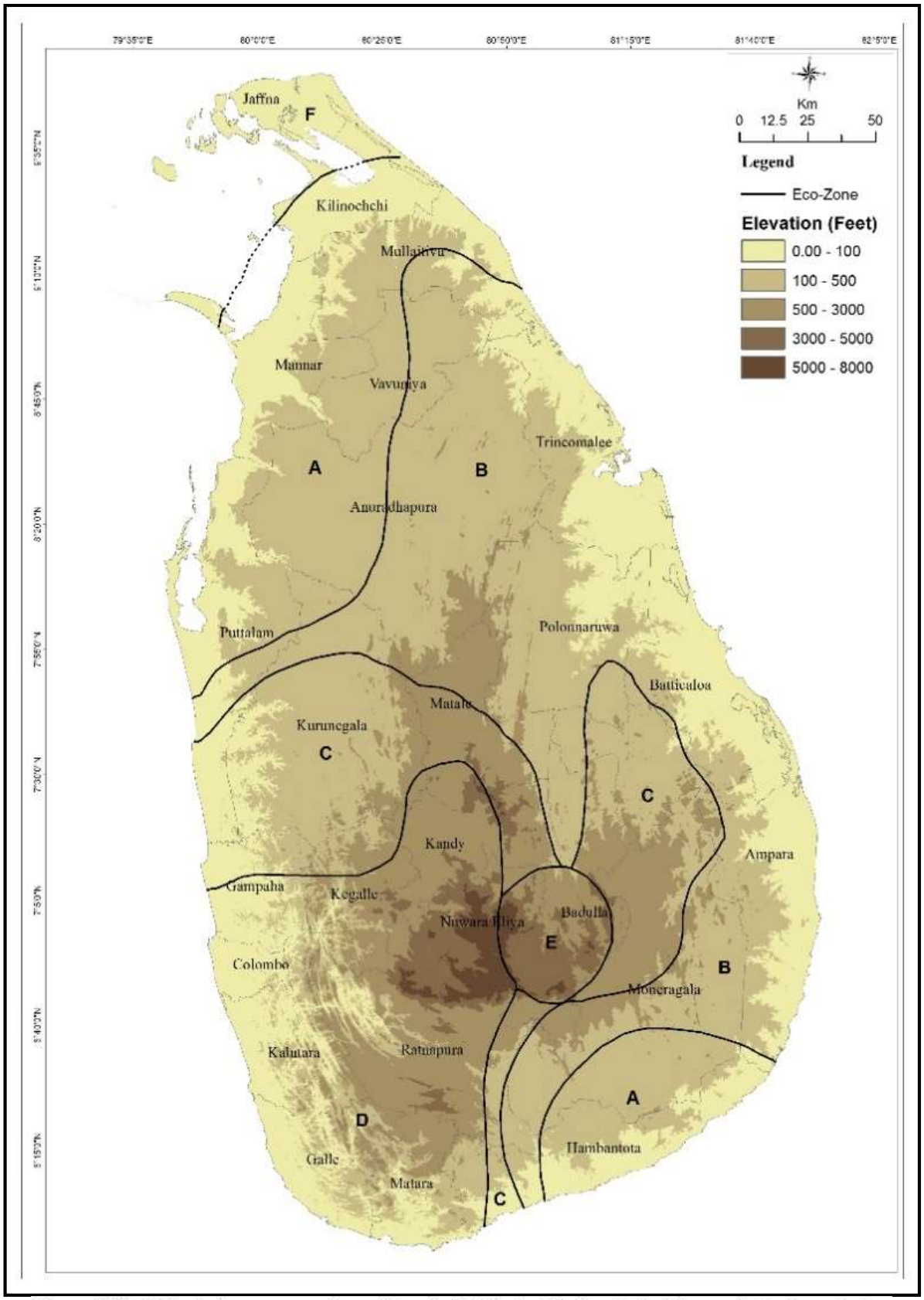


Figure 2.10: Sri Lanka's eco-zones: F—arid lowlands; B—dry lowlands; E—intermediate dry uplands; D1—wet lowlands, <1000m; D2—wet uplands, 1000-1500m; D3—wet highlands, 1500-2400m (after Deraniyagala 2004:2; Map 1)

Unfortunately, Sri Lankan chronicles record only political and military interactions that took place through *Mahatittha* (Mantai). As per the chronicles, India – the southern and eastern coasts in particular – was the main region of contact with *Mahatittha*. Kiribamune (1991:183) concluded that, "from the first century BC onwards practically everyone who is said to have come from India disembarked at *Mahatittha* which is also the point of departure for those who wish to leave for India". Nevertheless, a range of events reported in the historical records, including the arrival of Fa-Xian (Grimes 1941:76–79), Chandrabanu's attacks on Sri Lanka in 1268 (Nicholas 1963:79), Nandi's naval expeditions to China (*Sahassavattuppakarana*:145), and Parakramabanu's military expedition to Burma (Kiribamune 1987:70–71), to mention but a few, indicate *Mahatittha's* interactions with Southeast Asia and China as well (Table 2.1). Engagements with India and Far-Eastern countries described in the historical sources are mainly political and religious, though there are references to commercial interactions too. Sources from the Western Indian Ocean region, such as the vivid descriptions of Cosmas (IX.15–16) and the reference in the Arabic book *Hudud Al Alam* (*ca.* AD 982; Minorsky 1970), paint a different picture of Mantai as a famed international trading centre in the Indian Ocean. Western interest in Sri Lanka was focused on trade.

Drawing together the historical analyses and looking at overall patterns allows an exploration of how they relate to archaeological patterns. For example, based on heavy military use of the site is suggested by the historical sources, concerns have accordingly been raised as to the suitability of Mantai for the growth of international trade (Kiribamune 1991:189). Table 2.1, therefore, is aimed at placing the different uses of Mantai in a timeline to delineate the patterns of interactions through time and to compare them with those of the material remains from the site and the historical developments in Sri Lanka in general.

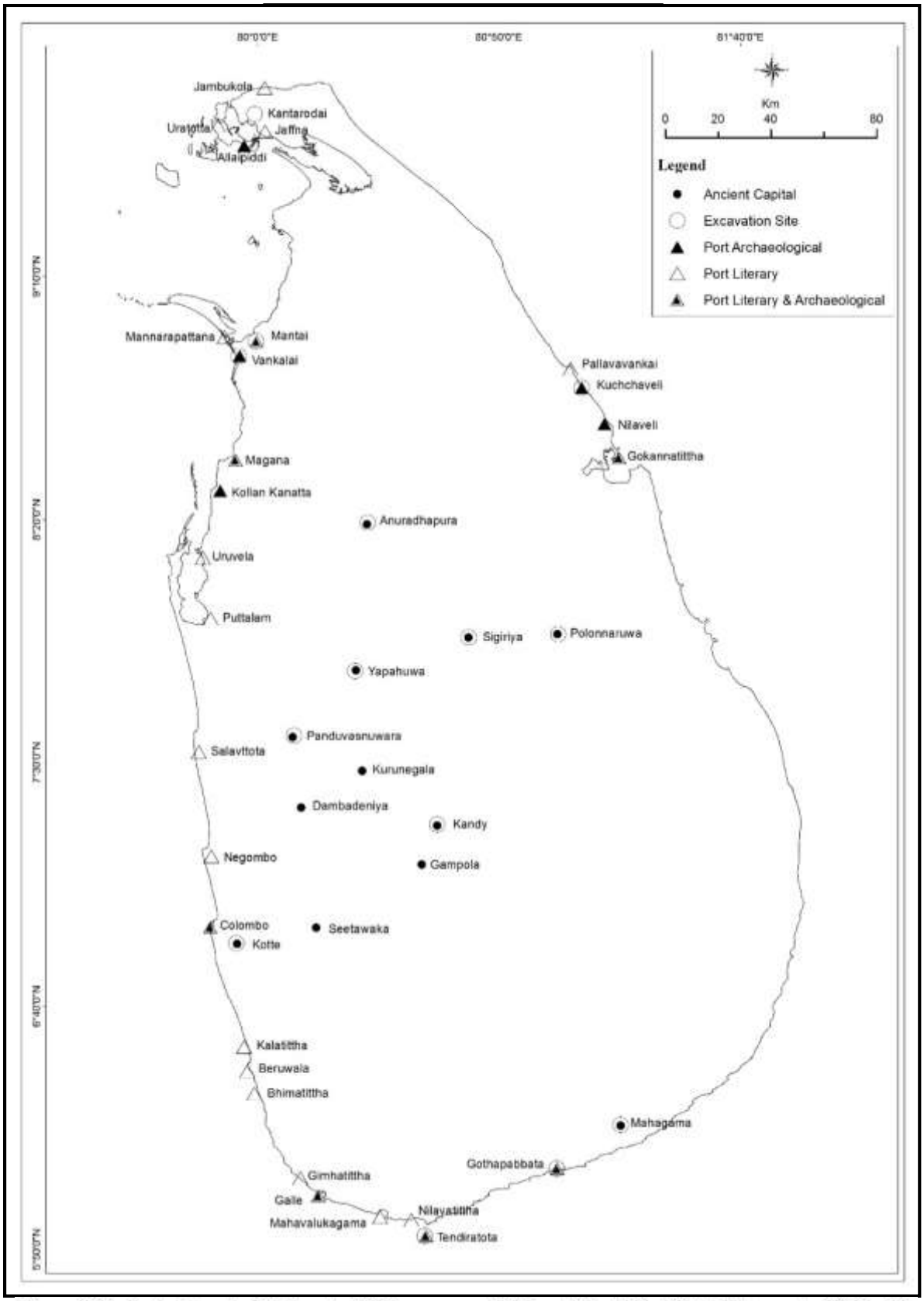


Figure 2.11: Ancient ports of Sri Lanka (Bohingamuwa 2016, modified after Prickett-Fernando 2003a:54)

It will also be used to observe changes in other internal dynamics such as the development of irrigation and other industries such as beads, bangles, metallurgy, gem working in the island for which Sri Lanka was well known (Chapter 4 and 6).

The reconstructed historiography (Catalogue 2.1 and Table 2.1) of Mantai helps to define one perspective on the roles and users of Mantai and how these roles and actors changed over time, which can be summarized under a few headings.

2.3.1.2 Royal intermarriages and strategic diplomacy

From around *ca.* 500 BC, Mantai was the main port that physically connected the political alliance between Sri Lanka and India (South India in particular). The arrival of Vijaya's (*ca.* 500 BC) consort at Mantai marked the first historically documented royal intermarriage between the two countries, a tradition that continued up to the time of Sri Lanka's last king (*Mv.*7:58). This strategic diplomacy, used for strengthening the alliance with Southern Indian dynasties, generally made Sri Lanka friends in one royal court (e.g., the Pandya) and enemies (e.g., the Cholas) in another. Mantai was the port of entry and exit in most of these encounters. The fleeing of the Sri Lankan king Ilanaga (33–43) (*Mv.*35:14–45)[15] to South India and the arrival of Rajasimha (935–938), the Pandyan king in the Sri Lankan court, all seeking political refuge and military assistance, are cases in point (*Mv.*52 (53):4–10). Thus, Mantai has had the role of maintaining Sri Lanka's main diplomatic channel for centuries. During the period covered in the present study, there are seventeen historical references to such interactions during which

[15] Nicholas (1963:76) mentions that Manavamma (684-718) also fled and returned through Mantai. The Mahavamsa, however, does not mention it.

Mantai played a pivotal role. More importantly, these political communications remained uninterrupted during all periods considered in my historical analysis.

2.3.1.3 Military role

Sri Lankan historical sources – *Mahavamsa* in particular – project Mantai predominantly as a naval base for the landing of invaders – mostly South Indian – as well as the launching of naval expeditions by Sri Lankan rulers. From Elara (*ca.* 2nd Century BC), the first recorded invaders to Chandrabanu in the 13th century used Mantai as their entry-exit port (*Raj.*:18; Nicholas 1963:79). There are 22 direct historical references to military activities that involve Mantai (Catalogue 2.1) for the period under discussion. They all took place either before 100–200 time period or after 700, with the most extensive and repeated military activities recorded for the period after 700 (Catalogue 2.1 and Table 2.1). The period from AD 200 to 700 records no historical references to military activities at Mantai in the *Mahavamsa*, but instead has the highest number of citations to trade, economic, religious/pilgrimage and political interactions. That might indicate a relatively peaceful period more conducive to international trade at Mantai, though the same cannot be generalized for the whole of Sri Lanka, where a lot of internal turmoil is recorded. This is, however, a critical finding of my historical analysis, which will be contrasted with material evidence in the following chapters.

Ancient rulers seem to have realised the importance of peace and stability for the smooth running of international trade. From about the 5th century onwards, kings took measures not only to protect ports but also to secure the sea. Thus, Moggallana I (495–512) instituted "a watch of the sea" (*Sagara Rakkham*) (*Mv.*39:57), while Silakala (522–535) appointed one of his sons to protect the sea (*Mv.*40:35). With regards to Mantai, Agrabodhi VII (772–777) took

steps to protect it from possible enemy attacks and to secure the sea-port for trade and commerce. During the Chola occupation of northern Sri Lanka (993–1056), *Mahatottam* was under their control and the port city was named after the Chola King Rajaraja (Indrapala 1971, 1991, 2013). Due to the strategic importance of the port, the securing of it was considered a prime task in any military operation. King Vijayabahu I (1055–1110), for example, secured Mantai and prevented re-enforcements before attacking Polonnaruwa, the Chola stronghold (*Mv.*57 (58):42–47). How the presence of an army and constant invasions through Mantai impacted on international trade is not clear from local historical sources. While operating Mantai as a main naval base such measures, it may be suggested, provided an environment conducive to the smooth running of international trade.

2.3.1.4 Religious and pilgrimage role

According to historical sources, travel between Sri Lanka and the southern and eastern ports of India had begun by at least 600 BC (*Mv.*7:58 and 11:23–24, 38). From about the middle of the first millennium AD, there were regular maritime routes established between the northern and north-western ports of Sri Lanka and Southeast Asia and China (Gunawardana 2003:24). The arrival of the Chinese pilgrim Fa-Xian (?412), and the Kashmiri monk Gunavarman-who proceeded to Java-in Sri Lanka, illustrate such regular connections. Fa-Xian sailed directly from Tamralipti and most probably landed at *Mahatittha,* as he left the island from this port (Ibid.). In 426, Sri Lankan Buddhist nuns went to China with a native ship owner/mariner Nan-ti (Nandi). Nandi returned to the island and took another ship-load of nuns headed by T'ieh-sa-lo (Tesara/Devasara) in 429 for conferring higher ordination. Gunawardana (2003:24) identifies Nan-ti (Nandi) with a Sri Lankan merchant Nandi who was residing at the port of *Mahatittha* (cf. Kiribamune 1991:185).

The presence of a Persian church (Cosmas XI.14; McCrindle 1897:365–367; Carswell et al. 2013:52) as well as a Hindu temple, clear from the poem of Suntaramurti Nayanar of the sixth century (Boake 1887), indicates the cosmopolitan nature of Mantai. Epigraphic and literary evidence (Indrapala 2013:65; below) as well as the archaeological remains of a Buddhist temple at Mantai further testifies to the variety of religious practice at the port city even as late as the eleventh century.

2.3.1.5 International trade

The foreign accounts (e.g., Cosmas, *Hudud Al Alam*, Fa-Xian—cited earlier) are explicit about the role of Mantai as an active international trading port (Chapter 7.2), a fact which is strongly supported by the epigraphic evidence and archaeological remains (Chapter 2.7). By the time of Ptolemy, Mantai was famous as an important emporium, known as '*Modouttoi*' or '*Modutti*' (*Geographia* VII.4.9; Nicholas 1963; Silva 2006; Francis 2013b). No port in ancient Sri Lanka other than Mantai qualifies as a better candidate for *Modutti*. Francis (2013b:53–60) suggested that *Modutti* housed a colony of Roman traders[16] between about 80 and 140.

By at least the 5th century, there were regular maritime routes established between the northern and north-western ports of Sri Lanka, and Southeast Asia and China. The mariner Nandi referred to above, also mentioned in the *Sahassavatthuppakarana* (:145), went on four year-long foreign trading expeditions, and is believed to have lived in a mansion at *Mahatittha*. The *Sahassavatthuppakarana* mentions another merchant prince called "*Vanija Kumara*" (Kiribamune 1991:185). These references indicate the wealth and the social status of traders involved with overseas trade at Mantai. The *Sahassavatthuppakarana* (:145) also refers to a

[16] ? Semi-permanent settlement for western traders

minister Siva who lived at *Mahatittha.* He was probably among those officials who were in charge of administrative arrangements.

According to historical sources, Sri Lanka had reached the peak of its trade and commerce, becoming a great entrepôt of Indian Ocean maritime trade, by the 6th century. The description of Cosmas testifies to Sri Lanka's key position in east–west trade at that time:

"...as its position is central, the island is the resort of ships from all parts of India, Persia and Ethiopia, and, in like manner, many are dispatched from it.... Sielediba [Sri lanka] being thus placed in the middle as it were of India, and possessing the hyacinth, receives goods from all nations, and again distributes them, thus becoming a great emporium" (Cosmas XI.15–16).

Although Mantai is not mentioned by name, it is widely agreed that the port referred to in Cosmas' description is Mantai (Perera 1952:109–113; Carswell and Prickett 1984:11; Prickett 1990:115–122; Kiribamune 1991:186; Silva and Bouzek 2003:115–116; Siriweera 2003:117–126; Nicholas 2003:273–281; Francis 2013b:53–60). Thus, by this time Mantai received ships from India, Persia and Ethiopia. The cargoes included silk, aloes, clove-wood, sandalwood and various other products from overseas, which were redistributed, along with Sri Lankan products (Chapter 7.2.3 and 2.3.1.5for other exports such as pearls, gems and high quality iron and steel, to ports in eastern India, Persia and north-east Africa, including Adulis in Eritrea (cf. Wolters 1967). *Mahatittha*, therefore, could have housed a large number of foreign merchants from the eastern and the western littoral of the Indian Ocean as well as from South Asia. It is during this period that no historical references to military activities at Mantai are recorded (Table 2.1).

Even after the period of peace suggested by the literary sources had ended (*ca.* 700), Mantai seems to have remained a port of international repute. *Hudud Al Alam* mentions Mantai, referred to as *Muvas* (Perera 1952:50), as a flourishing international trading port. Many products from all over the island were carried to the city, at which point they were exported around the world. This may indicate that the military activities highlighted in the historical records did not have much impact on international trade at Mantai or simply that their impact did not last long. Local chronicles are less helpful in resolving this question, which leaves little else aside from archaeological data to further examine this issue.

2.3.1.6 Infrastructure and administration

International trade requires infrastructure and a managerial system to administer and collect revenue for the state. Mantai's development as one of the greatest entrepôts of the Indian Ocean implies the existence of such facilities. Epigraphic evidence and structural remains (Chapter 2.7.3) illustrate the role of Mantai as a well-planned port city with the facilities necessary for international trade. According to epigraphic evidence, the city had different quarters for various artisans and industries, as well as a road network that comprised lanes and main streets, some of which were even named (Indrapala 2013:65–66). A system of administration was put in to place and revenue was collected for the state or whoever controlled it. The port city housed foreign mercantile communities such as the *Anjuvannam* and *Kurumban* of West Asian and South Indian origin, respectively, making it a truly cosmopolitan centre in which various multi-ethnic and religious communities co-existed (cf. Subbarayalu and Shanmugham 2001; Indrapala 2013:65). Reference to a Nestorian Persian church, the Tirukestheswaram Hindu temple and a Buddhist temple also clearly supports this

claim. Sponsorship of a Tamil trader for the *Vicakam* Buddhist celebrations (Indrapala 2013:65–66) also illustrates the coeval existence of religious faiths at Mantai.

The historical sources thus reveal the continuity of Mantai as an entry-exit point for the purposes of military, political, pilgrimage, trade and commerce, and as a trade and urban centre until about the 13th century. At Mantai, the period between AD 200 and 700 appears to have been a peaceful one during which politics, religion and commerce seem to have flourished. According to Arabic sources, Mantai's reputation as an international trading port continued until at least the time of the Chola invasion (*Hudud Al Alam* (Minorsky 1970). Local texts are less explicit about its role in maritime trade and commerce, as well as about the general function of the port city, which is better captured in epigraphic sources and observed in the archaeological remains.

2.4 Previous research

Since the 19th century seven archaeological investigations have been undertaken at Mantai prior to the present work. First, Boake (1887) excavated at three different locations and illustrated locations such as the 'palace', streets and wells of the ancient city. Then Still (1911) recorded a wide variety of surface materials at the site, including Pandyan, Cholan and Sinhala Massa coins, bangles of different materials, glazed pottery and structural remains. He also recorded an inscribed pillar, which Bell (1911) ascribed to the reign of "Siri Sanga Bo" (Sena II (866–901). Hocart (1927) was the first to realise the potential of deep stratigraphy for reconstructing chronologies not only of Mantai but for Sri Lanka in general. Mantai was subsequently examined by Sanmuganathan (1951), Kaplan (Deraniyagala 1958) and De Silva (Carswell and Prickett 1984:36). Sanmuganathan (1959) reports Arretine Roman Wares, a 40-

foot-wide road from the eastern gate, and a narrow road that ran parallel to the main road in the ancient city.

The most extensive investigations at Mantai were directed by John Carswell and colleagues (2013).[17] Unfortunately, the excavations were prematurely abandoned due to the outbreak of separatist war. While the substance of the Carswell et al. (2013) report is critically reviewed in the succeeding chapters, their general findings are summarized below.[18]

Carswell excavated 14 different areas at Mantai including the westward region in search of the port facilities (Figure 2.12). The earliest human occupation at the site was dated to the late Mesolithic phase *ca.* mid-second millennium BC, reported from trench D (Prickett-Fernando 2003b:107). Then the site was abandoned and reoccupied during the Early Historic Period (*ca.* 300 BC–AD 300), with continuous occupation thereafter up to the 13th century as an important maritime trading port (Prickett-Fernando 2003b). The layers representing primary developments in the historical period were recorded in trenches H and G (Graham 2013b:145, Graham 2013c:184). While Carswell and Prickett (1984) dated the Early Historical beginnings to *ca.* 300 BC, Graham (2013c:185) assigned it to the 1st/2nd century. Graham (Ibid.) dated the entire cultural sequence represented in H and G to a time period from the 1st or 2nd

[17] Three field seasons from 1982 to 1984

[18] The Mantai cultural sequence presented in the Caswell et al. (2013) report significantly differs from their previous publications (Carswell and Prickett 1984). The cultural sequence established in previous publications is used in this thesis as it is comparable with those established sequences from elsewhere in Sri Lanka, including those from Kirinda and Kantharodai, which makes comparisons easy. Moreover, the quantification data for ceramics by Prickett-Fernando (2003a&b, 1994, 1990), however imperfect they may be, is based on the cultural sequence established in those early publications. Quantified data is extremely important for the present work and hence I follow the earlier cultural sequence with slight modification based on inputs from the Carswell et al. 2013.

to the 5th or 6th centuries, above which the sequence is highly disturbed. He (Ibid.) does not, however, rule out the possibility of settlement's continuation over the centuries.

The archaeological evidence—which includes Lakshmi plaques (the earliest Sri Lankan coins; Codrington 1924), Punch-marked coins, Rouletted Ware, beads (>2500), structural remains (wooden post holes, a '2.4 metre-wide, fired-brick surfaced road'), and evidence for a customs post/naval installation close to the coastline (Pricket-Fernando 2003b:111) highlights the urban character of the site, and its importance as a centre for trade and localised manufacturing.

Prior to Carswell's study, it was widely recognised that Mantai was linked to Indian Ocean east–west trade. Artefacts originating from those regions, including mainland South Asia, were therefore bound to be found at Mantai, as Carswell's excavations clearly demonstrated. Less well understood, however, were the chronology, intensity and patterns of these interactions. Establishment of a clear cultural sequence through controlled excavations, scientific dating and quantification of material remains was necessary for such an understanding. Despite the large-scale nature of their excavations and the great volumes of material culture retrieved in the process, Carswell et al. (2013) were only able to analyse a small sub-set of samples for their final report. Their chronological sequences are supported by only three radiocarbon dates (Graham 2013b:155). Due to the abrupt abandonment of excavations and loss of stratigraphic information Carswell et al. (2013) provide only a "very incomplete archaeological sequence, often confused or confusing" (Graham 2013c:184).

2.5 Present study

Despite previous archaeological investigations conducted at the site, Mantai is far from being fully understood. As such the true potential of the longest surviving seaport of the Anuradhapura kingdom and the best site to study Sri Lanka's external interactions, trade and to some extent the martime history of the Indian Ocean is still an archaeological puzzle.

2.5.1 Objectives

The principal objective of my work at Mantai was to establish a chronological framework for the site and to interpret the range of archaeological remains for external contacts, for the purpose of understanding the nature and patterns of Mantai's and that of the island's interactions with the Indian Ocean.

2.5.2 Survey and excavation methods adopted across sites

The field strategy adopted at Mantai, Kantharodai and Kirinda took the form of small-scale excavations accompanied by field surveys. Considering the uniformity of methodology adopted across the three sites, it is briefly discussed here. The methodology adopted in the survey, excavations and sampling is discussed in detail in Catalogue 1.1.

2.5.2.1 Field survey

Kantharodai and Kirinda

Kantharodai was excavated by the Department of Archaeology, and the author only conducted the flotation (Figure 2.34) and studied the resulting artefacts from both excavation and the floatation. Therefore, no systematic field survey was undertaken by the author and

only a limited number of artefacts collected by him and villagers were analysed as surface findings.

At Kirinda, an extensive field walking survey was carried out, which covered the entire coastal area between the estuary of Kirindi Oya and Patanangala (Figure 2.38&C1.1). The survey material from Kirinda, however, does not form part of this study.

Mantai

It was considered that the limited scale of excavation conducted at Mantai[19] would result in considerable sample bias and the range of artefacts may not be representatively present in the excavated sample. Therefore, it was planned to undertake the surface survey in transects and employ systematic sampling at regular intervals. Unfortunately, due to the land use pattern and the vegetation at the time of the survey, this strategy had to be revised. While some privately-owned land could not be accessed, the overgrowth in certain areas of the site could not be penetrated and consequently the survey was confined to easily accessible land. These circumstances compelled the author to undertake limited surface survey and targeted sampling. The target was to sample (primarily) imported artefacts as representatively as possible. Thus, once a decision was made to sample from a particular locus the entire group of imported wares, beads, bangles, coins, minerals and iron ore/slag present in that site were sampled.

[19] At Mantai, it was not possible to carry out an extensive surface survey at the time the excavation, owing to safety concerns (due to land mines following the conclusion of the separatist war). This survey was undertaken in 2013, after the analysis of material.

2.5.2.2. Excavation

Limited excavations were undertaken at all three sites. The selection of *loci* for excavations was based on the results of previous excavations (Begley 1972 for Kantharodai and Somadeva 2006 for Kirinda) and our own survey. At Mantai, for example, a *locus* for digging was selected adjacent to the main area excavated in the central mound in the 1980s—namely trench D (Carswell et al. 2013:93; Figure 2.12). Being in the central area of the mound, it was expected to have the deepest undisturbed stratigraphy. The previous excavations at trench D have revealed the earliest occupation levels at the site.

A unique site-specific code was assigned to each excavated locality within the site. The excavated trenches at Mantai and Kantharodai measured 3m x 3m (Figure 2.13) while the trench 3 (KR3) at Kirinda was 2m x 4m (Figure 2.39). The trenches were hand excavated with strict stratigraphic control using the single context method. The context matrix recording was used to record sediment layers and other features (Harris 1989). GPS co-ordinates for all excavated trenches were recorded and site plans indicate their location on the ground. Photographic records for all trenches were created.

With the exception of Kantharodai, all excavated sediments were both wet and dry sieved using a 3mm mesh to ensure the total recovery of artefacts/eco-facts (Figure 2.14). All of the recovered artefacts were recorded, if required three dimensionally, according to their respective contexts/ spits and analysed The methodology adopted in material analysis is discussed in respective chapters and in Catalogue 3.1 and 4.1.

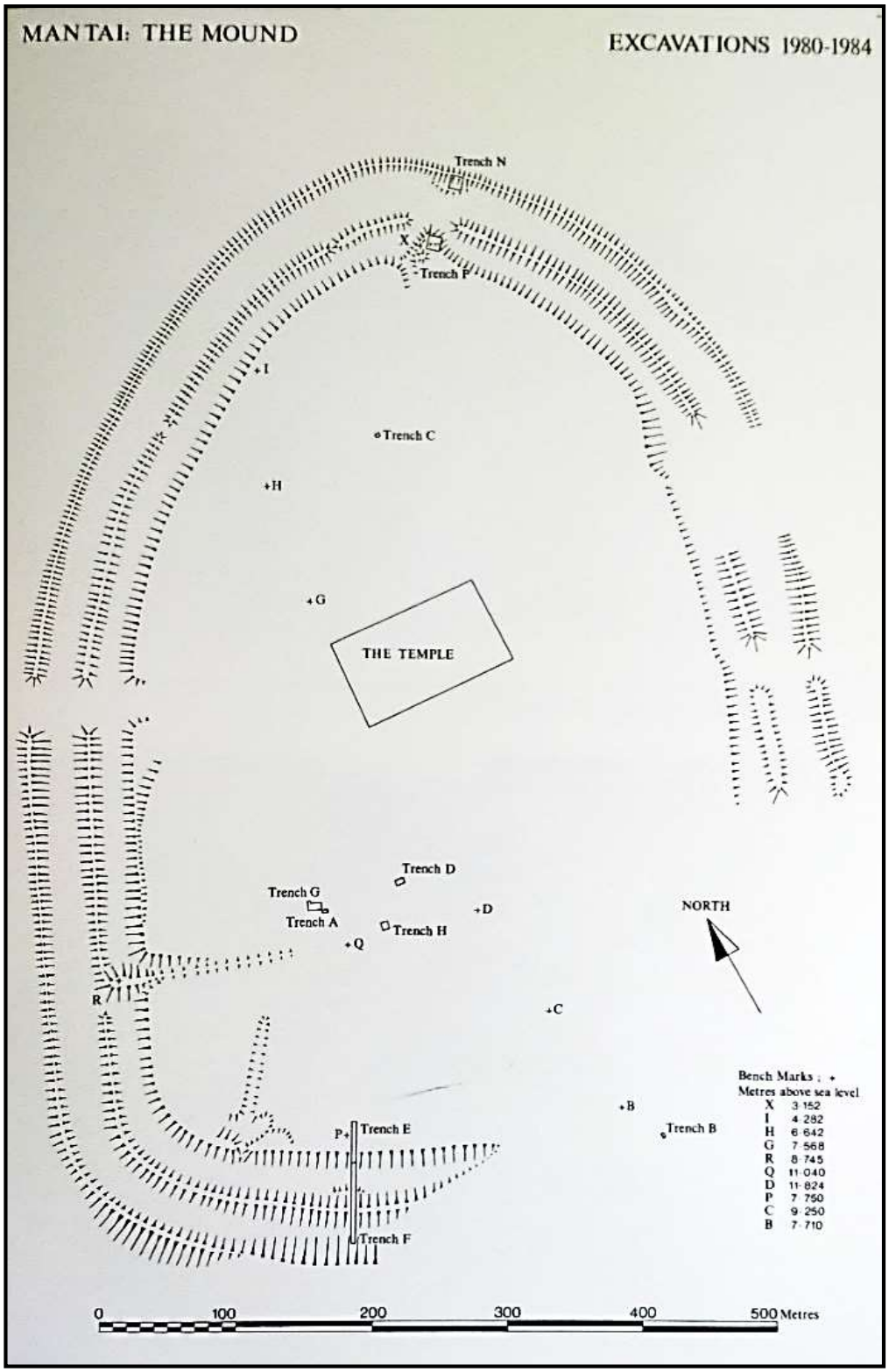


Figure 2.12: Mantai previous trenches (Carswell et al. 2013:93; Fig 3.2)



Figure 2.13: The excavation trench at Mantai (2009/10)

2.6 Chronology, cultural sequence and material culture

A total of 65 archaeological contexts were excavated at Mantai. The descriptive site matrix of this excavation is given in Catalogue 2.2, while Table 2.4 summarizes the sedimentological and associated material in relation to their respective phases and contexts. The section drawings and the matrix chart of the excavation are given in Figures 2.17 and 2.18 respectively. The contexts excavated represent 11 stratigraphic phases following major depositional episodes. These stratigraphic phases are divided into cultural periods based on radiocarbon dates and the material remains, particularly chronologically diagnostic artefacts such as imported pottery and coins. As our understanding of the material culture grows, refinement of this cultural sequence should be possible.



Figure 2.14: Floatation sampling at Mantai (Courtesy SEALINKS)

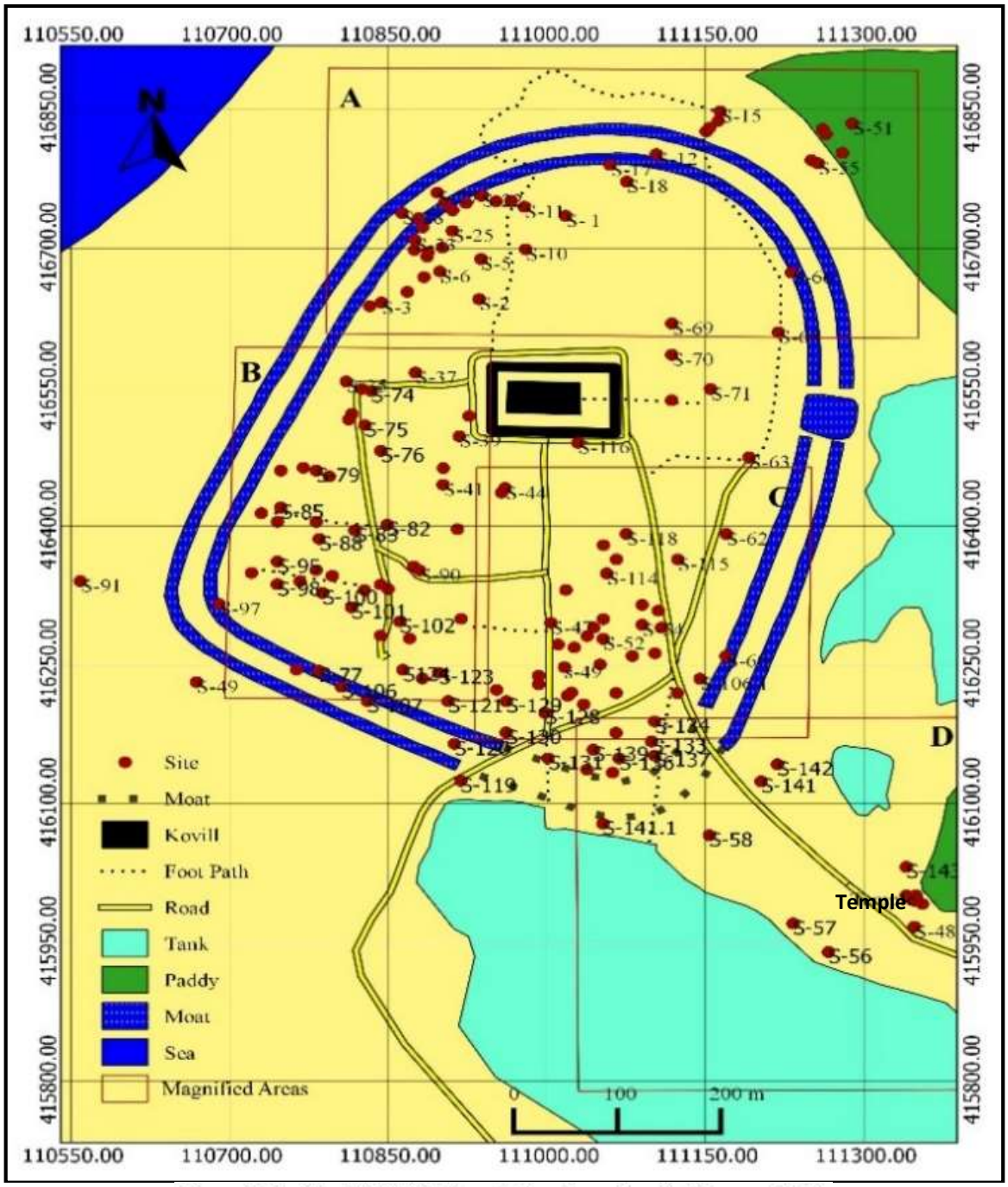


Figure 2.15: Mantai distribution of sites, based on field survey 2013 (see Catalogue 2.4 for list of sites surveyed)

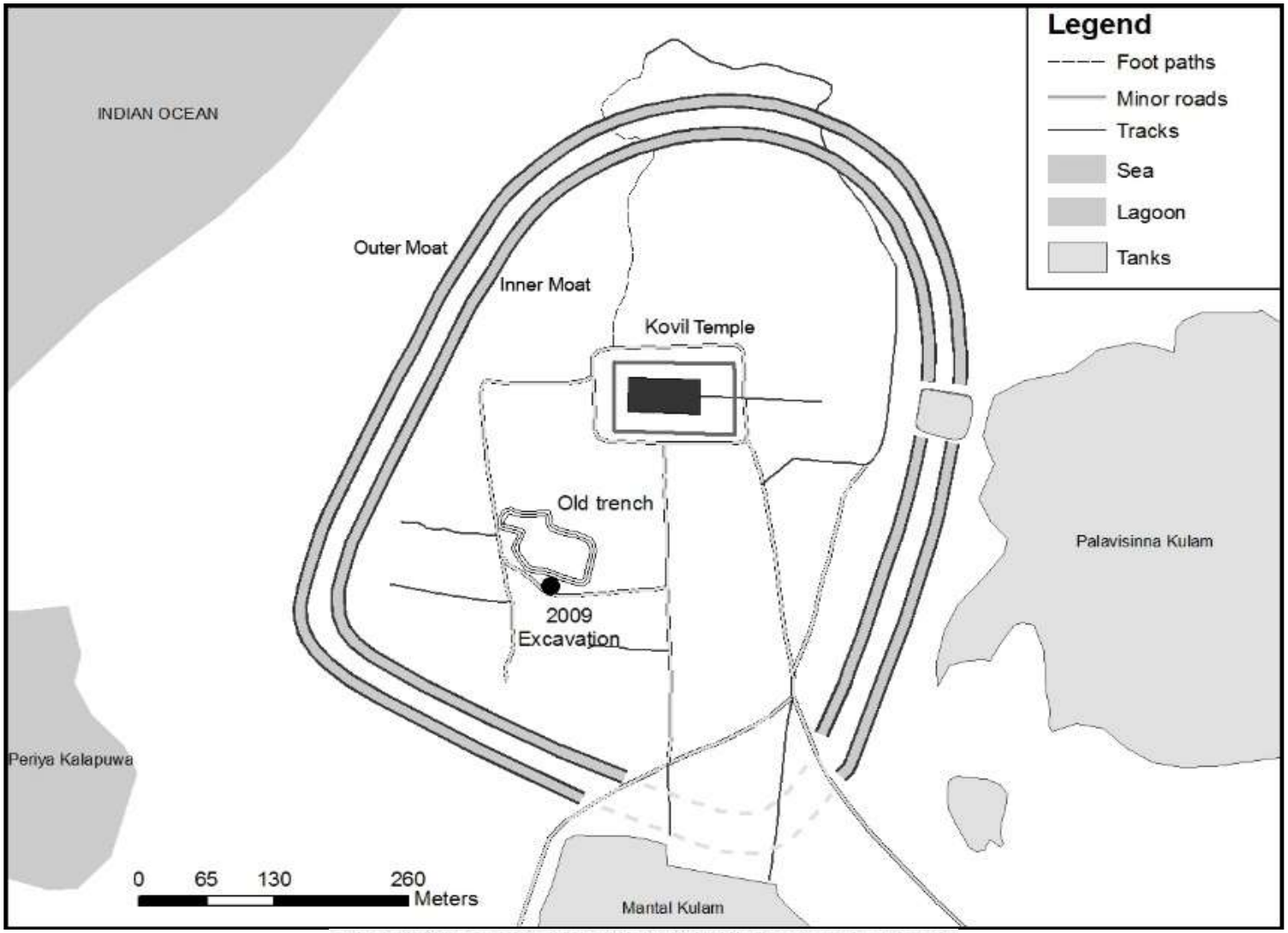


Figure 2.16: Mantai excavation 2009/10 (Courtesy SEALINKS)

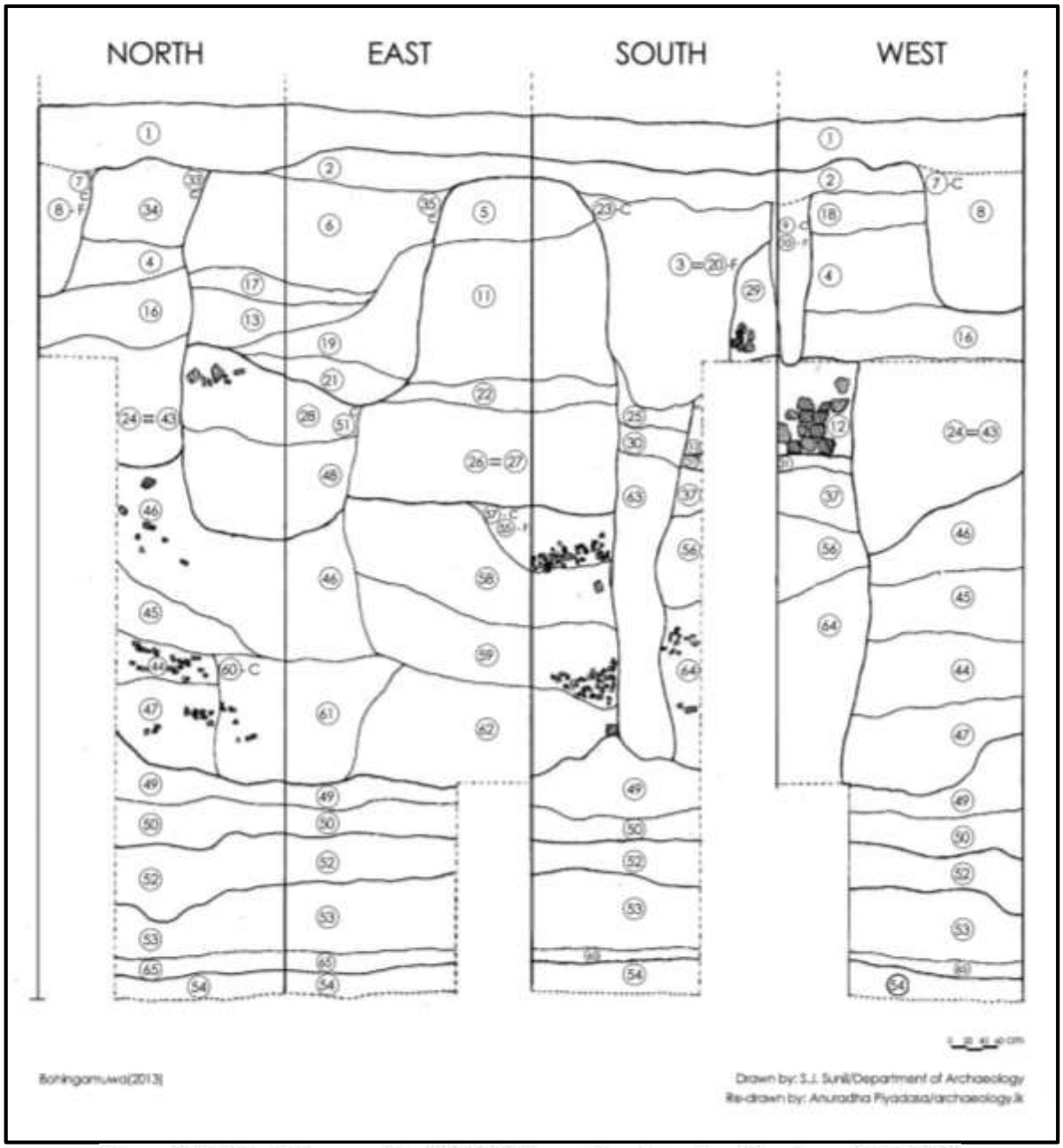


Figure 2.17: Mantai excavation (2009/10)—section drawings (Courtesy SEALINKS)

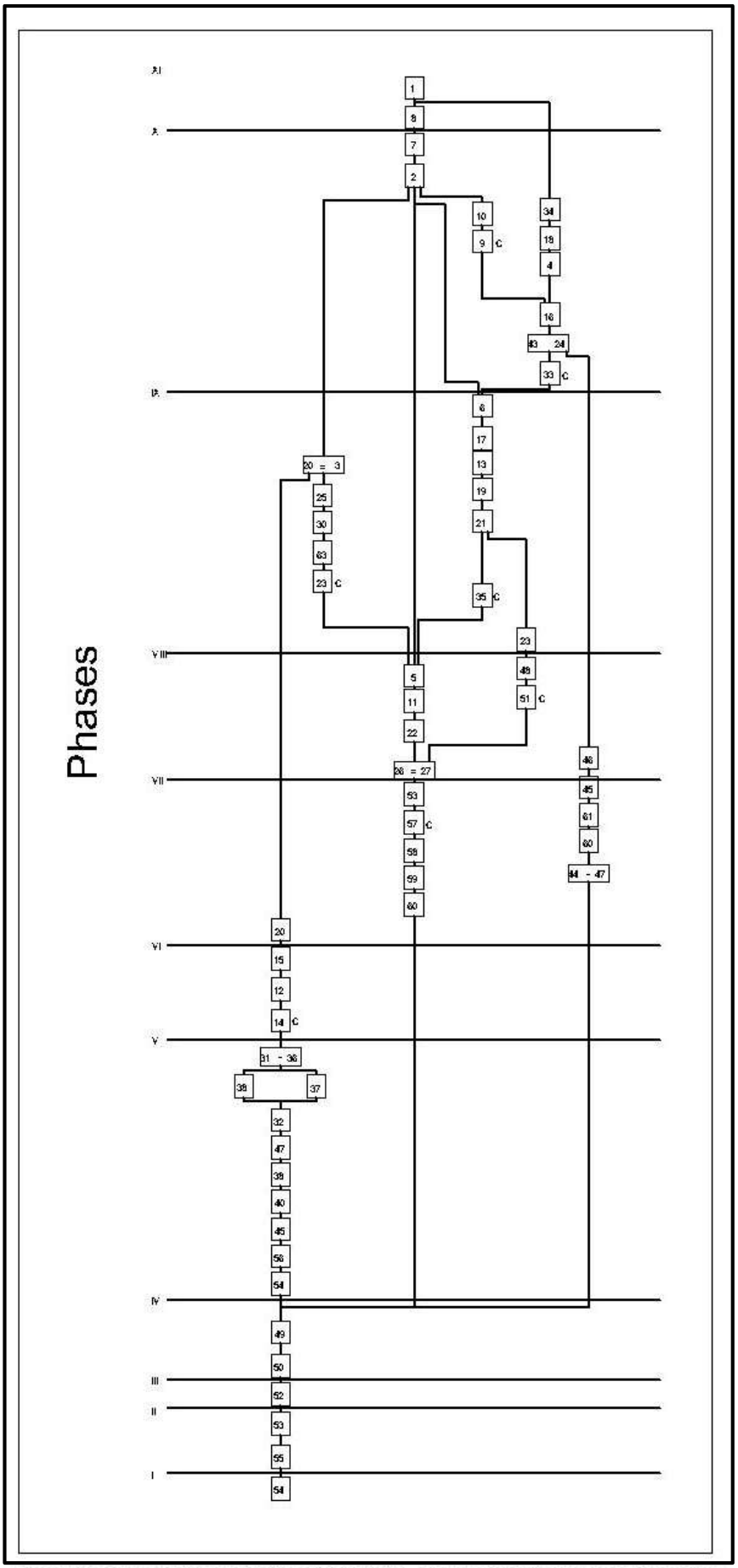


Figure 2.18: Mantai excavation (2009/10)—site matrix (Courtesy SEALINKS)

2.6.1 Radiocarbon dates and site chronology

Twenty-four radiocarbon dates, primarily on charred seeds, were obtained for the Mantai sequence (Catalogue 2.1).[20] These samples were assessed at the Scottish Universities Environmental Research Centre, Glasgow. Fourteen of these samples/seeds were collected from contexts sealed by a coral wall, and thus are not thought to be impacted by later disturbances. The remaining 10 seeds were sampled from contexts above the wall, but considered by the excavator to originate from undisturbed contexts. Due to all of the dates, except the earliest one, being obtained from seeds (movable small material), residuality and intrusiveness were considered likely dangers. Therefore, Outlier Analysis was applied to all 24 dates which removed several that it deemed inconsistent with the rest and the stratigraphy. This indicated that three dates from contexts above the coral wall (below) are residual and that seven dates below it are also probably intrusive. Once outlier dates were eliminated, the remaining consistent dates were modelled/calibrated using the OxCal Statistical Programme (Bronk Ramsey 1995), which provided a date range with an average agreement of 96.2% (Figure 2.19). The overall sum graph of the Mantai sequence was generated and is given in Figure 2.20 below.

Then the transitions/boundaries between excavated phases were obtained using OxCal to assist dating individual phases (Table 2.2 and Catalogue 2.3). Similarly, summary graphs for the main phases such as the coral wall were obtained (Figures 2.21, 2.22 and 2.23). This coral wall, which is *in situ*, provides a reliable landmark separating clearly undisturbed and disturbed

[20] The dates for Mantai were obtained/paid and modelled by Prof Dorian Fuller of the University College London while Dr Michael Dee of the Oxford Radiocarbon Accelerator Unit at the Oxford University Research Laboratory for Archaeology and the History of Art assisted me in interpreting radiocarbon dates from all three sites. The author is very grateful to both of them.

phases in the stratigraphy. This wall was assigned an arbitrary phase number VI as it represents the major construction period in the site. No C14 dates are available for Phase VI. However, it sits stratigraphically between Phases V and VII, which enables modelling at reliable date ranges for the wall (Figure 2.23).

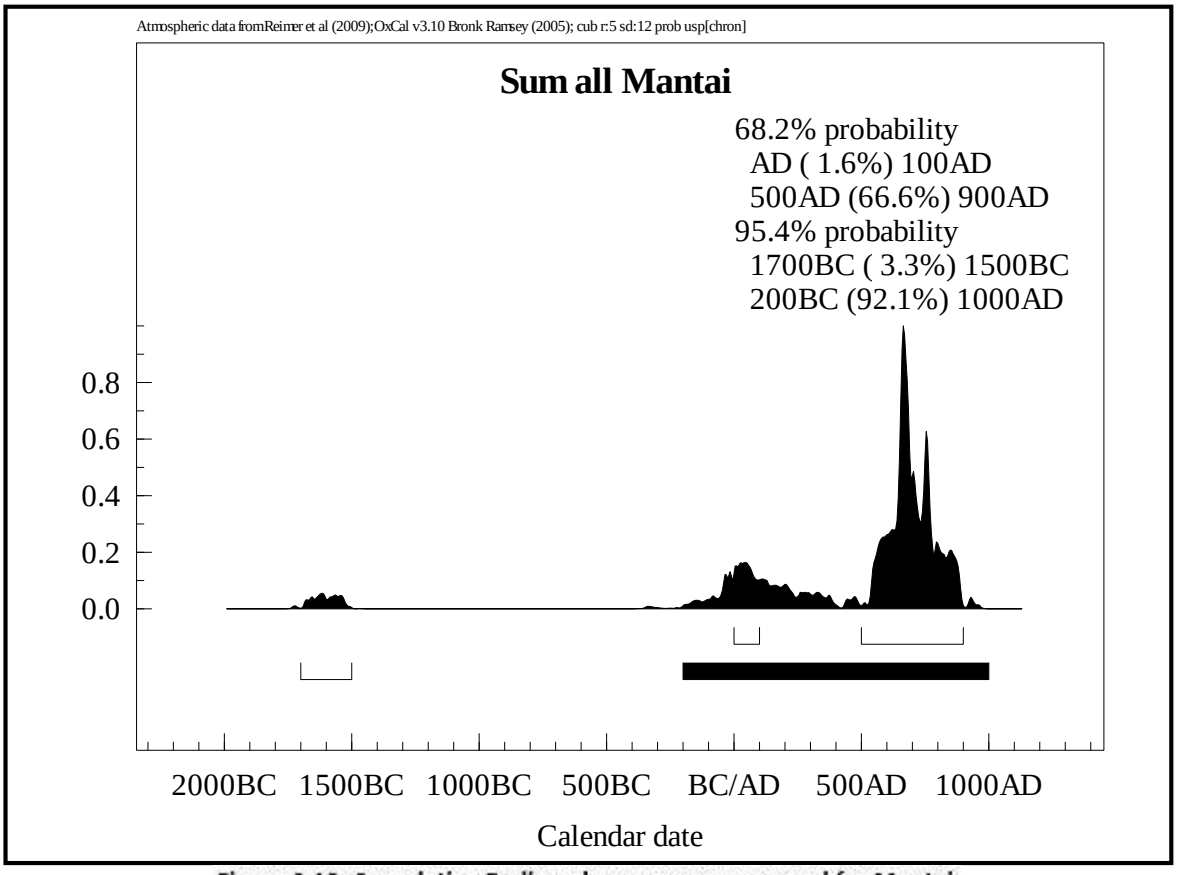


Figure 2.19: Cumulative Radiocarbon sequence secured for Mantai

Table 2.2: Phase transitions	
Phases	**Approximate date of transition**
Start of Phase II	ca. 50 BC (1 σ: 140 BC-30 AD); (2 σ: 330 BC- 70 AD)
Phases II and III	ca.90 AD (1 σ: 30-150 AD)
Phases III and IV	ca. 200 AD (1 σ: 150-330 AD)
Phases IV and V	ca. 620 AD (1 σ: 585-650 AD)
Phases V and VI	ca. 700 AD (1 σ: 690-720 AD)
Phases VI and VII	ca. 720 AD (1 σ: 700-735 AD)
Phases VII and VIII	ca. 740 AD (1 σ: 720-750 AD)
Phases VIII and IX	Cannot be reliably modelled.
Phases X/ end of sequence	By. ca. 1100 AD (1 σ: 760 AD -1090 AD); (2 σ: 760 AD-1250 AD)

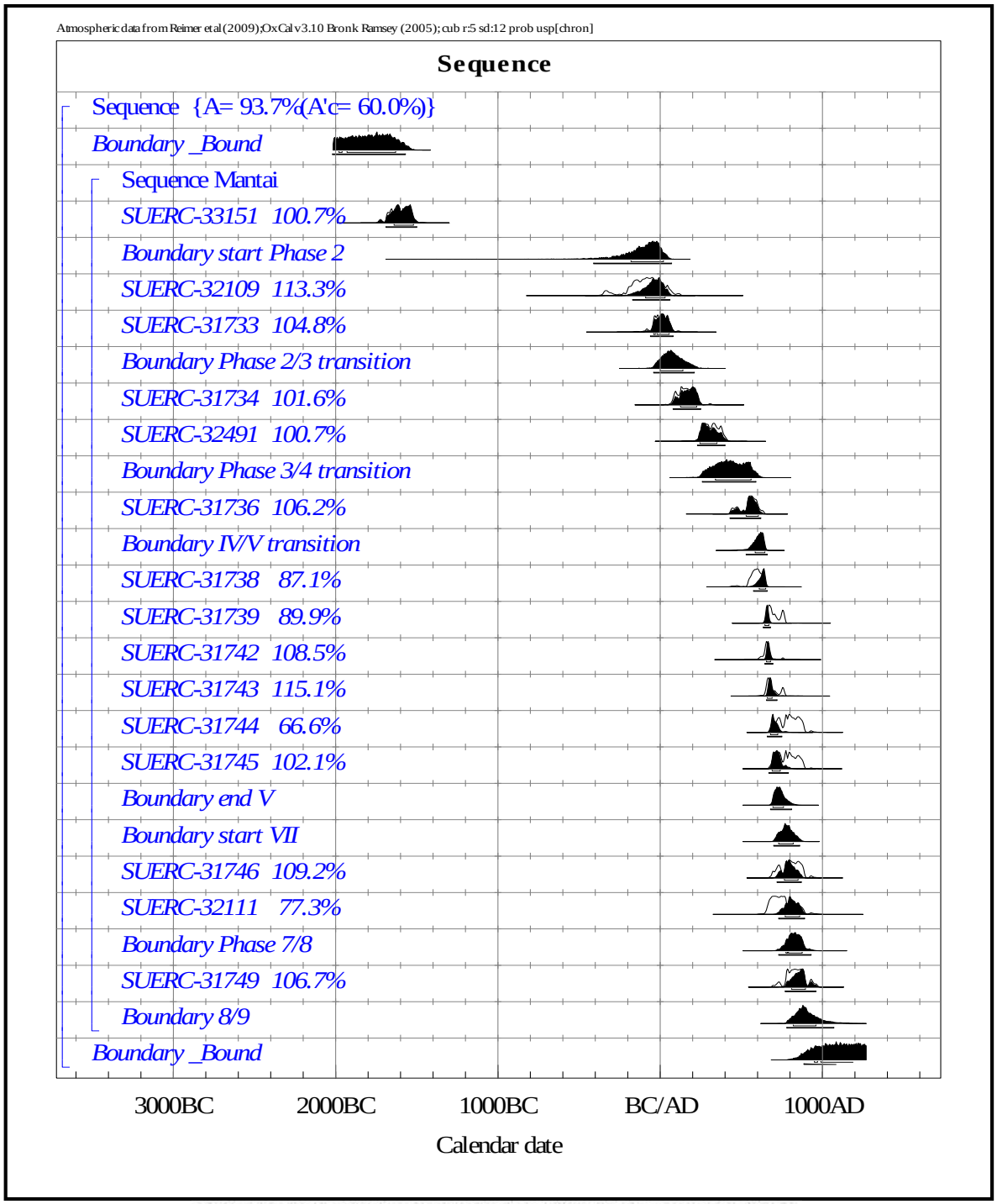


Figure 2.20: Mantai overall sequence with 93% agreement index

A full discussion of the site phasing is included in the Mantai report in preparation. The excavated sequence below Phase VI, the coral wall, is clearly *in situ*. Phase VII was considered as disturbed while writing the matrix description.[21] This conclusion, made before the analysis

[21]The site matrix and phasing was finalized and written by Dr. Siran Deraniyagala , Alfred De Mel and by this author.

of the material culture and the obtaining of radiocarbon dates, was primarily based on sedimentological grounds and the presence of two pits. The material analysis undertaken subsequently, however, indicated that Phase VII can be considered as a reliable phase. The ceramics, in particular, are largely consistent with the stratigraphy and radiocarbon dates secured for this phase (Chapter 3.3.14.1). Phase VII, therefore, is separated from the clearly disturbed Phases VIII to XI, which are treated as a single 'Disturbed Phase' in this study. However, a larger sample from more extensive excavations and additional radiocarbon dates are necessary to make a more informed assessment of the site's chronology and its material culture.

The excavated contexts in Phase V are restricted to a limited area in the north-east corner of the trench. With the exception of contexts 64, 56 and 37, all other contexts are either thin deposits spread over a limited area or small cuts and fills. The quantity of artefacts recovered in this phase seems to corresponds to the soil excavated. The decrease in artefacts in comparison to the preceding and succeeding phases may not, therefore, indicate any decline during this period at Mantai.

2.6.2 Date model and the cultural sequence

Largely based on the reliable radiocarbon dates, and to a lesser degree on the chronologically significant material remains, the following cultural periods (Table 2.3) are suggested for the Mantai excavated sequence.

In the radiocarbon sequence, the earliest date at *ca.* 1600 BC, secured on a shell, is from context 54. This represents Phase I and is assigned to the late Mesolithic Period as postulated

also by the site's previous excavators (Carswell and Prickett 1984; Carswell et al. 2013). The presence of domesticated goat (Perera, in prep.) in this phase may, however, suggest remnants of a late Neolithic or even Chalcolithic period at the site. After this brief late Mesolithic occupation, there is a long cultural hiatus—both in the radiocarbon and archaeological records—until about the 2nd century BC. This occupational gap was also noted by Carswell et al. (2013), and is thus perhaps a general phenomenon at the site.

The remaining dates seem to indicate two separate phases of occupation. The first of these is between *ca.* the 2nd/1st century BC and middle of the 3rd/4th century AD. The second phase spreads between *ca.* middle of the 6th century and the beginning of the 10th century. The break between two phases, however, cannot be interpreted as representing an interruption in occupation, only the absence of sufficient radiocarbon dates. The material remains demonstrate the continuity of occupation at the site from *ca.* the 2nd century BC up to the 12th/13th century AD. This was observed by Carswell and colleagues as well (Section 2.4) Therefore, radiocarbon dates are meaningful only when they are corroborated with material culture and the stratigraphy for a given sequence (Bronk Ramsey 1995:425–430).

Phase II in the sequence is securely dated to between the 2nd century BC and mid-1st century AD and is termed the Mid-Early Historic Period.[22] Its direct development is seen in the succeeding phase, the Upper Early Historic Period that is dated to between *ca.* the late 1st century and late 2nd/early 3rd century. This dating is extremely important not only for the Mantai sequence but also for Sri Lankan archaeology in general, as it provides secure dating for Rouletted Wares (Chapters 3.3.8.2 and 5.3.3.2). These two periods are similar to those

[22] The terminology of cultural phases is after Deraniyagala 2004.

established by Deraniyagala (2004) for the Early Historic Period of Sri Lanka. With regards to the material findings, Phase IV is a cultural continuity from Phase III, though there appears to be a chronological gap in the radiocarbon record. Dated to between the mid-3rd and early 7th century, this is the Middle Historic Period (MHP) in Sri Lanka. The discovery of late Roman coins in this period is important, as their dating in the island is debated (see Bopearachchi (2006:181–200, 1998:133–178, 1990:20–37).

The MHP continued into the succeeding Phases V and VI of which the former is dated to between early 7th and early/mid-8th century. Phase VI, which is the major construction period at Mantai, did not produce any scientific dates, but is stratigraphically placed between Phases V and VII. Phase VII, termed Mid-Early Historic Period is dated between *ca.* the early/mid-8th and the late 9th century, based on radiocarbon dates).[23] Based on these dates for Phases V and VII, Phase VI can be safely assigned to the early/mid-8th century. Phases VIII to XI are highly disturbed deposits at the site and all the dates obtained for these periods are out of order. However, when these dates are modelled, they postdate the 8th/9th centuries, and the end of the Mantai sequence is datable to *ca.* the 12th century. A small quantity of ceramics recovered can, however, be dated to the 13th and 14th centuries.

Thus the radiocarbon dates provide a reliable chronological framework, which is further supported by material evidence, particularly for the deposits sealed by the coral wall. A chronology cannot be established for Phases VIII to XI due to disturbances in the deposits and

[23] This phase, however, contains a small quantity of Middle Eastern ceramics (11 sherds of YGRAF, PIW, LIM (i.e., 3.5% of total ME wares in Phase VII) of later periods, indicating some mixture of material (possibly material from the pits or intrusive sherds discussed in Chapter 3). Nevertheless, the material culture largely represents the time period between the early/mid-8th century and late 9th century and generally tallies with the radiocarbon dates.

they are therefore considered to represent a period postdating the 8th/9th centuries, continuing up to *ca.* the 12th/13th century.

Table 2.3: Mantai radiocarbon dates site chronology

Phase	Context	Lab No.	C14 dates BP	Cal. Dates (1 σ) *Bayesian [By=]* (stratigraphic model, >60% agreement)	Suggested date	Cultural period
I	54	SUERC-33151	3326+/-38	1670-1530 BC	ca. 1600 BC	Mesolithic (?Neolithic)
II	53	SUERC-32109	2056+/-73	170BC-20AD; *By= 70BC-50 AD*	2nd C. BC- mid-1st C. AD	Mid-early Historic
	53	SUERC-31733	1993+/- 37	40BC-55 AD; *By=20BC-65 AD*		
III	52	SUERC-31734	1854+/-37	90-220 AD; *By= 90-180 AD*	Late 1st C.- late 2nd/Early 3rd C. AD	Upper Early Historic
IV	49	SUERC-31736	1510+/-37	460-610 AD; *By=250-380 AD*	Mid-3rd C.-early 7th C. AD	Middle Historic
V	41	SUERC-31738	1471+/-37	560-635 AD; *By=610-655 AD*	Early 7th C.- early/ Mid-8th C. AD	Middle Historic
	41	SUERC-31739	1319+/-35	650-770 AD; *By= 645-670 AD*		
	40	SUERC-31742	1368+/-35	635-680 AD; *By= 650-675 AD*		
	39	SUERC-31743	1336+/-37	650-770 AD; *By= 665-685 AD*		
	37	SUERC-31745	1232+/-37	700-870 AD; *By= 685-715 AD*		
VI				No dates secured	Early/ mid-8th C. AD.	Middle Historic
VII	47	SUERC-31746	1217+/-37	720-880 AD; *By= 710-740 AD*	Early/mid-8th- late 9th C. AD	Mid- Middle Historic
	61	SUERC-32111	1272+/-60	660-810 AD; *By= 715-745 AD*		
VIII-XI	Disturbed Phases. All the dates obtained for these periods are out of order. See Catalogue 2.2 for all dates				Post 8th/9th C. - 12th C. AD. Based on ceramic evidence 12th/13th C. AD	Late Middle Historic

Table 2.4: Mantai phase description		
Phase	**Phase description**	**Associations**
I	Lagoon sand deposit with shells with occasional cultural contents; ca. 9.70m below surface; excavated to up to water table; Context: 54.	Domesticated goat; microliths; bone tools; molluscs perforated for extracting flesh, leopard phalanx
II	Predominantly sandy stratum; Contexts 65 (Sandy shore deposit); 53 (Olive brown clayey sand with loose compaction).	Lakshmi plaque (200-100 BC), small quantity of Early Middle-Eastern (mainly container) wares
III	Clayey sandy deposit; Early Historic occupation; Context 52	Late NBPW (200 BC), Rouletted (decorated) (200 BC- AD 200)
IV	Major habitation and Pre- structural deposits; Contexts 49 (Light brown silty clayey sand deposit); 50 (Greyish brown clayey silty sand deposit.).	Lakshmi plaque; Late Roman coins (300/400-600AD); increase of Middle-Eastern wares
V	Structural debris with some occupation deposit admixture; Contexts: 64, 56, 41, 40, 39, 42, 32, 37, 38, 31/36.	Grapes; wheat; pepper; genuine appearance of Middle and Far Eastern ceramics (both luxury and container wares)
VI	Structure; Contexts: 14 (Foundation cutting); 12 (Coral-stone wall); 15 (Foundation filling/Structural debris).	Coral wall, Major construction activities
VII	Occupational deposit with two pits and their fillings Contexts: 29, 62, 44/47, 60, 59, 58, 61, 45, 57, 55, 46.	Profusion of Middle and Far-Eastern wares and Indian ceramic
VIII	Inter-cutting pits and their fillings; Contexts: 26/27, 22, 51, 48, 11, 5, 28	Profusion of Middle and Far-Eastern wares
IX	Inter-cutting pits and their fillings; Contexts: 23, 35, 63, 30, 21, 25, 19, 20/03, 13,17,6	Profusion of Middle and Far-Eastern wares
X	Inter-cutting pits & their fillings; Contexts: 33, 43/24, 16, 4, 18, 34, 9, 10	Profusion of Middle and Far-Eastern wares

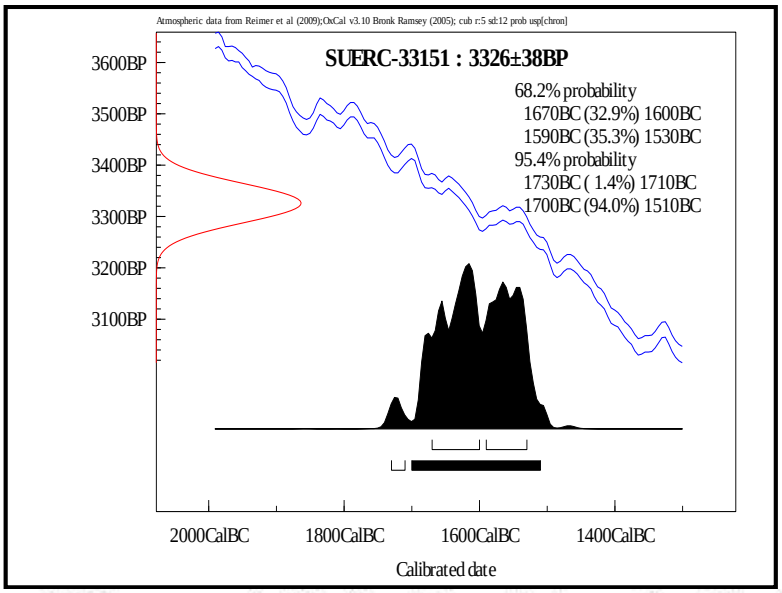


Figure 2.21: The sum graph of the Phase I, the earliest occupation at the site

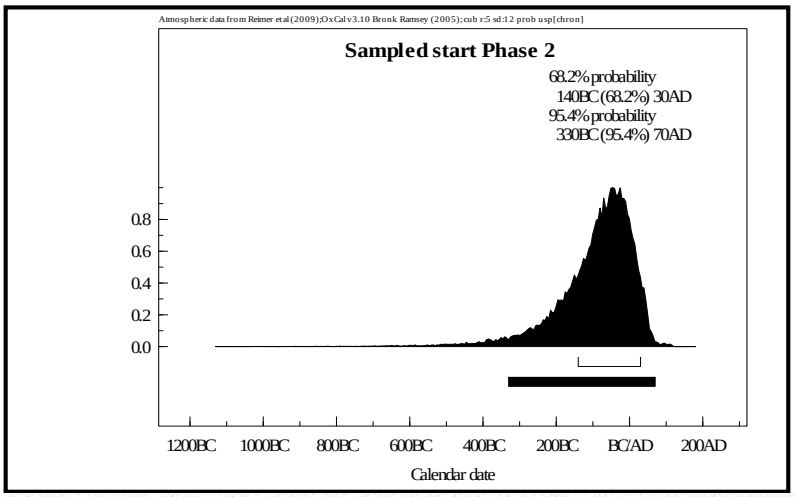


Figure 2.22: The sum graph of the Phase II, which with the continuous occupation begins at Mantai

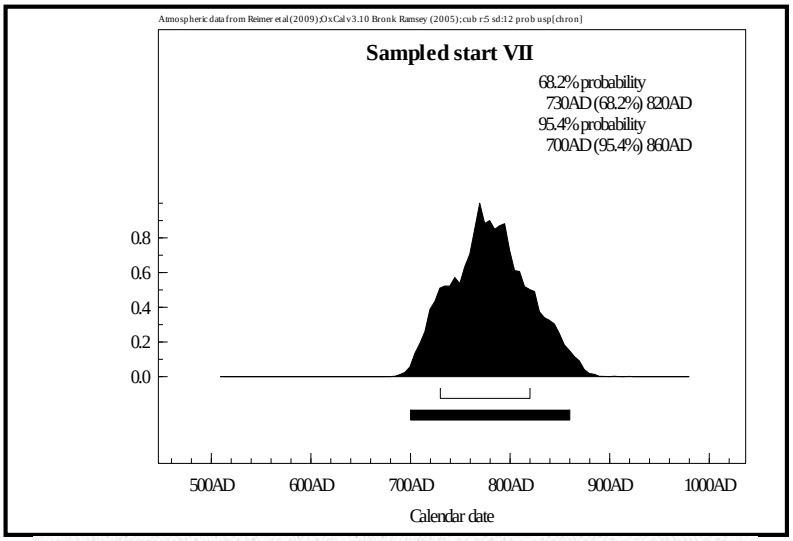


Figure 2.23: The sum graph of the Phase VI, which the coral wall

2.7 Material culture

The cultural materials recovered from our Mantai excavations were obtained from only a small portion of the total area of the site and its many likely activity areas. As such, interpretations of site-wide patterns based on the recovered assemblage must take these spatial biases into account. Nevertheless, it is assumed that the cultural material recovered are rich enough to provide insights into broader patterns. The excavated material was supplemented through surface sampling and by comparing my sample with that of the large assemblage of Carswell et al. (2013).

While ceramics and the majority of non-ceramic findings from Mantai are discussed in Chapters 3 and 4, architectural, numismatic and epigraphic evidence that are useful for dating are discussed below. Where necessary, my results are compared with those of the previous Mantai excavations. Nevertheless, a broader comparison of the Mantai assemblage with relevant findings from elsewhere in the country, particularly from our own excavations at Kantharodai and Kirinda, and from around the Indian Ocean take place in Chapters 5 and 6.

2.7.1 Architectural features

Part of a wall made of finely cut coral blocks was recovered in the excavation. The wall (context 12), along with its cut and fill (Contexts 14 and 15), was assigned to Phase VI in the stratigraphy, a period that is believed to coincide with a major construction phase at the port city. The wall (Figure 2.24) was oriented NE–SW and was encountered at the centre of the trench. Of this wall, eleven masonry courses of coral blocks laid in lime mortar are preserved. This wall can be dated to *ca.* the early/mid-8th century.



Figure 2.24: Mantai coral wall

While it is difficult to make clear stratigraphic correlations, this wall seems to be part of the building complex excavated by Hocart and Carswell's team. Graham (2013d:158–162) reports excavating three different sections of *in situ* coral walls; two in Trench A and one in Trench G (Unit 76). These walls were exposed and planned previously by Hocart (1926–27; see Figure 2.25). If the tentative correlation made here between the previously excavated structures, which they were unable to date, and our findings are correct, then this major construction period could be dated to *ca.* the early/mid-8th century. However, it is likely that there was more than a single period of construction at Mantai, as suggested by Graham (2013d:159)

2.7.2 Numismatic finds

A total of 18 coins, including two fragments, were recovered during our excavations at Mantai, and these correlate with cultural phases II, IV, VII and VIII (Table 2.3 and Plates 2.1&2.2).[24]

[24] Coins were conserved at the National Museum Conservation Department and studied with assistance of Senerath Wickramasinghe, Deputy Commissioner of the Museum. The author is very grateful to him.

These coins are highly corroded, which makes identification imprecise, though not impossible. With regards to the interpretation of coins, residuality is a serious issue. This is further complicated by the local imitations and counterfeits (See Horton and Middleton 2000).

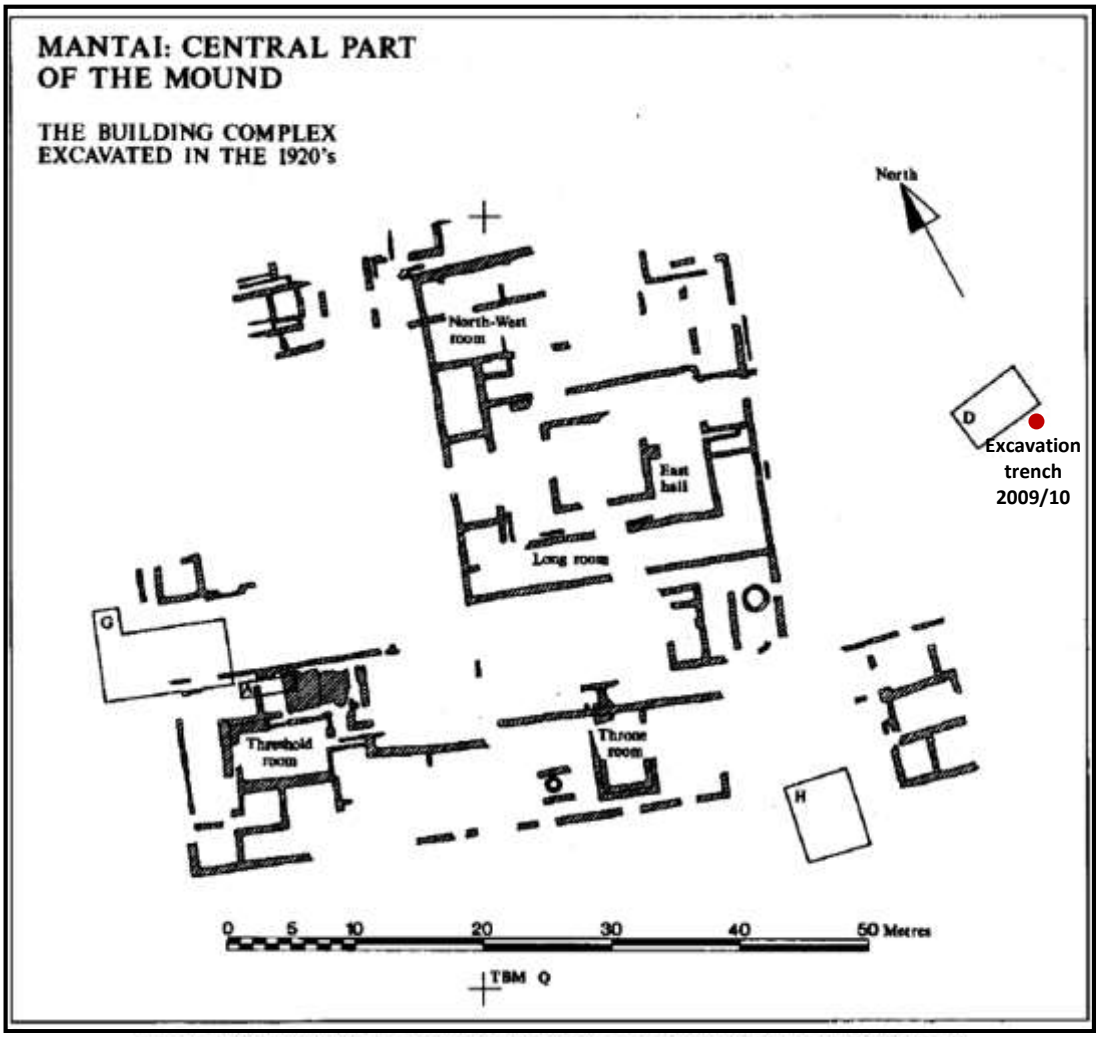


Figure 2.25: Part of the extensive structures excavated by Hocart (1926-27)
(reproduced in Carswell et al. 2013: 159; Figure 8.1 with the present excavation trench marked by author)

Phase II contained a single Lakshmi Plaque coin, generally dated to a period between the 1st century BC and 3rd century AD in Sri Lanka (Codrington 1924:16; Walburg 2008–31). Our Lakshmi Plaque is assigned more precisely to a period between the 1st century BC and 1st century AD (Wickramasighe pers.comm.2012), which fits with the radiocarbon dates from this phase. Phase IV revealed two unidentified coins, six Lakshmi Plaques and a Late Roman coin.

Since the Lakshmi Plaques and Late Roman coins are highly corroded, they can only be assigned to their general time ranges; 1st century BC –3rd century AD and the 4th –the 6th century AD, respectively. Thus, while Late Roman coins support the radiocarbon dates the Lakshmi Plaques seem to be residual in this phase.

A *Sangam* Age coin along with three Late Roman coins and an unidentified coin were recovered from Phase VII. The *Sangam* Age refers to a period of South Indian history, generally dated between 300 BC and AD 300 (Krishnamurthy and Wickramasinghe 2005), although coins from this period found in Sri Lanka usually date between the 2nd century BC and 4th century AD. Hence these coins are residual from early phases. In addition to the finds from Phase VII, a single Late Roman coin was also recovered from Phase VIII, in a residual context. While these coins provide insights into economic and trade connections, they cannot be reliably used for chronological purposes at Mantai. The only exceptions are those from Phases II, which are stratigraphically undisturbed and the date ranges of the coins roughly match with those of the radiocarbon dates.

Nevertheless, these coins are important for understanding cultural and economic connections of early phases. For example, the discovery of a *Sangam* Age coin is significant as interactions between Sri Lanka and South India increased considerably during this time (Pillay 1975; Krishnamurthy and Wickramsinghe 2005). In fact, Muranjiyur Mudinagar, one of the poets in the first *Sangam* Age is considered to have been a king from northern Sri Lanka (Pillay 1975:37). The *Sangam* literature also sheds light on the trade connections between Sri Lanka and South India. Pattinappalai, a *Sangam* Age text, mentions the import of Sri Lankan food stuff to *Kaveripattanam* in eastern India (Swaminatha Iyer 1918:24). *Kaveripattanam* is one of

the ports frequently mentioned in the Sri Lankan chronicles (Gunawardana 2003:17–18). South Indian inscriptions cite Sittapatti, as a centre of Sri Lankan traders (Rao 1938:367–368). Active participation of South Indian trade guilds in Sri Lanka is well known (Indrapala 1970; 2003; Chapter 7) and they might be responsible for the circulation of *Sangam* Age coins, mostly of Pandyan type, recovered from Sri Lankan sites such as Jaffna, Kantharodai, Vallipuram, Mantai, and Anuradhapura (Krishnamurthy and Wickramasinghe 2005:13–14; Pieris 1917:11–29). It is also interesting that the Lakshmi Plaques, a Sri Lankan coin type, have been found in Karur, near Amaravati, India (Krishnamurthy 1991:59–61), indicating trade links between the two countries. Karur was the capital of Cheras during the *Sangam* Age. Lakshmi Plaques (Figure 2.26) are the largest collection from our excavations at Mantai.

Most of these Roman coins referred to above seem to be imitations and they were in circulation much later than their actual manufacture (Walburg 1998; Boperarchchi 1997, 2001, 2004, 2006). Late Roman coins are found in abundance from all over Sri Lanka, particularly from the southern and Southeastern coastal regions, and their significance is widely discussed (e.g., Bopearachchi 1997:IX–XXI; Prickett-Fernando 2003a&b;).

Thus, the coins found at Mantai, though less useful for chronological purposes, provide additional evidence for the trading connection between Sri Lanka, South India and perhaps with the Roman world. The lack of Roman coins has been considered as the main source of evidence to reject the emporium status assigned to Mantai (Walburg 2008:31–39); however, the wealth of evidence discussed in the following chapters amply refutes this claim. Furthermore, Carswell et al. (2013) reports 140 coins including several as Roman/Indo-Roman imitation coins.

Plate 2.1

Coins recovered from Mantai	
 Phase III, Context 52, Laxmi Plaque	 Phase IV, Context 50, Laxmi Plaque
 Phase IV, Context 50, Laxmi Plaque	 Phase IV, Context 50, Laxmi Plaque
 Phase IV, Context 50, Laxmi Plaque	 Phase IV, Context 50, Laxmi Plaque
 Phase IV, Context 50, Laxmi Plaque	 Phase IV, Context 49, Laxmi Plaque

Plate 2.2

Coins recovered from Mantai—Cont.	
 Phase IV, Context 49, Late Roman	 Phase IV, Context 49, Unidentified
 Phase VII, Context 47, Late Roman	 Phase VII, Context 47, Unidentified
 Phase VII, Context 47, Unidentified	 Phase VII, Context 44, Late Roman
 Phase VII, Context 59, Sangam Age	 Phase VII, Context 59, Late Roman
 Phase VII, Context 59, Unidentified	 Phase VIII, Context 26, Late Roman



Figure 2.26: Coins discovered from Mantai during our excavation

2.7.3 Epigraphic record

During the surface survey conducted at Mantai in 2013, a fragmentary pillar inscription (Figure 2.27) was recorded on the Mantai Buddhist temple premises (Figure 2.15). Based on the iconography of the Buddha and *Bodhisatva* (Future *Buddha)* statues and the ancient image house, which is represented by stone pillar bases, this temple can be dated to the Early/Middle Historic Period. The pillar inscription is 80cm long and 22cm wide and is inscribed on three of the pillar's sides. Part of the inscribed area is broken and some sections are worn out and impossible to read.

Based on palaeographic and historical evidence contained in the inscription itself, it is datable to the period immediately following the reign of King Nissankamalla (1187–1196). According to the inscription, the self-proclaimed victory pillar was erected by General Abhimana Jaya Atishukra Senadhinatha to mark the building of a tank and a pond to alleviate the hunger of the '*Kurumban*' people who entered the port of Mantai. According to this inscription, the *Abhimana Jayawewa* (*Abhimana* victory tank), which stores water brought by long a distance

canal from *Kalawewa*, was built to the south of the victory pillar. Abhimana Jaya Atishukra Senadhinatha, mentioned in this inscription, can be identified with General Ayashmantha of *Mahavamsa* (*Mv.*80:33). He is also mentioned in the Minipe pillar inscription of Queen Kalyanawatie (Paranavitana and Godakumbura 1963:157). Ayashmantha was a powerful General during the post-Nissankamalla era, who coroneted Queen Kalyanawati, one of the consorts of the deceased king. The persons called '*Kurumban*' referred to in this inscription cannot be identified beyond doubt; they could be migrants related to Kurumba people in India (Hettiarachchi pers.comm.2013). The Kurumbas are agro-pastorals who are widely dispersed in India and particularly in the south (Selvakumar pers.comm.2014). Their relationship to continuing megalithic tradition and hunter-gatherers is under discussion (Kaap 1985, 1989; Poyil 2013). The connection between Indian *Kurumbas* and the *Kurumbans* in this inscription is not clear. But a group of people called '*Kurumbans*' were present at Mantai and, owing to a drought, were distressed from lack of food.

The construction of a tank possibly intended for the purposes of agriculture and providing drinking water seems to indicate the scarcity of water in the vicinity of Mantai, and perhaps a famine, at this time. It is interesting to note that the *Mahavamsa* (*Mv.*80:40) also mentions a famine during the time of General Ayashmanta, who is credited with remedying the situation. It is difficult to identify the exact location of the *Abhimana Jayawewa*, but there are a few candidates for the Kalawewa ('*Kala Vevin di'*) mentioned in the inscription. The best known 'Kalawewa' is one of the largest reservoirs built by Dhatusena (473–491), situated about 150km southeast of Mantai and is therefore an unlikely candidate (*Mv.*35:94–100). It more likely refers to the Kohala tank built by Vasabha (67–111) near *Mahatitthapatthana* mentioned in the *Vamsatthappakasini* (*Vp.*II:653). The other candidate is the much larger

historically-known giant tank or *Yoda wewa* (*Manamatta vapi*), built by Dhatusena (459–477), which is situated only 10.5km inland from Mantai (*Mv.*35:94–100). Wherever the tank was located, this inscription provides information about the port city and foreign nationals/traders residing at Mantai that would otherwise have remained unknown from any other source.



Figure 2.27: Mantai pillar inscription

2.8 Demise of Mantai

The abandonment of Mantai as an international trade centre is the key issue to consider. The claim that Mantai lost its trade significance after the 7th century due to the rise of Sri Vijaya and the opening of a direct sea route from the Persian Gulf to Canton (Kiribamune 1991) is certainly not accurate. The largest quantity of imported ceramics found at Mantai dates from the 7th to 10th centuries and this is the most prosperous period at Mantai. Similarly, the Chola attack in 993 and the shift of its capital to Polonnaruwa as the final fatal blow to Mantai is also not entirely accurate as other historical sources indicate the continuity of Mantai up to the 14th/15th century. The quantity of Middle Eastern and Far-Eastern ceramics that post-date the

11th century, however, are very limited at Mantai. This may indicate a reduced trade with these regions after the 10th century. Tampoe (1989) argued that the collapse of the Abbasid Empire and the decline of Siraf directly relate to the collapse of interaction between Sri Lanka and Middle Eastern regions. A combination of factors within and outside Sri Lanka are likely to have affected the decline of Mantai as an international trade centre. Consequently, the intensity, partners, and patterns of trade at Mantai seem to change in the 11th century, although the port city continued to function at least up to the 13th/15th century.

2.9 Kantharodai and Kirinda

Kantharodai and Kirinda are the other two sites studied for this thesis. While they are discussed in full detail in the Catalogues 2.5, 2.6, 7.1 and 7.2, both sites are introduced in brief here. The material culture recovered from these sites are incorporated in the discussions in Chapters 5 and 6.

2.9.1 Kantharodai (KTD): Introduction

Kantharodai is located approximately 6 miles from the coast at Uduvil village in Jaffna, Sri Lanka. It was linked with *Jambukolapatthana*, the second most historically significant sea port, which is often mentioned in chronicles as an entry-exit point since the 3rd century BC (*Mv*.19;23-43; Figure 2.29). Kantharodai was an urban cum religious centre contemporaneous with the capital Anuradhapura, Mantai, and Tissamaharama (Deraniyagala 2004; Figure 2.28). The both Kantharodai and *Jambukolapattha*na were connected to Anuradhapura though the northern highway (cf. Vidanapatirana 2012; Nicholas 1961) and with Mantai. Due to its direct maritime links to Tamralipti in Eastern India and the Gangetic Valley, to South-East Asia across

the Bay of Bengal as well as Southern India, it played an important role in the earliest cultural evolution in the island.



Figure 2.28: Remains of the Buddhist *stupas* at Kantharodai

2.9.1.1 Environmental setting

Kantharodai and *Jambukaolapattana*, are located in the Sri Lanka's northern arid lowlands (below 900 MSL, referred to as ecozone-F by Deraniyagala (2004:2, Map 1; Figure 2.9). Although, the annual rainfall in this region averages around 1000mm, the area experiences prolonged droughts (Ibid). This region is characterised by a flat landscape with sub-surface limestone belt (Deraniyagala 2004:487 also Cooray 1967:263). The vegetation cover is almost like that described in section 2.2 for Mantai, the only notable difference is the absence of Biobab trees present in the Mannar region.



Figure 2.29: Probable location of historical *Jambukolapatthana*

2.9.1.2 Archaeological excavation

The most recent excavations at Kantharodai were carried out by Nimal Perera (2013:63-65) in 2011. Two trenches (KTD1 and KTD2; Figures 2.30&2.31), each measuring 3 m^2, were dug approximately 100 m apart from each other (Figure 2.32). KTD1 was excavated to a depth of 5.80m from the surface and ten phases were identified by the excavator. KTD2 was excavated to a depth of 6.00m from the surface and eight phases identified (Figure 2.33; Perera 2013: 63–64; Catalogue 7.1.1.3 - Bohingamuwa in Prep.). Table 2.5 summarizes the stratigraphic phases identified during the 2011 excavation and the radiocarbon dates of Perera (2013: 63-65) and Fuller.



Figure 2.30: Kantharodai Trench 1 (KTD1), 2011 excavation



Figure 2.31: Kantharodai Trench 2 (KTD2), 2011 excavation



Figure 2.32: Kantharodai site plan (courtesy Department of Archaeology, Sri Lanka)



Figure 2.33: Excavated KTD 2 trench

2.9.1.3 Radiocarbon dates and cultural sequence

Thirteen radiocarbon dates were obtained for these two trenches; 10 by Perera (2013:63-65) and a further 3 by Fuller (2015 pers. comm). Based on his dates, Fuller (Ibid.) dated the Kantharodai sequence to ca. 290 BC and the latest to 70 - 50 BC. This is, however, solely based on three dates from KTD2, where the lowest occupation levels were not dated (Catalogue 7.1.1.4).[25] Perera's (2013:63-65) dates from both trenches suggest a chronological period from ca. 400 to 200/ 170 BC. However, he did not date the upper levels in both trenches. Therefore, these two sets of dates as well as artefactual assemblage were considered when dating of the overall excavated sequence at Kantharodai.

I analysed the archaeological material from the two trenches separately (Catalogue Table 2.5.2; Table 2.5—Section 4). The results of the analyses of radiocarbon dates and the similarity of the material culture indicate that both trenches represent almost the same cultural phases. Consequently, the two stratigraphic sequences were combined in to a continuous site

[25] I thank Prof. Dorian Fuller for paying for the dates through his NERC grant and providing me the modelled dates.

sequence. Similarly, the archaeological finds can also be considered as a single assemblage. Therefore, the present discussion (Chapters 5 & 6) is based on the combined site sequence and the amalgamated material culture.

These analyses seem to indicate that the Kantharodai cultural sequence commences at ca. 500 BC and while the upper levels are highly disturbed, it may extend up to early/ mid-1st century BC. The combined cultural phasing for Kantharodai suggested by the present author is given in Table 2.5 and it corresponds with those of Deraniyagala (2004:730). Since none of the previous excavators of Kantharodai have published full reports of their work, the combined site phasing that I propose is a necessary first step to provide a chronological outline for the site. This formed a framework to help with the subsequent analysis and interpretation of the rest of the material culture from the excavations.



Figure 2.34: Floatation sampling at Kantharodai

Table 2.5: Kantharodai 2011 excavation - Phasing and Dates (Comparison with Deraniyagala 2004 Phasing)			
KTD combined sites phases			Deraniyagala (2004)
Phase	Time	Cultural period	
VII (Disturbed)	Disturbed Early 1st C. BC to Mid-1st C. BC?	Mid-early Historic	Period IV ca. 100 - 0 BC
VI		Mid-early Historic	
V	Late 3rd to mid-2nd C. BC	Mid-early Historic	
IV	Mid-4th C. to late 3rd C. BC	Lower Early Historic	Period III ca. 400-250 BC - Lower Early Historic
			Period II ca. 400 BC - Lower Early Historic
III	Ca. 5th C. BC[27]	Lower Early Historic	Period I ca. 500 - 400 BC - Lower Early Historic
II	Sterile		
I	Miocene limestone bed rock		

2.9.2 Kirinda (KR3): Introduction

Kirinda (N 06°12'50", E 81°20'16) is a small port situated 10km South-east of Tissamaharama (ancient Magama) in Hambantota, Sri Lanka. Magama was the capital of the ancient Ruhuna Kingdom, which was established by King Mahanaga (ca. 250) in the 3rd century BC. He was the brother of Devanampiyatissa (250-210 BC), King of Anuradhapura. Excavations have revealed a long cultural sequence stretching from the 4th century BC to the 9th/10th centuries AD at Tissamaharama (Weisshaar et al. 2001). The discovery of a wealth of imported material such as Roman coins, Rouletted, Red polished, Torpedo ceramics and glass beads demonstrates the site's early connections with the Indian Ocean world (Weisshaar et al. 2001; Somadeva 2006: 105, 143).



Figure 2.35: Location of the historical Kirinda temple

2.9.2.1 Environmental setting

Kirinda is located on the South-eastern coast and in the Eco-zone F in Deraniyagala's classification (Deraniyagala 2004:487). The main features of the Southern and South-eastern arid lowlands of the Eco-zone F are the lagoons, marshes and sand dunes. It also contains spots of fresh water, required for human habitation (Ibid). Although the annual rainfall averages around 1000mm in this area, it drops to around 100mm during prolong dry periods

(Wickramatilleke 1963: 31). The Reddish-Brown earth (RBE), which is suitable for rice cultivation, is the main soil type in the area (Somadeva 2006:76) and it contains a dry evergreen forest cover, and 'tropical thorn forest type vegetation' (Bharathie 1988 cited in Somadeva 2006:77).



Figure 2.36: Arial view of Kirinda fisheries harbour (courtesy: Prof Mark Horton)

2.9.2.2 Archaeological excavation

The present Kirinda excavation site is located adjacent the modern fisheries harbour (Figures 2.36&37). The legendary Vihara Mahadevi landed there in the ca. 2nd century BC (*Mv*.22;23). The port is located immediately west of the Kirinda *Vihara* (Figure 2.35), which has inscriptions datable from the 2nd to the 10th century. Somadeva's (2006: 172), the former excavator at Kirinda, dated the earliest occupation levels from 260 BC to 30 BC.

Our Archaeological excavation at Kirinda was undertaken as part of Southern Sri Lanka's Maritime Connections Project, a sub-project of Oxford University's SEALINKS Project in 2013.

Two trenches were dug under the direction of Prof Mark Horton (KR2-Figure 2.40) and Dr James Blinkhorn (KR3; Catalogue 7.2.3). I analysed the archaeological material remains. The present study, however, considered only the Trench KR3 material.



Figure 2.37: Kirinda site map (Courtesy: Southern Sri Lankan Ports Project)

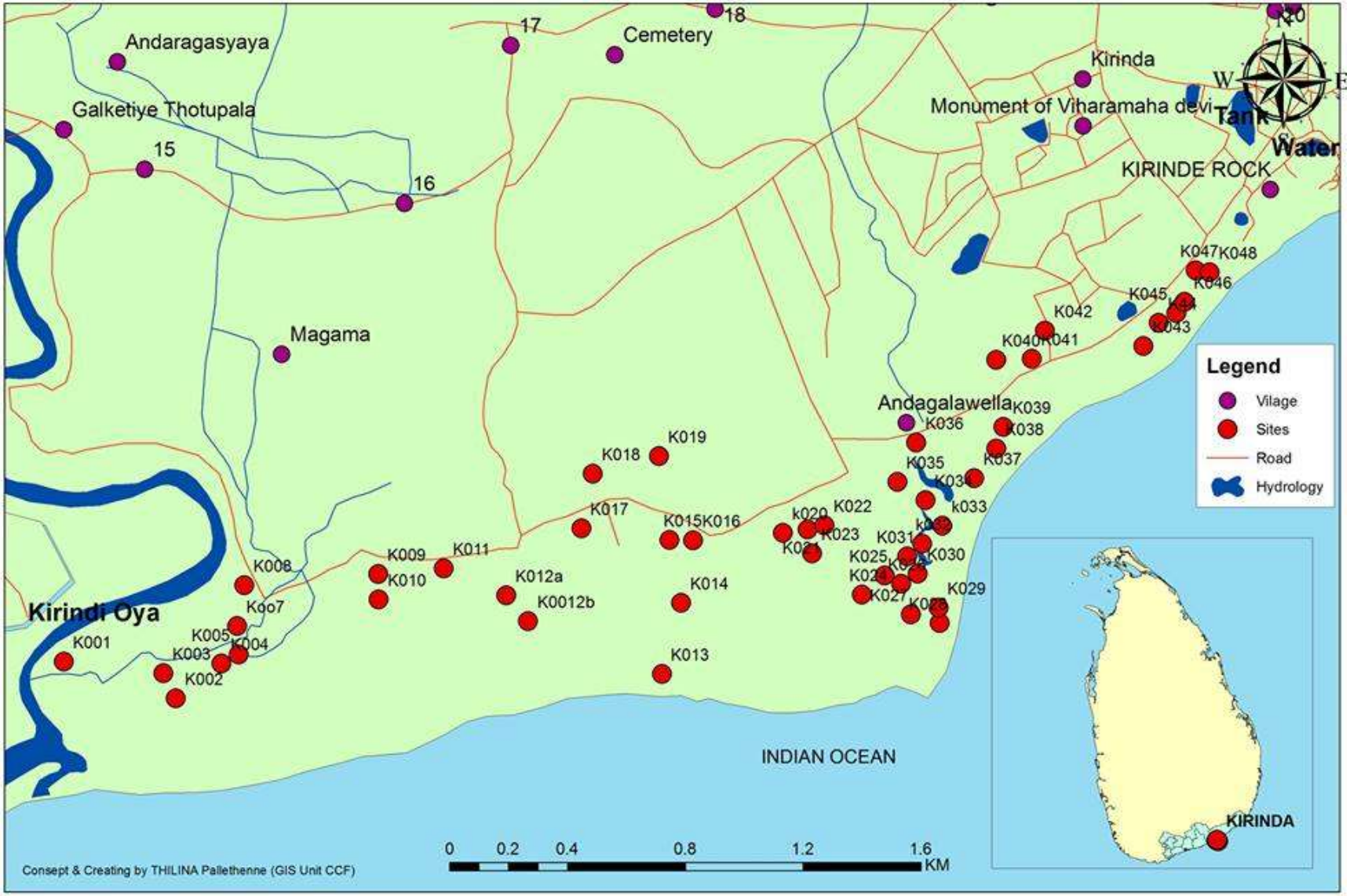


Figure 2.38: Kirinda survey map (Courtesy: Southern Sri Lankan Ports Project)



Figure 2.39: Trench KR3, 2013 excavation (Courtesy: Southern Sri Lanka Ports Project)



Figure 2.40: Trench KR2, 2013 excavation (Courtesy: Southern Sri Lanka Ports Project)

2.9.2.3 Kirinda sedimentological phasing

In trench 3 (KR3) at Kirinda, the excavator Blinkhorn (Catalogue 7.2.3) identified 89 contexts/ cuts and fills belonging to 12 horizons, which were divided into three distinct sedimentological phases, entirely based on the stratigraphy. Based on these phases, he suggests three distinct phases of human activity in the excavated area. The Phase 3, the most reliable and the earliest of the three, is comprised of two discrete post-hole activity representing two construction/occupation periods. The Phase II is considered to contain a deposit imported from outside and the potential structural evidence during this period is limited. The Phase 1,

the latest, is comprised of a series of dumping periods and grey colour sediments. The nature of the two distinct dumping episodes likely suggests different activity areas in the proximity of the excavated area.

2.9.2.4 Material analysis and sub-division of Phase 3

Based on the analysis of the artefacts, particularly ceramic, I split Phase 3, the earliest of the above phases, into three sub-phases. To differentiate my cultural phases from those of the excavator's stratigraphic phases, I use Roman numbers for my proposed cultural phasing, starting from the bottom to the top of the sequence. Thus, Phases 3, 2 and 1 identified by the excavator become Phases I, II, and III respectively in my discussion (Table 2.6).

2.9.2.5 Dating and site chronology

Four C14 dates on seeds were obtained for KR3 from the Beta Analytic by Dorian Fuller. These dates were modelled using OxCal.[26] Table 2.6 gives the un-calibrated and modelled dates, suggested date range as well as the key associated ceramics. The overall sequence represented at KR3 seems to begin around the late 3rd/4th century and continues through to the early/mid-8th century and most probably into the 9th century. While all the radiocarbon dates have different start dates, their upper date limit seems to overlap around the mid-7th century.

[26] I thank Prof Fuller and Dr Michael (Oxford Radiocarbon Accelerator Unit at the Oxford University) for obtaining these dates and modelling them.

Table 2.6: Kirinda Trench 3- Radiocarbon dates

Phase	Context	Publication code	C14 dates BP	68% Probability	95% Probability	Phase description	Date range based on C14 (C. AD)	Suggested Date range considering both C14 dates and key ceramics (C. AD)	Key Ceramics
III			Undated			Grey Sequence/ mainly dump deposits	Early 8th	Early/mid-8th to 9th century.	Highest number of 'Imp.Unk' and ME (EGG, PREGG, BEGG, TORP), No Chinese, REPO, OW, GRAPH
II	31	BETA-378857	1430 +/- 30BP	596- 641 AD	565- 650 AD	Yellow sequence/ Deposits imported from outside	Mid/Late 6th- Mid 7th	Early/mid-8th century (since the material in this phase is imported/not in situ, dated material could be derived mixed Deposits	Further increase of ME (PREGG, BEGG, TORP) SEA & 'Imp.Unk', MCW, DUSUN, OW, REPO, GRAPH
	35	BETA-376484	1490 +/- 30 BP	585- 636 AD	555- 645 AD				
IC						Basal/ Secure Sequence	Early 6th-Mid 7th	Mid/ late 7th to early 8th century (No C14 dates, based on appearance of DUSUN)	Appearance of SEA, ME (TORP) and Chinese (DUSUN), REPO, OW
IB	48	BETA-376485	1620 +/- 30 BP	414- 632 AD	392- 640 AD		Late 4th-Mid 7th	Late 4th-Mid 7th century.	Increase of 'Imp.Unk', REPO, GRAPH
IA	64	BETA-402885	1420 +/- 30 BP	390- 632 AD	298- 640 AD		Late 3rd - Mid 7th	Late 3rd - Mid 7th century.	91.2% are SL& 'Ind.SL' wares; Indian (REPO) and 'Imp.Unk' appears

2.10 Chapter summary

Of the three sites studied for this study, Mantai is the main site and the establishement of its historical and archaeological background is key to compare it with other two sites. The strategic location of Mantai in relation to Indian Ocean navigation during the pre-modern period made it an indispensable port in east–west trade. Its connection with the capital Anuradhapura, other settlements and resource areas guaranteed its position as the main sea port of Sri Lanka for nearly 1500 years. The intimate relationship between Mantai and Anuradhapura was so strong that it is postulated that one's fate would have had detrimental impact on the other (Kiribamune 2013:51). Mantai is the best port to study Sri Lanka's early external connections, though its chronology hitherto remained largely unresolved. I have been able to secure a reliable stratigraphy and scientific dates up to Phase VII. Phases II to VII (*ca.* 2nd century BC–late 9th century AD) are extremely important for Sri Lanka's external connections. While the stratigraphy above Phase VII is highly disturbed and post-dates the late 9th century, the end of the sequence dates to the 12th century. Imported ceramics found in the 'Disturbed' include those datable to the 13th/14th centuries, indicating the continuity of the site beyond the speculated demise date of Mantai after the Chola attack. Epigraphic and textual evidence strongly supports the continuity of the site and provide clear evidence for a well-planned and administered cosmopolitan city.

'*Modutti*'/Mantai was an important emporium during the time of Ptolemy (*Geographia* VII.4.9; Francis 2013b:56–56). By the 5th century AD, it was connected through maritime routes to various ports in India and Southeast Asia. Mantai was the greatest entrepôt of Indian Ocean trade during the time of Cosmas (XI.15–16). Ethiopians who came to Sri Lanka were

unable to buy Chinese silk due to the monopoly of Persians who were present in the island's ports (Procopius I.20.9–13); undoubtedly a reference to Mantai.

Although the *Mahavamsa* presents Mantai more prominently as a port used for military purposes, our historical analyses illustrate that it played a number of other roles such as in politics, diplomacy, religion, and international trade throughout its occupation. In the *Mahavamsa*, there are no direct references to military activities between AD 200 and 700 at Mantai. This is the period when Procopius and Cosmas mentions Mantai as one of the main entrepôts of the east–west trade of the Indian Ocean. The majority of the military related historical references to Mantai are found after AD 700. Arabic records, however, clearly indicate that even in the late tenth century Mantai was still flourishing as an international trade centre. Thus, the foreign records are explicit about Mantai's role as one of the most important entrepôts in the Indian Ocean.

Inscriptions attest to the presence of an international mercantile community, facilities necessary for an international trade, quarters for artisans of different industries. The architectural remains testify to the presence of such infrastructure. All of these clearly illustrate Mantai's far and wide external interactions and internal networks.

Of the three sites studied, Kantharodai has the earliest evidence for human occupation and urbanism, from ca. 5th centuray BC. It, however, declined before the beginning of the CE. Linked to Jambukolapatthana, it's main sea port, Kantharoadia was invariably connected to main settlements in the interior on the one hand and the external world on the other. The

material remains, however, indicates that its interactions were largely confined to India and the Bay of Bengal region.

In comparison to the other two sites, Kirinda was the latest to be occupied from ca. 3rd/ 4th century. It did not developed into an urban centre of any magnitude and remained a regional port with limited external interactions and small craft industries in the vicinity.

These three sites located on the northern, northwestern and southern coasts of Sri Lanka illustrate different scales of productions and external and interal interaction patterns. Chronologically they overlap with each other providing excellent opportunity for comparative studies, which will be examined in the following chapters.

CHAPTER 3

THE MANTAI CERAMIC ASSEMBLAGE

3.1 Introduction

Ceramics are by far the most numerous finds from the archaeological investigations at Mantai and provide the best material evidence for its external interactions. Alongside local wares, imported ceramics come from South Asia, the Middle East and Far-East. As the focus of this thesis is Sri Lanka's external interactions, the primary emphasis of the analysis is to identify the origins of the ceramics. The aim of this chapter is to place the Mantai ceramic assemblage in its stratigraphic and chronological context as well as provide clear statistical data[27] and suggest their likely provenance in order to make inferences about Mantai's role in maritime trade. The lack of such data is one of the biggest obstacles for understanding trade and interaction across South Asia (cf. Kennet 2004:94; Saunders 2013:13).

The ceramic assemblage from Mantai includes both stratified and un-stratified material recovered by excavation (Excavated Ceramic Assemblage—ECA) and surface survey (Surface Ceramic Assemblage—SCA/'Surface'). The ECA indicates that the Middle Eastern (ME) assemblage was more diverse and larger in quantitative terms than that from the Far-East. This perhaps indicates greater interactions with the Middle East, which contrasts with historical evidence (Chapters 2&7). Considering the limited sample size from excavations, the possibility of sample bias could not be ruled out. At this time Carswell et al. 2013 was unpublished and there was little other published material on Mantai, consequently the sample size was increased by undertaking a surface survey. The target was to sample only imported

[27] However, due to word limit only selected tables giving statistics are included in the text. All other tables are given in catalogues.

wares to supplement the ECA. Nevertheless, the exclusion of local (Sri Lankan), 'Unknown' and 'Indian/Sri Lankan' origin groups (defined in 3.3.2) from the survey created a sample bias in the SCA. Therefore, they are catalogued as 'Surface' separately and referred to as SCA to differentiate from the ECA. The Mantai Total Ceramic Assemblage (TCA)[28] comprises 12,171 sherds representing 142 wares (Table 3.1).

Table: 3.1 Mantai ceramic sample size

Ware	Sherd Count	Ware Count
ECA	11418	123
SCA	753	50
TCA	12171	142

My results are compared with previous Mantai excavations, particularly Carswell et al. (2013), which indicate the range of imported ceramics but do not provide clear quantitative and stratigraphic details. Although less comprehensive, Prickett-Fernando (1990, 1994, 2003a&b) and Carswell and Prickett (1984) provide useful data on the imported ceramic assemblage at Mantai. The integrity of these datasets for drawing comparisons with our data is therefore considered alongside the reporting of our results. Our findings are also compared with those found at Gedige/citadel (Deraniyagala 1972, 2004) and Salgahawatta2 (ASW2) (Coningham 2006) in Anuradhapura, Tissamaharama (Schenk 2001:59-195) and Kantharodai (Begley 1967). While limited regional and inter-site comparisons are attempted in this chapter, these are dealt with in detail in Chapter 5.

The material analysed in this study covers the period from *ca.* late 2nd century BC to the 12th/13th centuries AD. The assemblage comprises of wares originating from South Asia, the Middle East and the Far-East (geographical regions defined in Catalogue 3.1). Dealing with

[28] The amalgamated total of ECA and SCA

such a diverse assemblage over a long chronological period is a daunting task, which is further complicated by the disturbances to the upper levels of the site.[29]

3.2 Methodology

The main aim of my ceramic analysis is to define ceramics by typology with regards to their wares,[30] rim types and vessel forms etc. and to provide clear stratigraphic and quantified data as well as date them by scientific means in order to make assessments about Sri Lanka's external interactions and its role in Indian Ocean trade.

In this study, Kennet's (2004) ceramic classification system, with slight modifications, was adopted. He catalogued ceramics using a multivariate system where a number of variables for each sherd – fabric, rim type, decoration, form and manufacture – were recorded and described (Ibid.:114). Due to the consistent similarities in respect of their fabric, decoration, and form the majority of the ceramics was grouped as classes. My study also benefits from and builds upon the pioneering work of Horton (1996) as well as Priestman (2005) and Saunders (2013) who made certain modifications to Kennet's classification. For general guidelines in various aspects of ceramic classification, works such as Orton et al. (1993), Young (1980), and Rice (1996, 1987) were followed. Similarly, for regional studies, the works of

[29] While excavated ceramics were stored at the state Department of Archaeology artefacts store at Anuradhapura, Sri Lanka, some ceramic bags had been damaged and re-bagged by the Department staff. By the time I collected the ceramics for the analysis, a few more bags had become damaged and they were excluded from the analysis. It is clear, however, that there are several sherds from the undisturbed phases, sealed by the in situ coral wall, mostly of Middle Eastern and Far -Eastern origin that seem to be intrusive or mixed. Graham (2013:185) also reports occurrence of Middle Eastern and Far-Eastern sherds, which he did not consider as intrusive, in the contexts datable to the 5th or early 6th centuries, which may be considered too early to be at Mantai.

[30] The term 'ware' used in this study is more or less synonymous and interchangeable with 'class' in Kennet's (2004:33) ceramic classification, where it is defined as "a group of pottery with consistently similar characteristics" (Defined in Ceramic conventions Catalogue3.3). The term 'ware' is preferred over 'class' because it is used in Sri Lanka and India and since the material studied are mostly from this region.

Schenk (2001, 2006, 2007), Tomber (2005, 2008), Miksic (2003), Gunasekera et al. (1971), Deraniyagala (1984), De Silva and Dissanayake (2008), Coningham (2006), Nanji (2011), Karashima (2004), Flecker (2001), Guy (2008), Glover (2002), Wheeler et al. (1946), and Begley (1983; 1996; 2004) were consulted.

The methodological basis of the present ceramic analysis is the total recovery, sampling and quantification of the entire ceramic assemblage. The main quantification criteria considered in this chapter is sherd and ware count. Detailed descriptions of ceramic recovery, sampling and analysis procedures is found in Catalogue 1.1.4.1.[31]

3.3 Mantai ceramic assemblage

This section establishes a chronological framework for the Mantai ceramic assemblage, based on the stratigraphy, datable ceramics, and the radiocarbon dates.

3.3.1 Wares across phases

A total of 12,171 sherds were recovered from the excavation and survey at Mantai, which were catalogued into 142 wares[32] across 11 phases, including the 'Disturbed' and the 'Surface' (Section 3.3.3). The Catalogues contain a full account of ware and rim indices (Catalogues 3.3&3.4), their descriptions (Catalogues 3.5&3.7), a photo log (Catalogue 3.6) and drawings (Catalogue 3.8). Such details, however, could not be furnished for material from the Mantai surface survey due to the time constrains

[31] See Catalogue 3.5 for Fabric details and C3.9.3 metric details such as weight.

[32] Term 'Ware' is defined in the Catalogue 3.2

The seriated Total Ceramic Assemblage (TCA), which shows the lifespan of wares, is set out in C3.9.2.[33] It records ware codes, their full names, and the number of sherds in each ware recovered from the different phases. The quantitative information is given both as raw numbers and as percentages against their respective phases. Similarly, the seriated sequence in relation to sherd weight is given in C3.9.3, although no further discussion on sherd weight takes place in this thesis. Phase I at Mantai was aceramic and is not included in ceramic discussions. As in any deep stratified sequence, residuality is a serious issue at Mantai. Some of the residual material was identified by careful examination of the ceramic sequence (see Kennet 2004:16; Catalogue 1.1).[34]

3.3.2 Ceramic ware origins

The identification of the origins of wares is based on published works[35], comparative studies of museum collections, and the analysis of my assemblage with colleagues and ceramic experts (Catalogue 1.1). The geographical origins of the wares discussed in this study, their suggested dates and a brief citation are given in C3.9.1.

Our ceramic assemblage, inclusive of Kantharodai and Kirinda (Catalogues 7.1-Kantharodai & 7.2-Kirinda3) are the products of seven different regions. There is a group whose origins can be identified with some certainty: Sri Lanka, India, the Middle East, China, Southeast Asia

[33] The reader is urged to refer to the Seriated Ceramic Sequence. All tables from C3.9.1 to C3.9.55, referred to in this chapter are found in Catalogue 3.9.

[34] Several Middle Eastern and Far -Eastern sherds, which look odd in the early phases were not excluded as they were recovered from the undisturbed layers and similar wares are reported in earlier reports as well (Graham 2013:185). They are retained in the sequence to alert future workers. These sherds, however, should be further examined.

[35] The main publications consulted in dating ceramics are Carswell and Prickett 1984; Prickett-Fernando 1994, 1990, 2003a&b; Premathilleke 1982, 2003; Schenk 2001, 2005, 2006, 2014; De Silva and Dissanayake 2008; Horton 1996, 2013; Coningham 1999, 2006; Kennet 2004; Karashima 2004; Preistman 2005; Guy 2008; Nanji 2011; Saunders 2013; Dharmawardene 2015.

(SEA), to which are added a group of earthenware produced locally or imported from India are collectively termed as 'India/Sri Lanka' ('Ind/SL') and a number of wares identified as imported but unable to assign to any particular region, termed 'Imported.Unknown' ('Imp.Unk'). Finally, there are wares whose origin cannot be determined, termed 'Unknown' ('Unk').

The 'Unk' wares are excluded from discussions of imported and local wares. Similarly, the 'Ind/SL' wares are excluded from imported wares. The identification of SEA wares is tentative due to the lack of understanding of these wares. Where necessary SEA and Chinese wares are collectively termed Far-Eastern (FE) wares and Indian, Sri Lankan and 'Ind/SL' ware groups are termed South Asian.

3.3.2.1 Ware origins across phases

The main focus of this study is the provenance/origins of ceramics. The changes in the ceramic assemblage over time demonstrate the developing patterns of external trade and interactions.

Tables 3.2 and 3.3 and Figures 3.1 and 3.2 below summarise the different ceramic origins of the Mantai Total Ceramic Assemblage (TCA). In them the number of sherds found in the 'disturbed phases' (VIII, IX, X, XI) are discussed separately. In all subsequent tables and discussions, however, they are grouped together as a single category and noted simply as 'Disturbed'. Tables 3.2 and 3.3 illustrate the amount of sherds and wares of different origin groups present in a given phase as well as the changes in the assemblage composition across phases within the site. Tables 3.2 and 3.3 are further sumarised in C3.9.4.

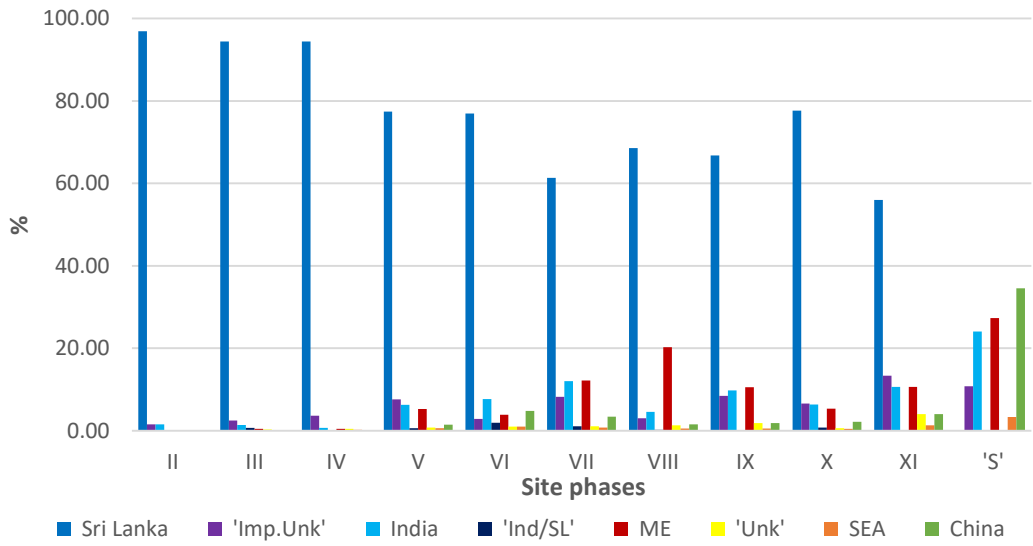


Figure 3.1: Origin-wise distribution of ceramic sherds across the site sequence - % from the TCA phase total; based on Table 3.2.

Table 3.2: Mantai TCA ware origins across phases (Sherd count & % from TCA phase total)

Origin	II	III	IV	V	VI	VII	VIII	IX	X	XI	'S'	Total
Sri Lanka	63	1287	2218	527	80	1589	814	499	1752	42	N/S*	8871
%	96.92	94.42	94.38	77.39	76.92	61.35	68.58	66.80	77.66	56.00		72.89
'Imp.Unk'	1	34	85	52	3	212	36	63	148	10	81	725
%	1.54	2.49	3.62	7.64	2.88	8.19	3.03	8.43	6.56	13.33	10.76	5.96
India	1	19	16	43	8	312	54	73	144	8	181	859
%	1.54	1.39	0.68	6.31	7.69	12.05	4.55	9.77	6.38	10.67	24.04	7.06
'Ind/SL'		9	2	4	2	27	3	1	18		N/S	66
%		0.66	0.09	0.59	1.92	1.04	0.25	0.13	0.80			0.54
ME		6	11	36	4	315	240	79	121	8	206	1026
%		0.44	0.47	5.29	3.85	12.16	20.22	10.58	5.36	10.67	27.36	8.43
'Unk'		4	11	5	1	28	16	14	13	3	N/S	95
%		0.29	0.47	0.73	0.96	1.08	1.35	1.87	0.58	4.00		0.78
SEA		2	6	4	1	19	6	4	11	1	25	79
%		0.15	0.26	0.59	0.96	0.73	0.51	0.54	0.49	1.33	3.32	0.65
China		2	1	10	5	88	18	14	49	3	260	450
%		0.15	0.04	1.47	4.81	3.40	1.52	1.87	2.17	4.00	34.53	3.70
Total	**65**	**1363**	**2350**	**681**	**104**	**2590**	**1187**	**747**	**2256**	**75**	**753**	**12171**
%	100	100	100	100	100	100	100	100	100	100	100	100

Table 3.3: Mantai TCA origins across phases (Ware count & % from phase total)											
Origin	II	III	IV	V	VI	VII	VIII	IX	X	XI	'S'
SL	3	5	8	6	5	10	6	4	10	4	N/S
%	60	17	19.05	10	25	9.8	8.7	6.2	11	20	
'Imp.Unk'	1	7	11	19	2	19	12	13	19	7	12
%	20	24	26.19	32	10	19	17	20	22	35	24
India	1	5	8	11	5	23	13	16	16	3	11
%	20	17	19.05	19	25	23	19	25	18	15	22
ME		5	7	12	3	24	19	17	22	3	17
%		17	16.67	20	15	24	28	26	25	15	34
'Unk'		3	3	3	1	4	4	4	3	1	N/S
%		10	7.14	5.1	5	3.9	5.8	6.2	3.4	5	
'Ind/SL'		2	2	3	1	3	3	1	2		N/S
%		6.9	4.76	5.1	5	2.9	4.4	1.5	2.3		
SEA		1	2	2	1	6	3	4	4	1	3
%		3.5	4.76	3.4	5	5.9	4.4	6.2	4.6	5	6
China		1	1	3	2	13	9	6	12	1	7
%		3.5	2.38	5.1	10	13	13	9.2	14	5	14
Total	5	29	42	59	20	102	69	65	88	20	50
%	100	100	100	100	100	100	100	100	100	100	100

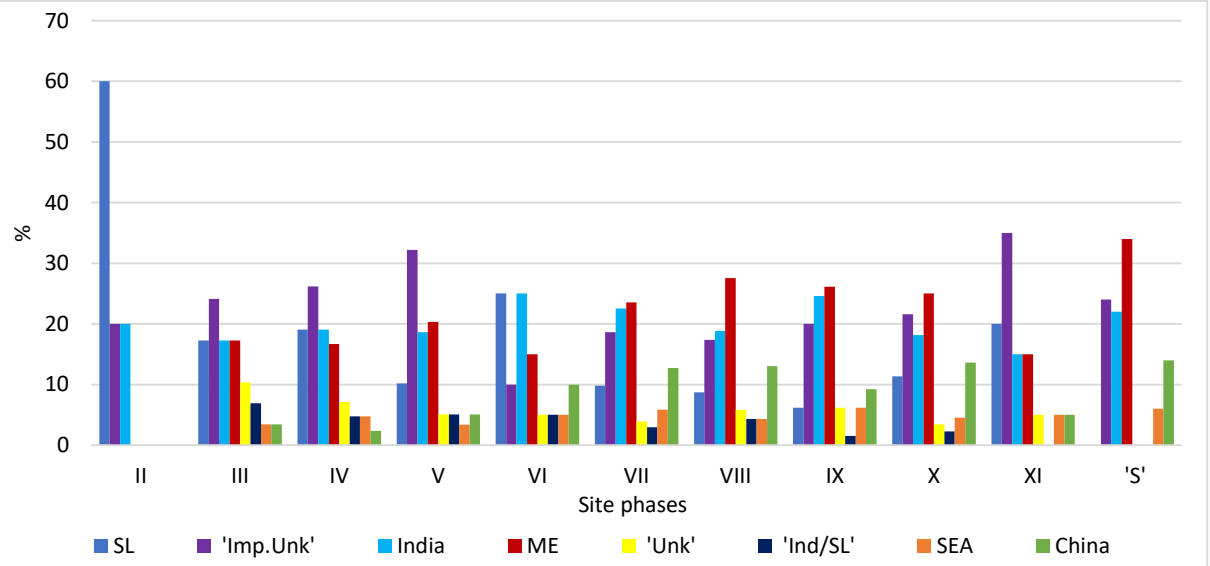


Figure 3.2: Original-wise distribution of ceramic wares across the site sequence - % from the TCA phase total; based on Table 3.3

3.3.3 The phase summary

This section provides a summary of the different ceramic phases at Mantai (based on Tables 3.2 and 3.3; Figures 3.1 and 3.2; C3.9.2) and serves as the basis for the subsequent discussion

of individual ware origin groups. The time ranges assigned to different phases were discussed in Chapter 2.6 and summarized in Table 3.4. In the text, the distribution of wares is discussed within their respective phases only. Section 3.3.14.1 assigns internal dates to selected wares from Mantai (Catalogue 3.10 provides these for the entire assemblage).

Table 3.4. Mantai phase dates	
Phase II	*Ca*. 2nd century BC to mid-1st century AD
Phase III	Late 1st to late 2nd/early 3rd century
Phase IV	Mid-3rd to early 7th century
Phase V	Early 7th to early/mid-8th century
Phase VI	Early/mid-8th century
Phase VII	Early/mid-8th to late 9th century
'Disturbed'	Postdate 8th/9th century- 12th/13th century

In our excavation five wares of local, Indian, and 'Imp.Unk' provenance appear in Phase II. Phases III and IV see a rapid increase in local wares and a slight increase in imported ceramics. In Phase III, the number of wares and sherd counts increased to 29 and 1363, respectively. Among the imports, those from unknown overseas locations are the most common, followed by Indian ceramics then Middle Eastern wares. A few Chinese and SEA wares are also present. In Phase IV, new imported wares, including those from SEA and China, emerge indicating the high demand they commanded on the island. The total number of ware (42) and sherd (2350) counts further increases during this phase. Phase V witnesses a slight decrease in sherd counts (681), although the ware (59) composition becomes more diverse. The increase in the number of foreign ware/sherd counts suggests a growing demand for imported wares. The sherd count is proportional to the volume of soil removed. The coral wall (Chapter 2.4.7), assigned as Phase VI, is not significant for the ceramic analysis. The assemblage reaches its peak (102 wares and 2590 sherds) during Phase VII in which 61.35% of the phase assemblage comprises of Sri Lankan sherds. Middle Eastern ceramics are the most common imports in terms of sherd count (315), closely followed by those from India (312), with Chinese wares accounting for only 88

sherds. However, the range of Indian wares is far greater (23) in comparison to those from Middle East (4). The number of Chinese wares is 13. After Phase VII, the site chronology cannot be established due to disturbances to the deposit. Nevertheless, the 'Disturbed' and the 'Surface' contain a large amount of local and imported ceramics, indicating the continued prosperity of Mantai. The latest wares from these upper disturbed levels can be dated to the 12th/13th centuries, which can be refined further though the radiocarbon dates to *ca*. AD 1100.

3.3.4 Local, Undefined and Imported wares

In the following sections, the ceramic assemblage is discussed in three parts; local, undefined and imported wares (C3.9.4; Figure 3.3). The undefined comprises 'Unk' and 'Ind/SL' wares (section 3.3.2).

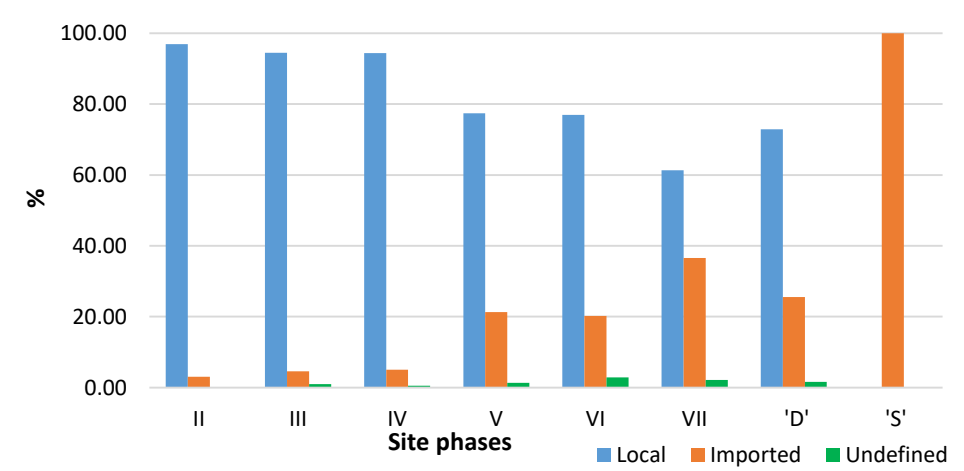


Figure 3.3: Propotions of Local, Undefined and Imported wares across the site sequence - % from the TCA phase total; based on C3.9.4.

Of the Mantai assemblage, 26% of the TCA are imported wares, whereas 73%[36] are of local origin. Of the local wares, RESL (4493) and PLRE (4087) have a high number of sherds (7 0.5%).

[36] Excluding 'Unk'

Figure 3.3 illustrates the occurrence of local, undefined and imported ware groups by phase. It suggests four distinct periods of imports: Phases II–IV: limited number/beginning of imports; Phases V–VI: a sudden increase; Phase VII, the peak; 'Disturbed': a slight decrease.[37] Figure 3.4 and Table 3.5 exhibit the occurrence of imported ware groups by phase. They indicate a gradual increase of imported wares—particularly from Phase VII upwards—and hence trade and exchange, over time.

Table 3.5: Imported wares across phases as a % from the ICA

Origin	II	III	IV	V	VI	VII	'Disturbed	'Surface'	Total
ICA	2	63	119	145	21	946	1090	753	3139
%	0.06	2.01	3.79	4.62	0.67	30.14	34.72	23.99	100

While all wares and rim/vessel forms are included in their catalogues, the following discussions are confined to selected significant wares. This has implications, as many wares with few sherds might reflect the diversity of interactions, while few wares with larger quantities of sherds could be interpreted as intense interaction. The quantity of sherds could also be affected by number of other factors such as the brokenness- the average number of sherds into which pots have broken; it is calculated by dividing the total number of sherds by the EVE/100 -(Orton et al. 1993:168–171, 178; Kennet 2004:93–94). The selection criteria was consequently not entirely based on the quantity of sherds, but also upon their historical significance.

[37] Since only the imported wares were sampled from the 'Surface' no such comparison is possible.

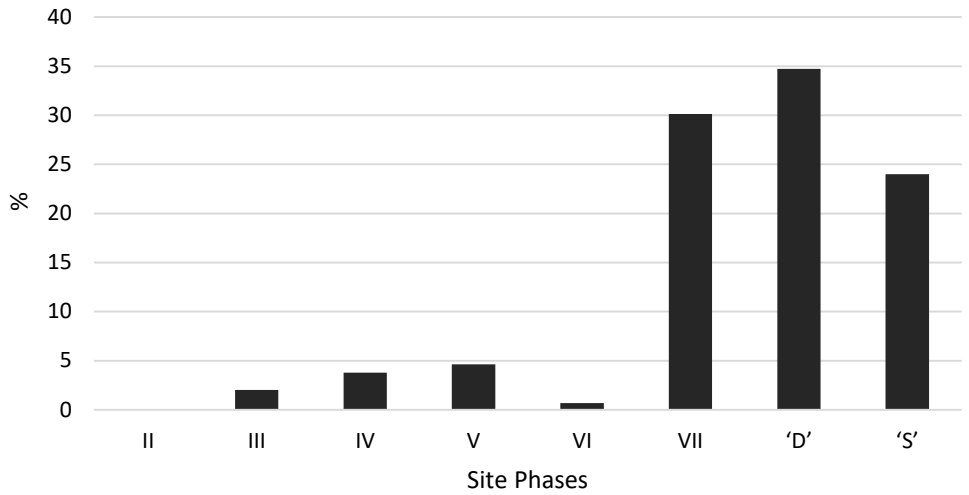


Figure 3.4: Imported wares across phases- % from the ICA, based on table 3.5

In dealing with individual origin groups, the composition of the entire assemblage is briefly considered first. The majority of the analysis, however, is based on the selected wares. While this chapter is mainly confined to presenting ceramic data, broader discussions on ceramics with regards to trade/exchange take place in Chapter 5. The exception to this is the discussion on ceramic decoration, which is used for dating and assigning origin to certain wares. The sites mentioned in this chapter are illustrated in Figure 3.5.

3.3.5 Local (Sri Lankan) assemblage

A total of 8,871 sherds representing 13 wares comprise the Sri Lankan assemblage, of which 5764 (65%) come from undisturbed contexts (Phases II to VII). The local assemblage is set out in C3.9.5a and summarized in Table 3.6. This discussion, however, is based on the selected wares (Figure 3.5; C3.9.5b).

Table 3.6: Local wares across phases

Origin	II	III	IV	V	VI	VII	'Disturbed'	Total
Wares	3	5	8	6	5	10	11	13
Sherds	63	1287	2218	527	80	1589	3107	8871

Although only 13 wares can be identified as Sri Lankan, some of the 'Ind/SL' are also probably locally produced. Of the Sri Lankan wares, RESL, PLRE, BRW, BRWO, TBRW and GRAPH are the most significant and will be introduced before discussing the distribution of the Sri Lankan wares across the different phases.

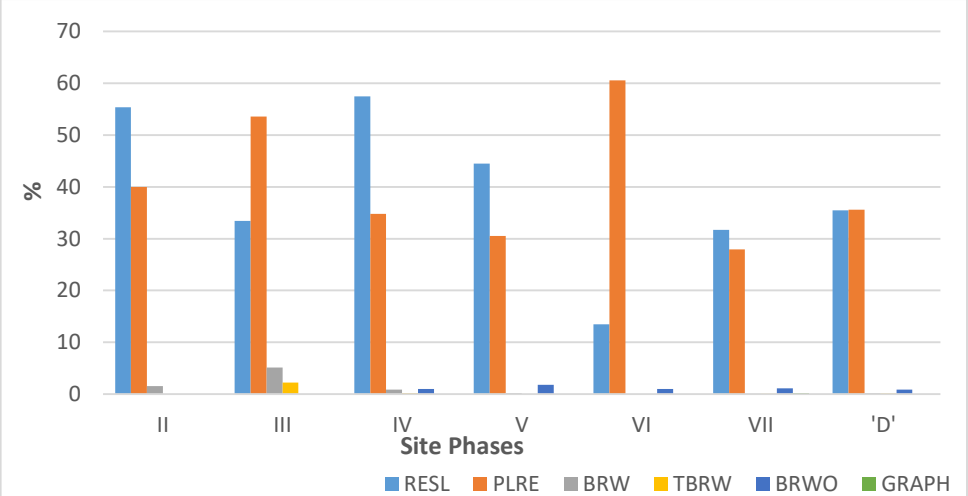
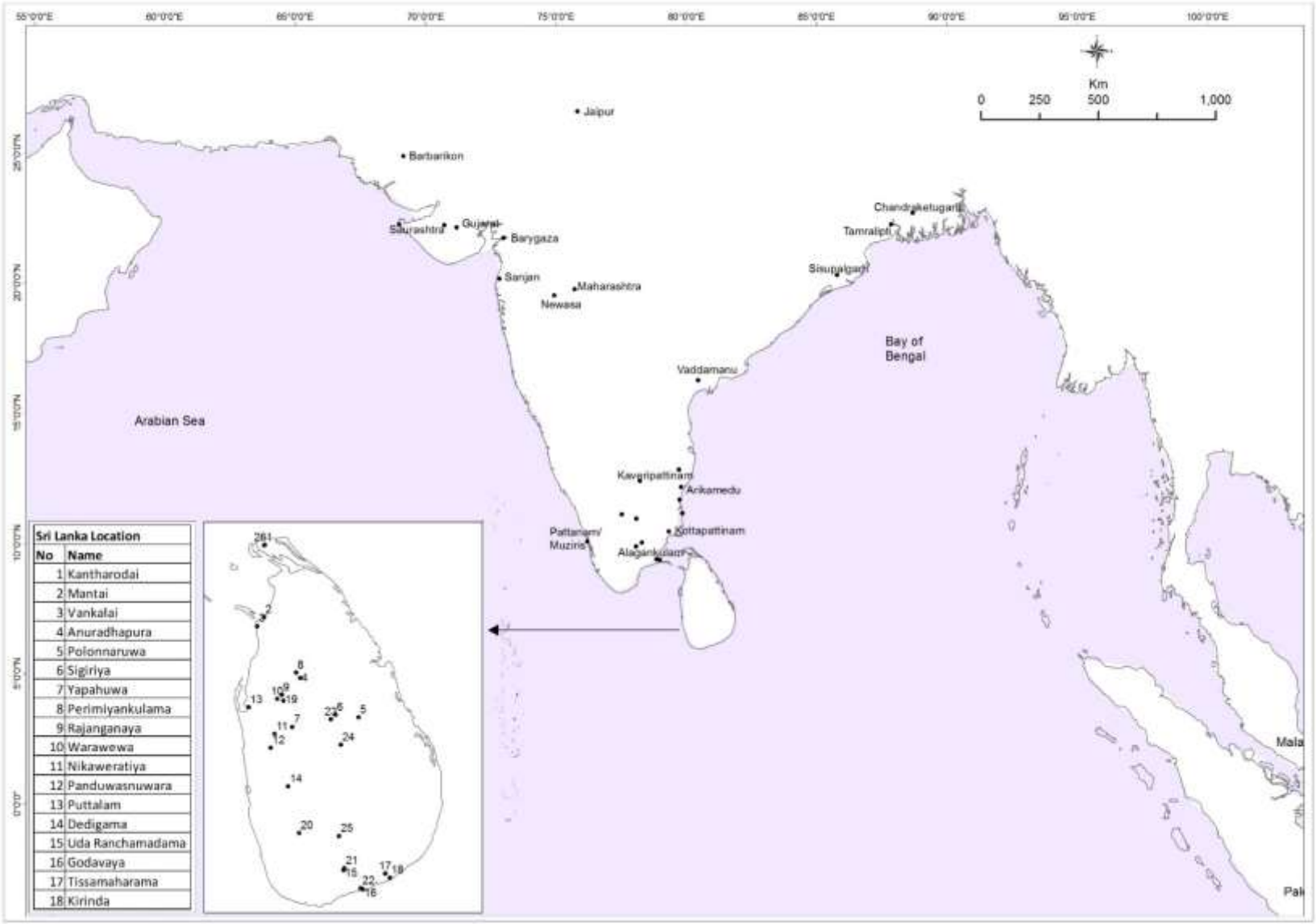


Figure 3.5: Propotion of selected local wares across the site sequence - % from the TCA phase total; based on C3.9.5b.

Figure 3.5 shows the dominance of RESL and PLRE across phases, averaging nearly 71% of the TCA. The remaining selected wares collectively make up only 2% and only BRW and BRWO account for more than 100 sherds. The emergence of BRWO from Phase IV upwards is noteworthy as it follows the decline of BRW (disregarding residual sherds). By Phase III, local production had picked up, with RESL and PLRE having 87% of the TCA phase total. The high proportion of local wares (35% of the total local assemblage) in the 'Disturbed' indicates the continuity of indigenous industry.



Sri Lanka Location	
No	Name
1	Kantharodai
2	Mantai
3	Vankalai
4	Anuradhapura
5	Polonnaruwa
6	Sigiriya
7	Yapahuwa
8	Perimiyankulama
9	Rajanganaya
10	Warawewa
11	Nikaweratiya
12	Panduwasnuwara
13	Puttalam
14	Dedigama
15	Uda Ranchamadama
16	Godavaya
17	Tissamaharama
18	Kirinda

Figure 3.6: Main sites referred to in the chapter (Bohingamuwa 2016)

3.3.5.1 Selected ware descriptions

The suggested internal date range, based on their distribution in the stratigraphy and C^{14} dates and external dates based on previous studies for all main wares, are given in section 3.3.14.1, Catalogue 3.10 and C3.9.1, respectively. In the text the ware descriptions confined to their morphological attributes (see Plate 3.1).

Plain Red Ware (PLRE)

PLRE comprises of a variety of fabrics and vessel forms made using different firing temperatures and techniques, including wheel turned, handmade, paddle and anvil techniques. The fabric contains varying degrees of sand, mica, black and white inclusions and voids. A variety of decorations, such as paddle marks, grooved lines, and incised lines, combing marks, bands and ribs, are noted on both surfaces (3.3.13). The surface colour varies greatly. Vessel forms include the full range of local storage, transport, cooking, and serving forms. PLRE is similar to the Plain Red Ware of De Silva and Dissanayake (2008:14) and to part of the Coarse Ware of Schenk (2001:68, 70).

Red Slipped Ware (RESL)

RESL is similar to Red Slipped ware (De Silva and Dissanayake 2008) and part of Coarse Ware (Schenk 2001). They differ from PLRE primarily by having a slip on the exterior. RESL is a thin to medium ware, with a variety of fabrics. The fabric contains varying degrees of sand, mica, and white inclusions and voids. Different vessel forms are produced under varying firing temperatures and using a number of techniques such as wheel turned, handmade, paddle and anvil. There are a variety of decorations, including paddle marks, grooved lines, and incised lines on the exterior, while combing marks, bands and ribs are noted on both surfaces. The

surface colour comprises a variety of different shades of red. RESL vessel forms include all local storage, transport, cooking, and serving forms.

Black and Red Ware (BRW)

BRW is made from a wheel-turned, thin to medium-thick, hard fabric, and typically comprises tablewares with smooth surfaces. Characteristically, the ware has red exterior and black interior surfaces, although these colours vary. The majority of wares are slipped on the exterior. Paddle impressions, the most common decorations, and incised and banded lines, are found on the exterior surface. BRW has a variety of fabrics, which contain sand, black and white inclusions and voids. Vessel forms, for the most part, comprise a range of tablewares. BRW is similar to that found in Sri Lanka and India more generally (e.g., Schenk 2001:68–69; Deraniyagala 2004:709; Coningham et al. 2006:176; De Silva and Dissanayake 2008:14; Dharmawardane 2015).

Black and Red Ware-Other (BRWO)

BRWO is wheel-turned in thin and hard fabric. It mostly comprises smooth-surfaced tablewares. As with BRW, BRWO has red exterior and black interior surfaces, although the shades of these colours vary. The majority of the sherds are slipped on the exterior. There are a number of different fabrics with sand and white lime/shell, as well as black and white inclusions and voids. BRWO is similar to BRW, but the paste/fabric and firing are of inferior quality and it appears to have continued to be manufactured long after BRW was discontinued.

Graphite Ware (GRAPH)

GRAPH is a wheel-turned, thin (7–8mm), lime-tempered, hard fabric. The entire exterior surface is treated with a mica wash. The fabric contains abundant sand, as well as white inclusions and voids. It has a dark grey exterior with a reddish-brown interior. Vessel forms may include table vessels, such as water jars. GRAPH is similar to the Graphited Ware of Schenk (2001:59–195).

Thick Black and Red Ware (TBRW)

TBRW is a wheel-turned, medium to thick (11mm) hard-fired fabric, which varies greatly. It is a multi-purpose ware, although the majority were probably used for storage. Its surfaces are smoothened and in the majority of cases the exterior is slipped. Because the vessel is produced using an inverted firing technique the exterior surface is red while the interior is black. TBRW is close to BRW and BRWO, although thicker and it is also perhaps related to TOBW.

3.3.5.2 Rims and vessel forms

All rim types were described and drawn (Catalogue 3.7 and 3.8). The rim and vessel forms of the assemblage were compared with those of Carswell et al. (2013), Anuradhapura citadel (Deraniyagala in press) and ASW2 (Coningham et al. 2006), as well as Tissamaharama (Schenk 2001) (Catalogue 3.11). Based on my fieldwork, as well as ethnographic studies conducted by Seevalee (1998), Bandara (2005), Karunathilake et al. (2010), and Gunasekara et al. (1971), attempts were made to identify local ceramic forms that correspond with those of traditional household kitchen/tablewares (C3.9.6b). Drawing ethnographic parallels, however, can be misleading without caution.

The discussion on rims and vessel forms is confined to key observations that are relevant to the present work. Links will also be made to possible parallels found at other sites. The vessel forms discussed under local wares are illustrated in the Plates 3.2, 3.3 (see also Catalogue 3.7; Catalogue 3.8).

There are 1,152 local ware rim sherds (C3.9.6a&b): PLRE (61), RESL (1088), STPRW (1) and BRW (2). Both BRW rim sherds belong to the REW39.1.2 variety and comprise partially closed orifice tablewares; small bowls (*Patras*), shallow dishes and cups, which have inturned rims with pointed rim tops. STPRW 1 is a thin everted rim from a unique square or rectangular shaped shallow vessel, which seems have a partially closed orifice. There are 96 rim types belonging to PLRE (25) and RESL (95), some of which are also shared with BRW. While sharing some of the rim types and vessel forms, PLRE and RESL also illustrate marked differences in them. Therefore, they are discussed separately (C3.9.7a; C3.9.7b).

PLRE

Eleven PLRE rims are from tableware, of which nine are closed orifice vessels. Fourteen rim types belong to closed orifice domestic storage/cooking vessels. Twelve rim sherds are un-diagnostic and sometimes too small to determine a rim type or form. As a result, they are collectively termed ‘various’.

In terms of the number of rim sherds, tablewares top the list (54%) of the PLRE rims. Of these, 17 are *Patra* type bowls. Domestic storage/cooking vessels, which are the main constituent of local wares, are limited to only 16 (26%) rims and clearly under-represented in the sample. Of these 14 are *Mutti*, *Atili*, *Hali*, or *Mutti*/*Atili*, all of which are kitchenwares. The ‘various’ rim

category, of which the form is un-determined, accounts for 20% of rim sherds. 11.47% rims represent water pots/jars including *Kotale*.

RESL

Of the RESL rims, 327 (30%) are tablewares of which 232 items are partially closed, while the remainder are open orifice vessels. 659 (61%) of the rims are from storage pots, the majority of which are of closed (516) or partially closed (95) forms. Together they comprise 93% of the total storage vessels. Of the storage/cooking vessels, 581 (88%) are *Mutti, Hatti, Kundahatti* or *Atili* types. The *Mutti/Atili* category alone accounts for 191 items. All are medium to large multi-purpose vessels in traditional Sri Lankan households. There are 28 *Koraha*/*Nambiliya* (3%), which are used for rice processing and 286 (26%) bowls, of which 167 are of the *Patra* type. The vessel forms discussed here are illustrated in Plates 3.2 and 3.3.

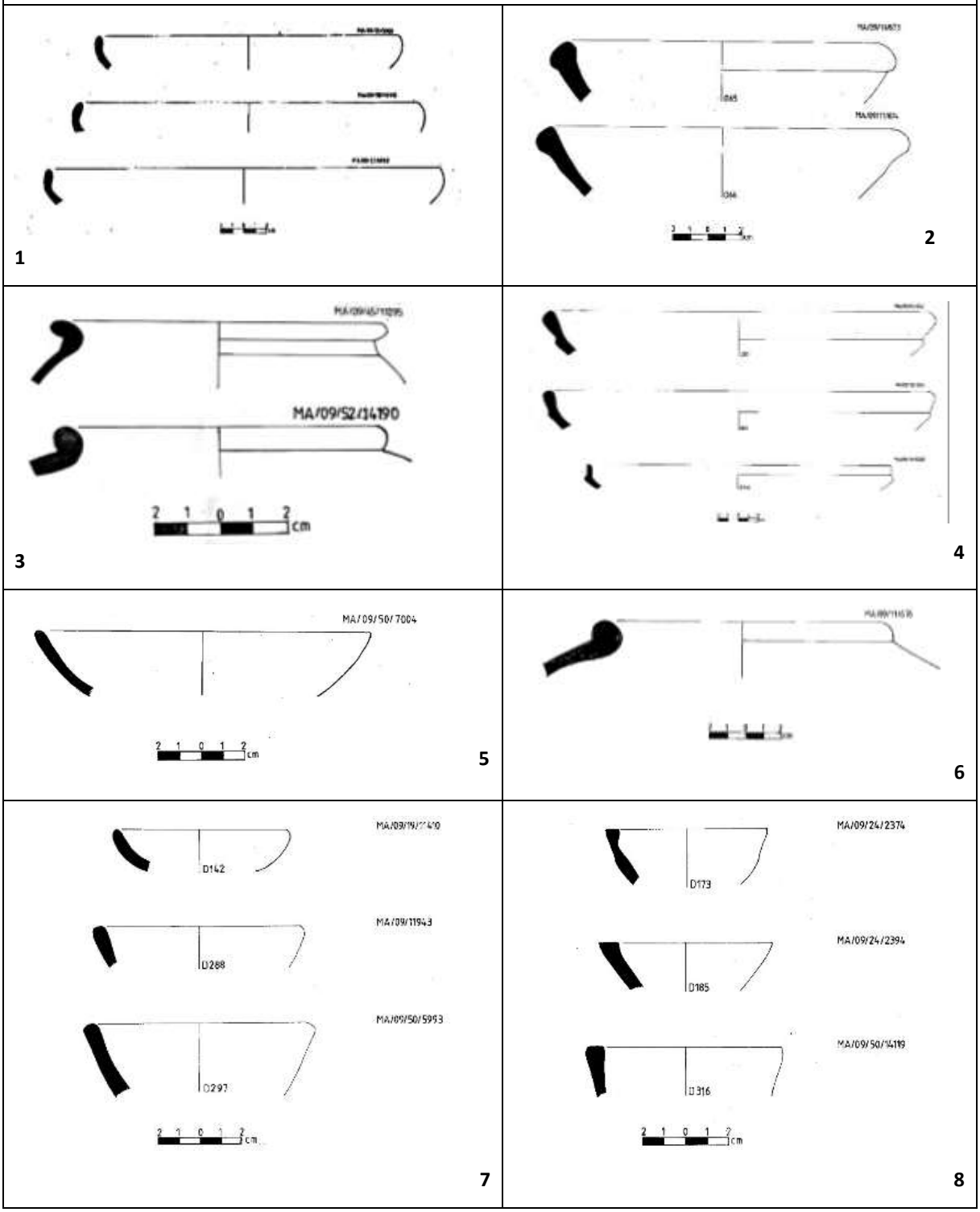
A large percentage of Mantai local rim/vessel forms are strikingly similar to those found in the Anuradhapura citadel (Deraniyagala in Press) and ASW2 (Coningham et al. 2006) as well as at Tissamaharama (Schenk 2001) (Catalogue 3.11). These local assemblages seem to be part of the same techno-cultural tradition, indicating close relationships between potting communities/traditions.

Plate 3.1

Selected Sri Lankan wares	
PLRE	**GRAPH**
	
BRW	**BRWO**
	
RESL	**TBRW**
	

Plate 3.2

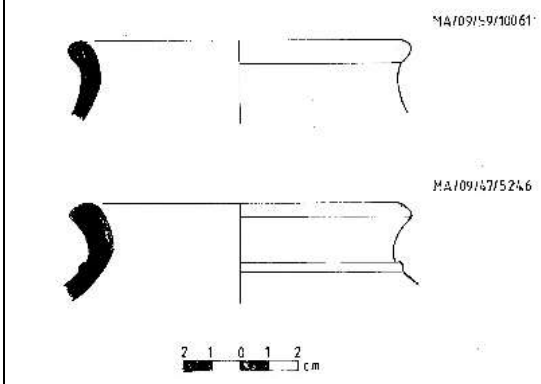
Sri Lankan vessel forms



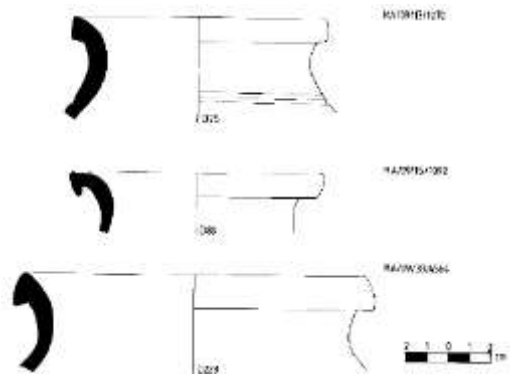
1. Small bowl (patra), shallow dish, cup 2. Shallow pan/bowl 3. *Mutti/Athili* 4. Deep dish/*Thali* 5. Shallow bowl 6. *Mutti* 7. Shallow small bowl 8. Medium shallow bowl

Plate 3.3

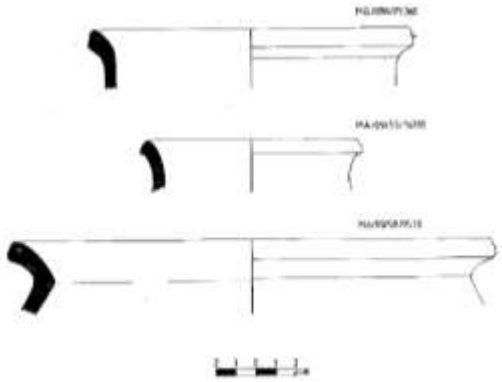
Sri Lankan vessel forms- cont.



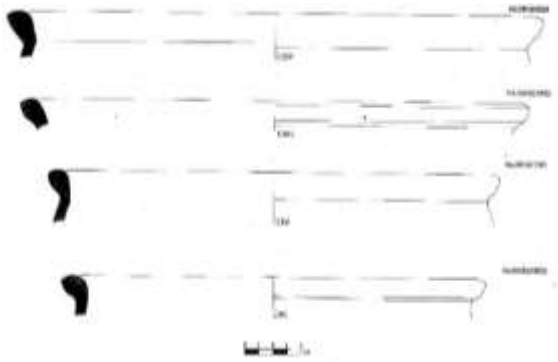
9



10



11



12

9. Jar/ *Mutti* 10. Jar/*Kotale* 11. Bowl/*Athili* 12. *Mutti/Athili*

Sri Lanka Location	
No	Name
1	Kantharodai
2	Mantai
3	Vankalai
4	Anuradhapura
5	Polonnaruwa
6	Sigiriya
7	Yapahuwa
8	Perimiyankulama
9	Rajanganaya
10	Warawewa
11	Nikaweratiya
12	Panduwasnuwara
13	Puttalam
14	Dedigama
15	Uda Ranchamadama
16	Godavaya
17	Tissamaharama
18	Kirinda

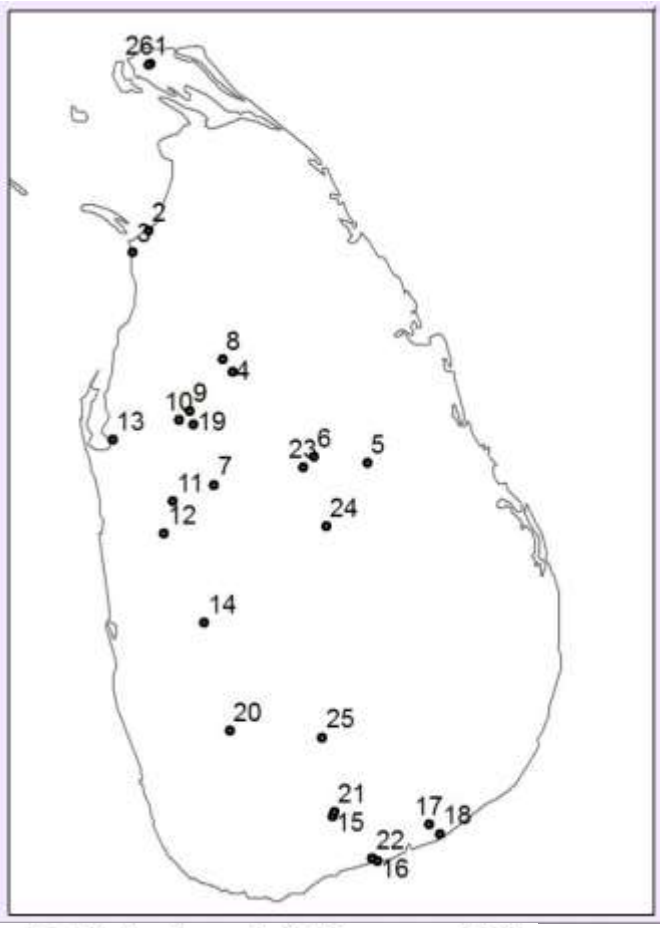


Figure 3.7: Selected sites related to local ceramics (Bohingamuwa 2016)

3.3.5.3 Assemblage Summary and Discussion

With the introduction of local ceramics in Phase II, they increased in both ware and sherd counts through phases III and IV,[38] with a reduction in the sherd count in Phase V. Phase VII saw the introduction of new wares and the increase of sherd counts.

There is a decline in the size of the local assemblage after Phase III, in which, for example, the local assemblage accounts for 94.42% of the TCA. By Phase VII, this component had reduced to 61.35%. The decrease in the local assemblage is a direct result of the increase of the

[38] Which has the highest number of sherds - 2218

'Imported' assemblage (37%) (C3.9.4), indicating expanding external interactions after Phase III.

The local assemblage is dominated by PLRE and RESL, which are abundant across all Sri Lankan sites (see Schenk 2001:68; De Silva and Dissanayake 2008:14). They account for 97.2% of the total selected local assemblage. BRW, BRWO and TBRW are the next most prominent local wares. They were all produced using an inverted firing technique as BRW. In Sri Lanka, it is thought that BRW production started in the Early Iron Age (*ca.* 900 BC) and continued into the Early Historic Period (*ca.* AD 300) (Schenk 2001; Deraniyagala 2004). At Mantai, however, our internal dating shows its possible continuation until the (mid-3rd or) early 7th century. Furthermore, TBRW and BRWO continued after the decline of BRW. These five types of coarseware make up the majority of the local assemblage. For example, only three sherds of GRAPH were found (Phase VII), a ware that is found more regularly in Tissamaharama (Schenk 2001) and Kirinda (Catalogue 7.2-Kirinda3). It is possible that all of these coarsewares reached Mantai via internal trade-exchange networks.

The overall distribution pattern of the local ware group was summarized in Table 3.5. The proportion of the local assemblage seems to have fluctuated over time, largely in response to the increase of imported wares, which in turn signifies an expansion of external trade/contacts.

The local assemblage is varied in fabric, firing and inclusions. This diversity may indicate multiple sources of production. Although Carswell et al. (2013) mention that an 'enormous quantity' of local wares were recovered during their excavations, only 410 sherds were

analysed (Graham 2013e:191). The 'enormous quantity' remains empirically ambiguous leaving limited opportunity for comparison. Their entire earthenware assemblage dates from the 1st/2nd to the 5th/6th centuries whereas our local assemblage occurs from the 2nd century BC to the 12th/13th centuries AD.

The best studies of local wares in Sri Lanka have been at Tissamaharama (Schenk 2001), and Anuradhapura (Deraniyagala 2004; Coningham et al. 2006). The comparison of the Mantai local rim types/vessel forms with these sites clearly illustrates the occurrence of identical rim types and vessel forms (Catalogue 3.11), which probably reflects the interrelationships between different communities of potters. My ethnographic fieldwork among potters, however, illustrates that they trade within a limited area as it is uneconomical to undertake long journeys, where the risk of damage to pots is greater. Communities of potters are stationed at regular intervals and cater to the people in their catchment area. My fieldwork and that of Seevalee (1998) demonstrate that potting communities are often related and that their relationships are reinforced through intermarriage, which facilitates the transfer of technology across regions. This finding is supported by the work of Karunathilaka et al. (2010).

3.3.6 Undefined origin assemblage

This group consists of 'India/Sri Lanka' ('Ind/SL') and 'Unknown' ('Unk') wares. The latter includes 95 sherds and four wares of which, Ceramic Building Material (CBM) is a general group for all ceramic building materials, such as tiles and bricks. Gaming pieces (GAP) is another group of reworked sherds. The Pale Burnished Ware (PALBUR) of buff fabric and NON-ID.E are the only other ceramic wares in this group, comprising 10 and 41 sherds, respectively.

The majority of them are found in Phase VII and the 'Disturbed' and the origin of these un-diagnostic wares is uncertain (C3.9.8). None of these are discussed further.

3.3.6.1 India/Sri Lanka ('Ind/SL') assemblage

The 'Ind/SL' origin group contains only 66 sherds from five wares (C3.9.9; Figure 3.8). Thin Red Slipped Ware (TRSW) with 39 sherds is the most dominant and consistent ware, occurring from phase IV to the 'Disturbed'. The internal dates of 'Ind/SL' wares are given in Catalogue 3.10. Considering the potting attributes such as fine fabrics, TRSW, BPW and BBUR could be Indian-made. These are not further discussed, though their statistics are included in calculations and given in the catalogue.

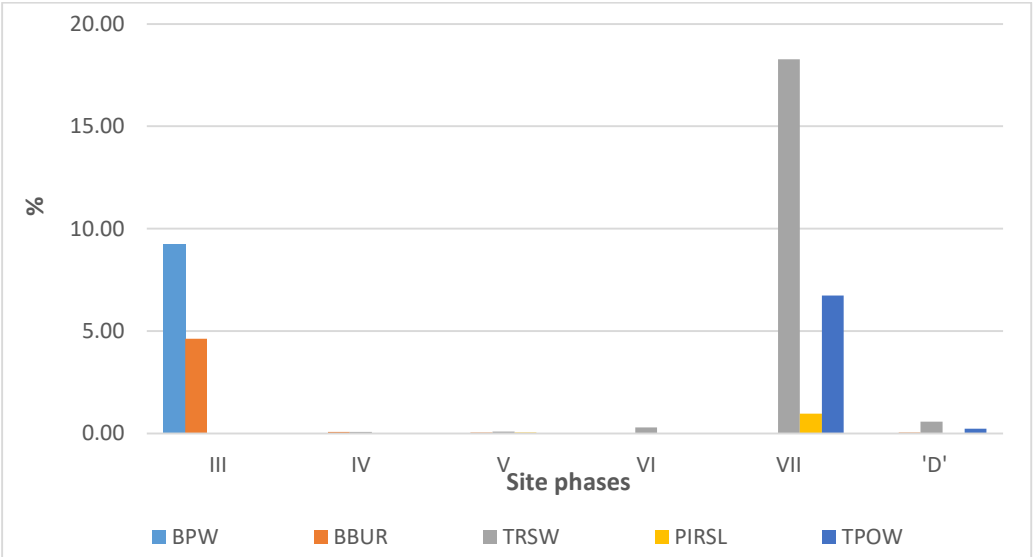


Figure 3.8: 'Ind/SL' wares across the site sequence - % from the TCA phase total; based on C3.9.9.

Selected ware description

Thin Red Slipped Ware (TRSW)

TRSW (Figure 3.9) is a thin, hard fabric with a red slipped, smooth exterior surface. The interior surface is light reddish grey. The exact shades, however, vary substantially. Its fine and well-sorted fabric contains sparse sand, red and white inclusions. In some sherds abundant mica is present. Vessel forms are unknown.



Figure 3.9: Thin Red Slipped Ware (TRSW)

Black Polished Ware (BPW)

BPW (Figure 3.10) is a very thin (2.5–4.5mm), hard ware with a shiny exterior surface and a well-sorted fabric, which contains sparse mica and sand inclusions. The surfaces are smoothened and the exterior is polished. The BPW vessel form was probably a water pot.



Figure 3.10: Black Polished Ware (BPW)

3.3.7 Mantai imported ceramic assemblage (ICA)

The Mantai Imported Ceramic Assemblage (ICA), which amalgamates both ECA and SCA, consists of 3,139 sherds (26% of the TCA; C3.9.4) and 120 different wares. Those that could be identified as foreign are of Indian, Middle Eastern, 'Imp.Unk', Chinese and Southeast Asia (SEA) origins (C3.9.10 and C3.9.11).

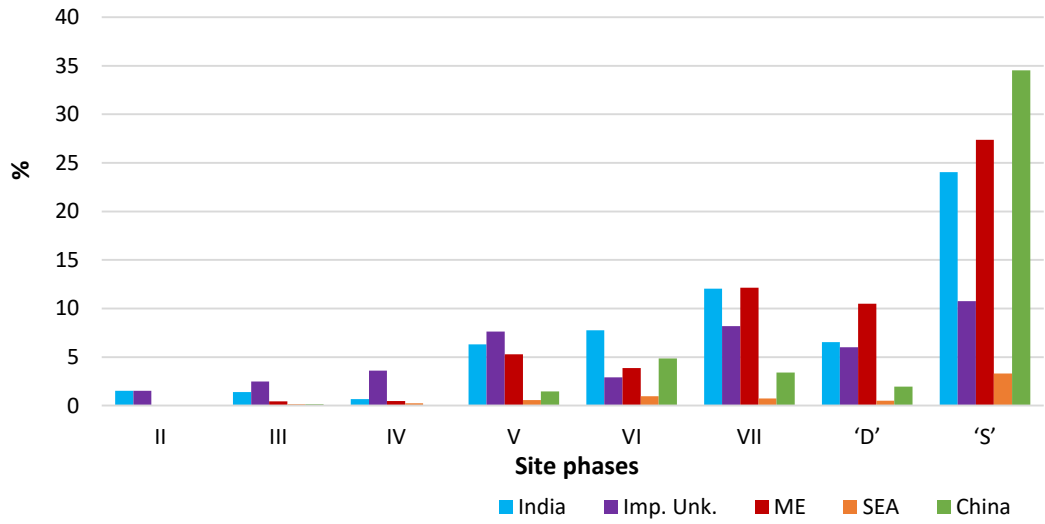


Figure 3.11: Origin-wise distribution of Imported Ceramic Assemblage (ICA) across the site sequence- % from the TCA phase total; based on C3.9.11. Note the increasing size and the diversification of the composition of phase assemblage after phase III

Figure 3.11 depicts each imported origin group as a percentage of the TCA. The Middle Eastern wares with 8% are the largest the group, followed by Indian (7%) and 'Imp.Unk' (6%). Chinese (4%) and SEA (1%) wares are only represented in small quantities.

The increasing proportion of 'Imp.Unk' from Phases III, peaking at VII and the 'Surface', may indicate the increasing interaction with yet unknown overseas regions. The diversification of the 'Imp.Unk' assemblage through the introduction of new wares from phase IV upwards may also support this. Similarly, the increasing proportion of sherds from the Middle East, and the number of wares from Phase V upwards, is significant for external connections (Table 3.4). The size of SEA and Chinese wares fluctuated over time, although their sherd count increased from Phase V onwards, particularly in the 'Disturbed'. This is due to the increase of Middle Eastern wares, which perhaps reflects intense interaction with the Middle Eastern region as compared to SEA and China from Phase V upwards.

3.3.8 Indian assemblage

The Indian assemblage is composed of 859 sherds (C3.9.12a, C3.9.12b, C3.9.13 & Table 3.7). They are distributed from Phase II to the 'Surface' (Figure 3.12), although there is a gradual increase up to Phase VII. The large size of the 'Surfce' assemblage (24%) may reflect a sample bias (section 3.1); nevertheless, it is significant for the continued occurence of Indian Wares, though some are clearly residual.

Table 3.7: Indian wares and sherds across phases

Phase	II	III	IV	V	VI	VII	'Disturbed'	'Surface'	Total
Wares	1	5	8	11	5	23	20	11	25
Sherds	1	19	16	43	8	312	279	181	859

The earliest Indian wares, with the exception of OSW, are Rouletted and related Grey Wares termed Grey Ware Family (GWF) in this study and are discussed below along with Red Polished Ware (REPO).

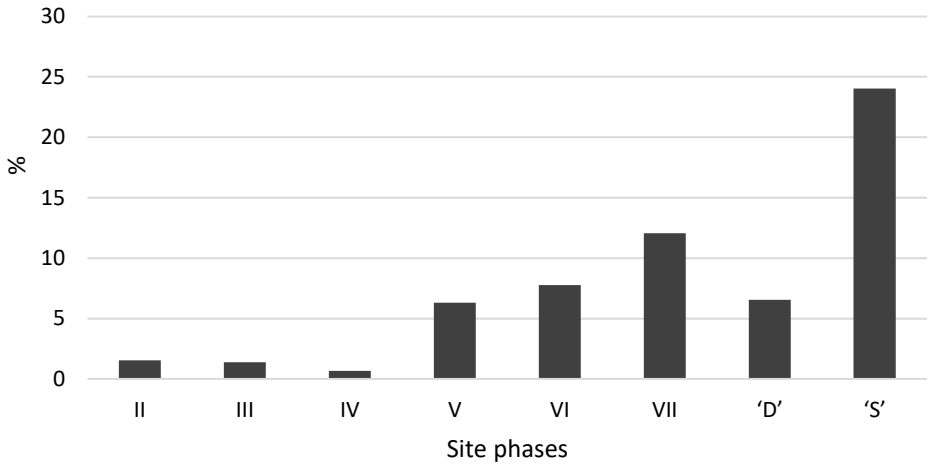


Figure 3.12: Indian Ceramic assemblage across the site sequence - % from the TCA phase total; based on C3.10.12a. Note the inceasing size of the phase assemblage in relation to the TCA

Figure 3.13 illustrates the changing proportion of the Indian assemblage over time.

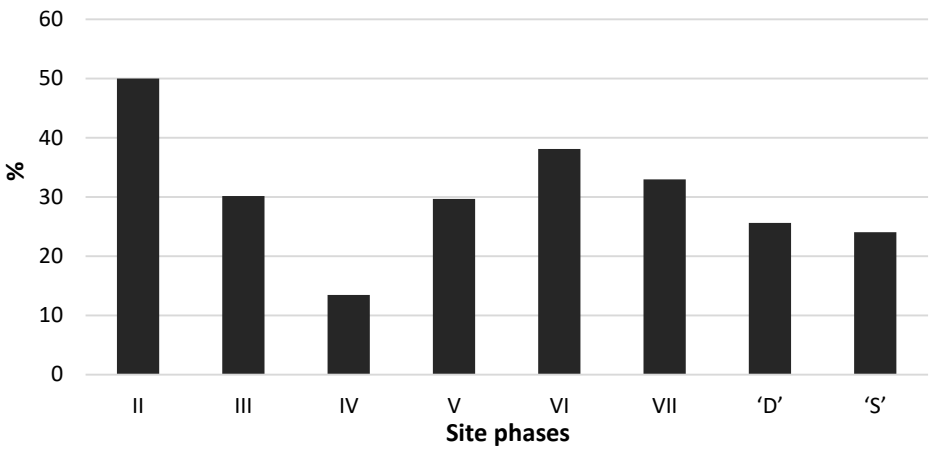


Figure 3.13: Indian ceramic assemblage across the site sequence - % from the ICA phase total; based on C3.10.12b. Note the fluctuating assemblage size over time

3.3.8.1 Selected ware description

This section discusses the significant Indian wares, including GWF and other fine wares such as REPO. These are further discussed in Chapter 5 for understanding Indo-Lanka cultural relations.

GWF wares

There are six Indian wares in the Mantai assemblage that have a grey body of varying fabric textures as well as mica inclusions and burnishing. Rouletted Ware is distinct for its decorations, so is GREBUR for its burnish that is visible as painted vertical strokes on the exterior. The FIG and FIMIG are both Grey Wares of fine fabric that have some burnishing effect on the exterior but differs from GREBUR as the burnishing on FIMIG is not prominent and mica is present in the fabric. Nevertheless, all these six wares can be grouped together as 'GWF'. Our 'GWF' is partly similar to Fine Ware/Fine Grey Pottery classified by Deraniyagala (2004:712), Schenk (2001:128, 2006:123–152) and Coningham et al. (2006:127; 3.3.8.4 below). REPO and other fine wares are discussed separately. The distribution of 'GWF' and

REPO is given in C3.9.14, C3.9.15a&b and presented in the Figures 3.14&15 below and illustrated in Plate 3.4.

Rouletted Ware (ROUL)

ROUL is wheel turned and has a hard, thin (4–6mm) very fine fabric that is well-sorted. The fabric has almost no inclusions and very sparse voids. Occasional sherds have black and mica inclusions. Its surfaces are smooth and shiny. Although the colour varies slightly, the exterior is generally red or light red, while the interior is dark grey. Vessel forms comprise of bowls or dishes and occur from Phase III to IV; with two residual sherds in Phase VII. ROUL is similar to the general Rouletted class (e.g. Wheeler et al. 1946).

Fine Grey Ware (FIG)

FIG is wheel-turned and has a hard fired, thin (3–4mm), fine grey fabric with a well-burnished outer surface. Occasional sherds have limited white sand inclusions. The ware has a dark surface with a marginally lighter grey inner fabric. There are stripped marks on the exterior surface, possibly from the burnishing.

Grey Ware (GREW)

GREW is wheel-turned and has a hard, thin (7mm body, 12mm rim) grey fabric with smoothed surfaces and a consistent grey colour with very few, if any, inclusions. The exterior may be slightly burnished. Some sherds have band, square and groove and incised decoration on the exterior. It is similar to the Grey Ware of Deraniyagala (2004:712; Coningham and Allchin 1995:163) and variant 5 and perhaps 6 from Tissamharama (Schenk 2001:72–73).

Burnished Grey Ware (GREBUR)

GREBUR is wheel-made, with a hard, thin (8mm) grey fabric and a smoothed exterior surface. It is very similar to GREW. The only distinguishing feature is the shiny exterior surface. The fabric is very fine with very few inclusions and voids. The exterior surface has very faint vertical strokes, probably resulting from burnishing/polishing. Some sherds have banded and grooved decorations on their exterior surface. The exterior colour can vary from grey to light-brownish grey.

Fine Mica tempered Grey ware (FIMIG)

FIMIG is wheel-turned, with a hard, thin (8–10mm) burnished grey fabric, with dark surfaces and abundant mica temper. The fabric has very sparse black sand inclusions. Grooving and rouletting decoration are found on exterior surfaces, which are burnished.

Two Toned Grey Ware (TTGW)

TTGW[39] is wheel-turned, with a hard, thin to medium (5–13mm), very fine two-tone fabric with smooth surfaces, which have occasional grooved, banded and impressed decorations. The fabric has very sparse white particles.

REPO and other fine wares

Wares included in this category are documented in C3.9.13 with some discussed under decorations (3.3.13). While both REPO and IRPW are described, only REPO is discussed further.

[39] I argue (below) TTGW as a local imitation

Red Polished Ware (REPO)

REPO is wheel-made, with a thin (4mm), hard fabric. It is a tableware or ritual ware. Two related additional fabrics have sparse sand, white, red or black inclusions and voids. The exterior surface is smooth and shiny red. The interior is quite rough and grey in colour. Vessel forms may include water pots, sprinklers, and similar tablewares.

Imported Red Polished Ware (IRPW)

IRPW is wheel-made, with a thin (3–6mm), hard, fine fabric. It is a tableware with a red slip/polish on the exterior surface. Vessel interiors are relatively smooth. It is a well-lavigated, fine fabric with sparse white inclusions and angular voids. The fabric is not as fine as most Gujarati types, but it could still be Gujarati (see Plate 3.4).

3.3.8.2 GWF and REPO

Since GWF and REPO collectively account for 75% of the Indian ceramics, the discussion of the Indian assemblage is based on them. The GWF and REPO account for 5% and 0.2% of the TCA, respectively (Figure 3.14). While the GWF increases from Phase III to the 'Surface', REPO is mainly concentrated after Phase VII following its appearance in Phase IV.

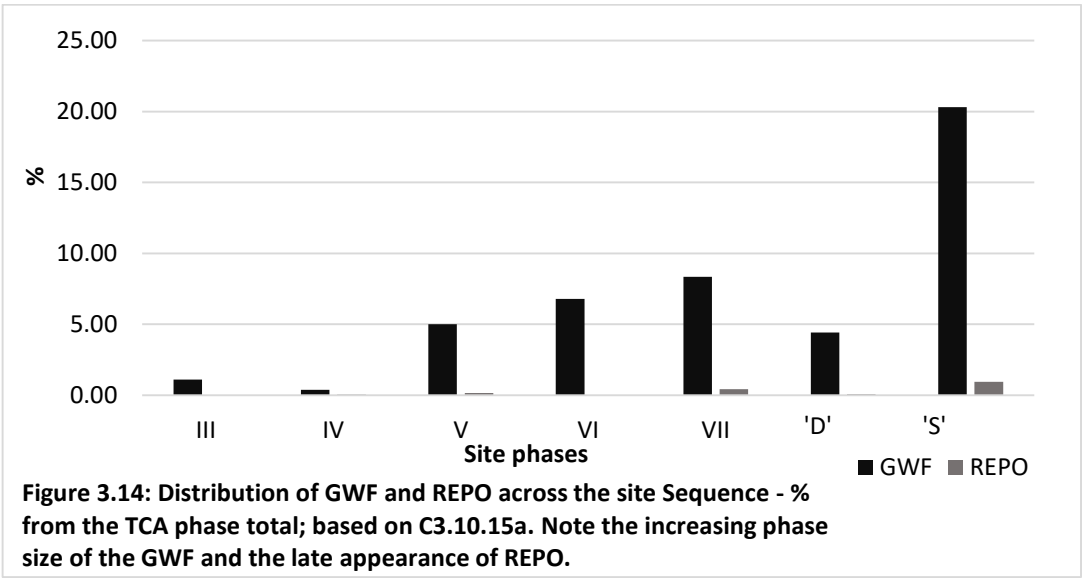


Figure 3.14: Distribution of GWF and REPO across the site Sequence - % from the TCA phase total; based on C3.10.15a. Note the increasing phase size of the GWF and the late appearance of REPO.

Figure 3.15 compares GWF and REPO as a percentage of the two. REPO accounts for only 3%, while GWF comprises 97% of the assemblage, reflecting the patterns of interaction within those regions where the wares originated.

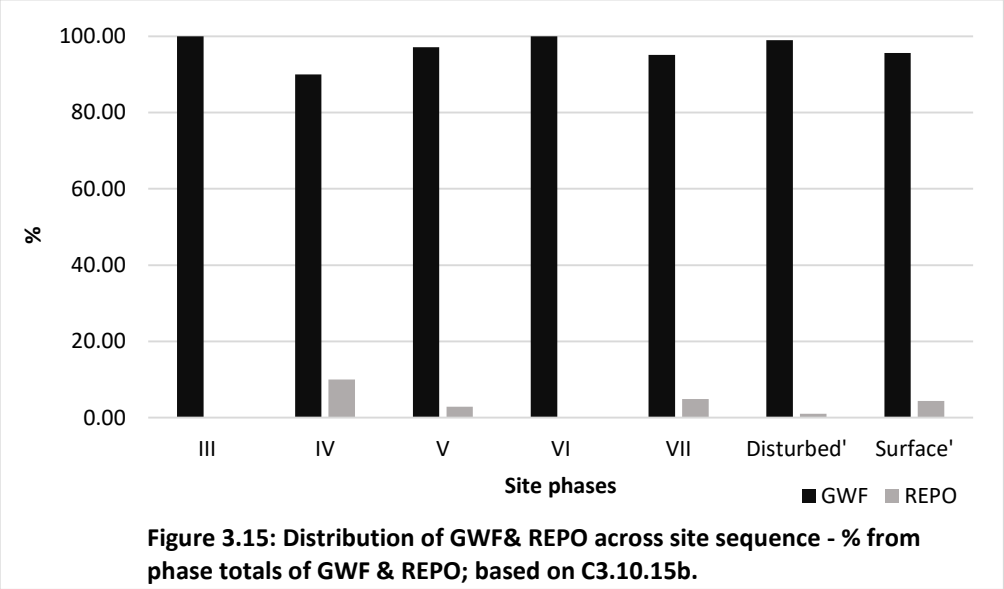


Figure 3.15: Distribution of GWF& REPO across site sequence - % from phase totals of GWF & REPO; based on C3.10.15b.

GWF

Of the six wares in GWF, GREW accounts for more than half and occurs from Phase III to the 'Surface' (Figures 3.16 and 3.17). Their highest concentration is from Phase VII upwards. FIG makes up 20% of the GWF assemblage and has a similar occurrence to GREW. TTGW, GREBUR and FIMIG occur from Phase V to the 'Surface' and collectively account for 27% of the GWF. TTGW, has the highest sherd count and is mainly concentrated after Phase VII. The occurrence of all wares after Phase VII could be residual. ROUL accounts for only 0.1% of the TCA and mainly occurs in Phase III with the three sherds in Phase IV and VII being residual.

Plate 3.4

<table>
<tr><th colspan="2">Selected Indian wares</th></tr>
<tr><td>ROUL</td><td>GREW</td></tr>
<tr><td></td><td></td></tr>
<tr><td>FIG</td><td>FIMIG</td></tr>
<tr><td></td><td></td></tr>
<tr><td colspan="2">GREBUR</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>REPO</td><td>IRPW</td></tr>
<tr><td></td><td></td></tr>
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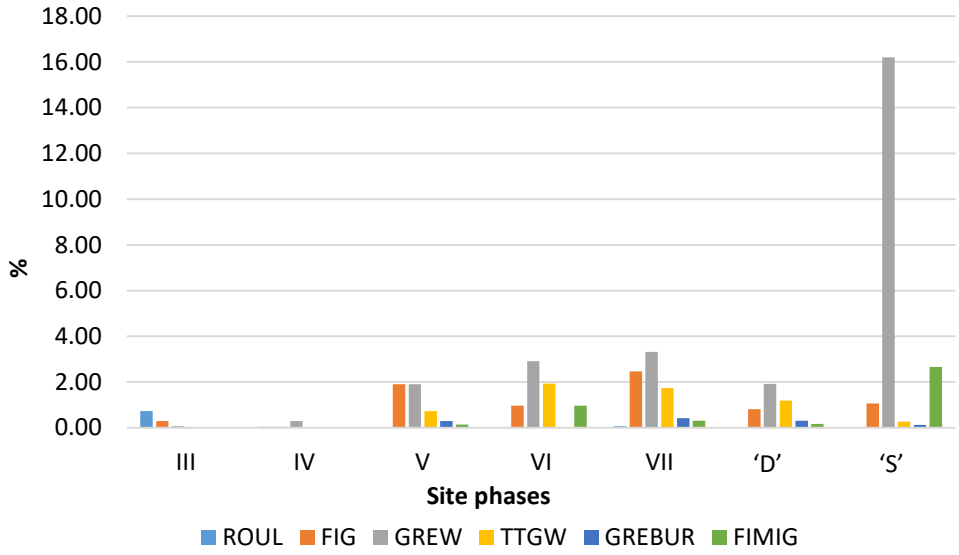


Figure 3.16: GWF wares across site sequence - % from the TCA phase total; based on C3.9.16a

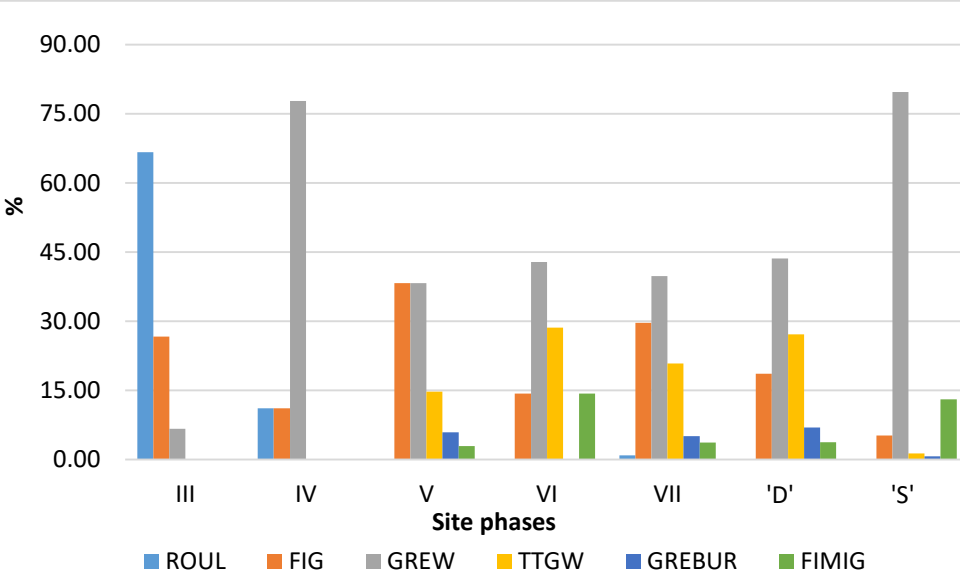


Figure 3.17: GWF wares across site sequence - % from GWF phase total; based on C3.9.16b. Note the increase of ware counts after Phase VI

REPO

REPO is one of the most discussed Indian wares (Orton 1991), although there are only 22 sherds (0.2%) in the Mantai assemblage. There is a gradual increase of REPO up to Phase VII, followed by a sharp decrease in the 'Disturbed' and an increase in the 'Surface' (Figure 3.18).

The sherds in the 'Disturbed' and 'Surface' are residual. Figure 3.19 illustrates changes in the REPO assemblage over time due to the changing composition of the total Indian assemblage. While the occurrence of REPO in our assemblage is numerically insignificant, their presence is historically important for connecting Mantai to the wider REPO network in the Indian Ocean and further discussed in Chapter 5.

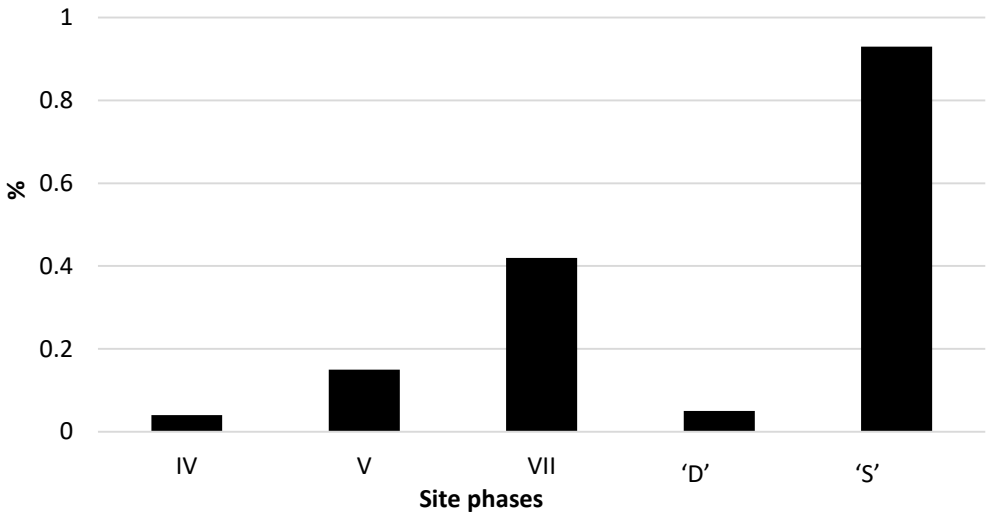


Figure 3.18: REPO assemblage across the site sequence - % from TCA phase total; based on C3.9.17a.

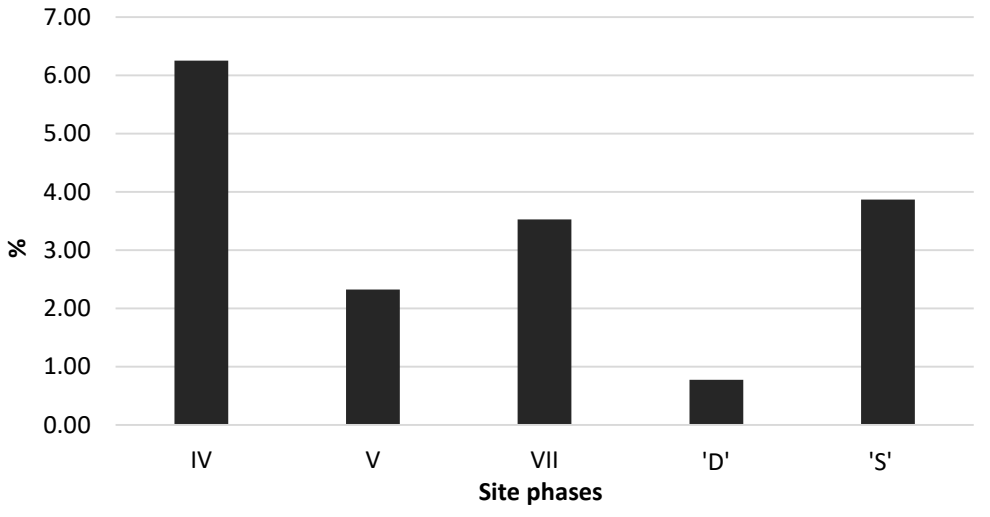


Figure 3.19: REPO assemblage across site sequence - % from Indian assemblage total; based on C3.9.17b.

3.3.8.3 Rims and vessel forms

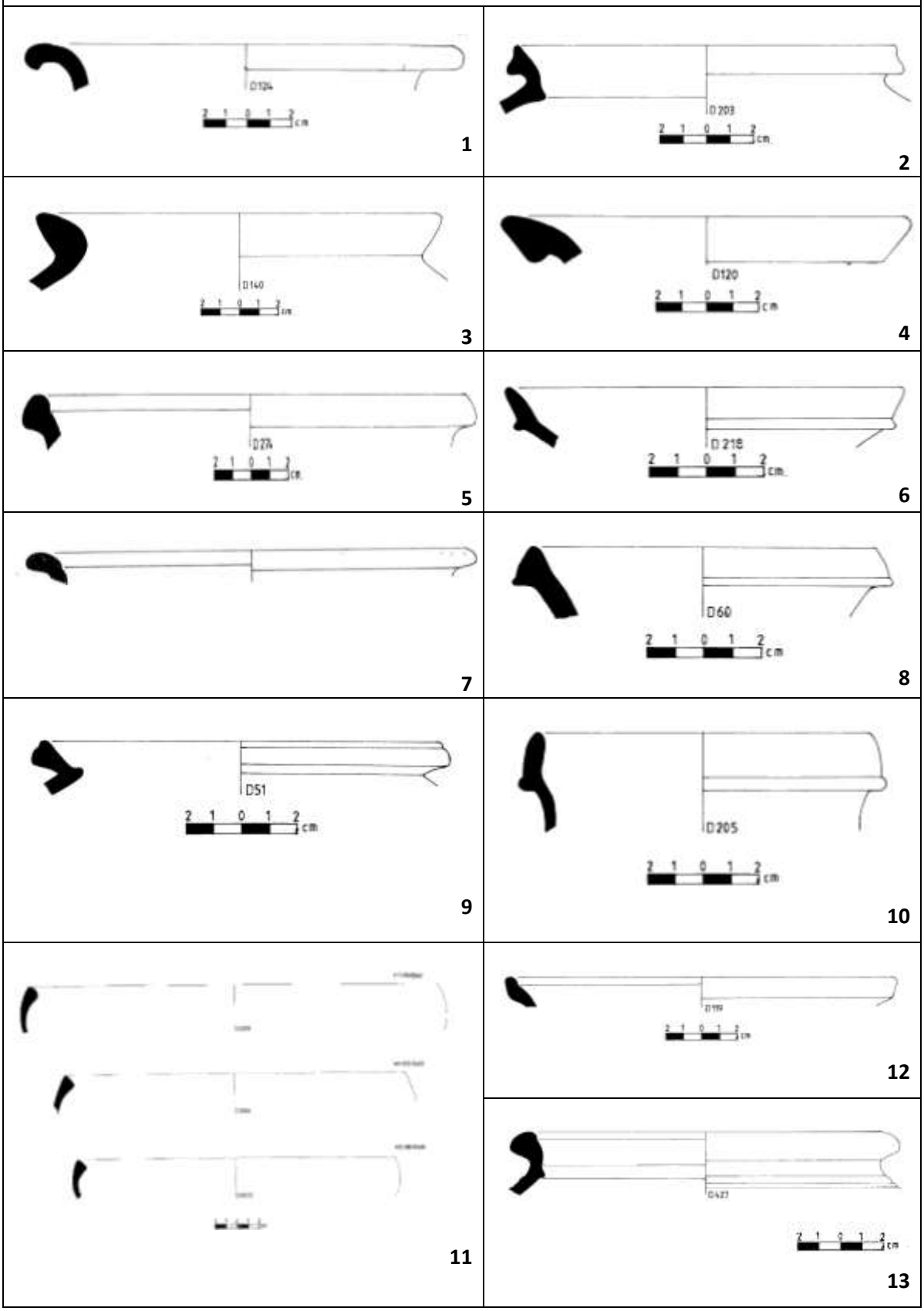
Thirty-five sherds representing 27 rim types make up the total Indian rim assemblage (C3.9.18a). 28 sherds are GWF rims (C3.9.18b), which are discussed here. Seventeen rims (61%) are GREW, of which only six are tableware vessels. Others are storage vessels, such as water jars and small or occasionally, large pots. Although these are termed storage vessels, they were also (with one exception) likely used as serving or drinking vessels. Small pots, for example, were used as drinking vessels in rural villages in ancient Sri Lanka (Coomaraswamy 1906:135–141, Gunasekara et al. 1971:166–192).

There is only a single ROUL rim in the assemblage of non-GWF rims. ROUL1 is a thin to medium-thick, inturned rim for a bowl or shallow dish. It is identical to Wheeler (et al. 1946) Type 10. FIG1 and FIG2 are pots and storage jars; FIMIG2 is a water jar, while FIMIG1 is a platter or saucer. TTGW1 and TTGW2 are storage vessels.

The GWF assemblage is primarily a table/serving ware. Of the non-GWF wares, FOW1 and FOW2 are also tablewares (C3.9.18a). Thus, the majority of the Indian wares in general are luxury table/ritual wares. The rims/vessel forms discussed here are illustrated in Plate 3.5.

Plate 3.5

GWF rims



1. GREW1 2. GREW2 3. GREW3 4. GREW4 5.GREW5 6. GREW6 7. GREW7 8. GREW8 9. FIG1 10. FIG2
11. ROUL1 12. TTGW1 13. TTGW2

3.3.8.4 Assemblage summary and discussion

The earliest occurrence of Indian ware at Mantai is a single sherd of OSW from Phase II. Phase III contained 19 sherds representing five wares, the majority of which are 'GWF', including 10 ROUL sherds (below). Though numerically insignificant, PYGW and MICOW are also tablewares represented in this phase.

In Phase IV, the sherd count decreased to 16, but the ware count (eight) increased and include GWF (below). Notable fine tablewares are FTRW, FIRSL, REPO and BPW. Their arrival indicates contact with new areas, such as Gujarat and Saurashtra, a demand for these imported wares and perhaps the emergence of an elite class at Mantai or in the urban centres of the interior.

Phase V saw a further increase of Indian ceramics both in the number of wares (11) and their sherd count (43). The addition of new tablewares such as MTSW and RWPW is notable. RWPW is special for its exterior surface and is discussed further under decorations.

Indian wares further proliferated in Phase VII, which produced 312 (12% of the TCA phase total) sherds across 23 wares. 65% of the Indian assemblage was GWF and other notable fine tablewares were REPO, FIRSL, and MTSW. There is a high percentage of tablewares in this phase.

Clearly, the ceramics in the 'Disturbed' are mixed. They include 279 sherds (33% of the Indian assemblage) representing twenty wares. Of the 181 Sherds of the surface assemblage, 85% belong to the 'GWF' category. Nearly 80% of them are GREW. Other notable ware present in the 'Surface' is REPO.

Carswell et al. (2013) studied only a sub-sample of the wares from Trench H at Mantai. They dealt with the Rouletted and the Fine Grey Wares but quantitative and stratigraphic details are unclear. Twelve Rouletted body sherds of shallow flat-bottomed dishes and the 'Fine Grey Ware family' sherds of bowls, small jars, basins, globular pots, and medium size storage vessels were analysed by Mohanty (2013:231–227). Based on the dates from Tissamaharama (Weisshaar et al. 2001), Mohanty (2013:222) assigned Fine Grey Wares in Sri Lanka a pre-4th century BC date.

Finewares from Sri Lanka are known by several names.[40] Deraniyagala (2004:712) was the first to suggest that NBPW, Grey and Rouletted Wares were closely related. Schenk (2001:128, 2006:123–152, esp. 129) agrees with Deraniyagala and groups Rouletted, NBPW, Wheeler type 10 and 18 and Plain Grey Wares under the term 'Fine Grey Pottery'. Coningham et al. (2006:127) grouped 13 wares as Fine Wares, including Grey, Rouletted (Arikamedu Type I), Arikamedu Type 10 and 18, as well as NBPW and Red Polished.

I discuss GWF wares independently from REPO and other fine wares. Although our Mantai assemblage does not contain any NBPW, the basis of our categorization of GWF is that of all these wares are also closely related. ROUL and GREW are not merely part of a larger fine ware family but that some wares such as TTGW could be local imitations (Chapter 5).

Of the GWF wares, GREW, which is considered to be a North Indian introduction, is the first to appear in Sri Lankan sites. The ware appears around 600 BC predating the Rouletted decoration (Deraniyagala 2004:712). In our assemblage GREW (314 sherds) is found from

[40] Rouletted, Wheeler type 1, 10, 18, Grey Ware, Red Polished etc.

Phase III to the 'Surface'. The largest number of pieces is found in Phase VII (86) and in the upper levels. GREW, along with other GWF varieties, occurs in Phase V, which is sealed by the wall and securely dated by four C14 dates from the early 7th to the early/mid-8th century. They are found in large quantities in Phase VII (Early/mid-8th to late 9th century), for which the stratigraphy is reliable. Therefore, the upper age boundary of some of the GWF, GREW in particular, surpasses tradition date of their demise (*ca.* 500 BC see Prickett-Fernando 2003a:73) and further discussed in Chapter 5).

Sri Lankan Grey Wares, Rouletted and Wheeler Type 1 and 10 are mineralogically identical (Krishnan and Coningham 1997). They all form part of the same Indian Ocean Rouletted network and therefore are further discussed in Chapter 5.

Of the other Indian fine wares, REPO, IRPW, RWPW and MTSW are the noteworthy findings. MTSW and RWPW are discussed under decorations (3.3.13). IRPW (seven sherds) occurs only in Phases VII and the 'Disturbed' and is not discussed further. Our assemblage includes 22 REPO sherds, of which 13 are from Phases IV, V and VII and seem to date from *ca.* the mid-3rd to the early/mid-8th to late 9th century. They could be Late Red Polished Wares as suggested by Prickett-Fernando (2003a:56). Based on Gupta et al. (2003:29–30), however, Kennet (2004:89) argues that Red Polished Wares (IRPW) continued up to the 8th century in India. Over 30 pieces of REPO are reported from Mantai by Mohanty (2013:217–220), which are similar to those found in Gujarat, Rajasthan and elsewhere. They date from the 1st century BC to the 3rd century AD, though the basis of dating is unclear. Mohanty credits traders from the western Indian coast for their arrival on the island. A ritual use can be assigned to some vessel forms, as is clear from the scenes depicting a worshiper and deity noted at Tissamaharama

(Weisshaar 2001:133). Our Indian assemblage is similar, in terms of the range of wares represented, to that reported in Carswell et al. 2013, althoughNBPW and *Kundalikas* are not found by us.

3.3.9 Middle Eastern assemblage (ME)

The Middle Eastern assemblage from Mantai comprises 1026 sherds representing 36 wares. They are tabulated across site phases in the C3.9.19 and summarized in Table 3.8.

Table 3.8: Middle-Eastern wares across phases

Phase	III	IV	V	VI	VII	'Disturbed'	'Surface'	Total
Wares	5	7	12	3	24	25	17	36
Sherds	6	11	36	4	315	448	206	1026

The Middle Eastern assemblage accounts for 8% of the TCA and 33% of the imported assemblage (Figures 3.20 and 3.21). The figures below clearly show the appearance of Middle Eastern wares in Phase III, which increases through subsequent phases; the highest concentration being in Phases VII (12%), 'Disturbed' (11%) and the 'Surface' (27%). This reflects the increasing interaction with the Middle East from *ca*. 9th century.

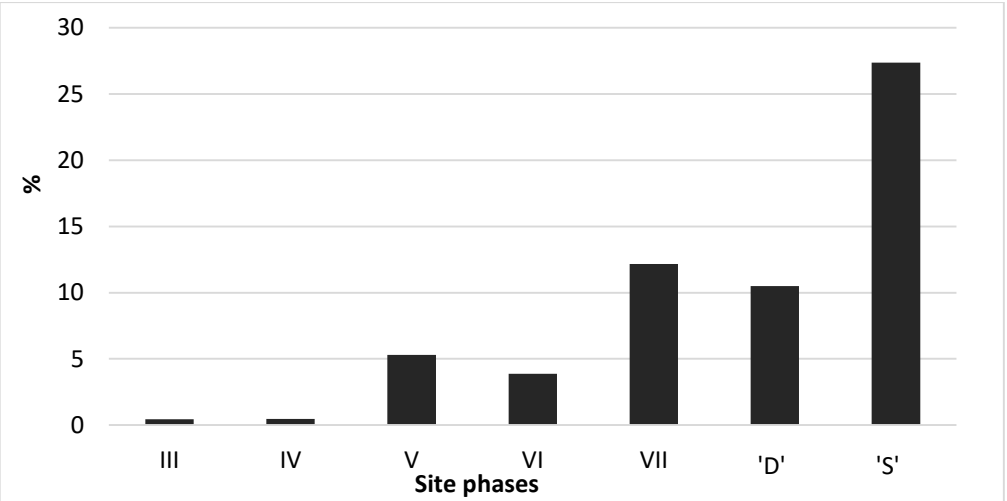


Figure 3.20: 'ME' assemblage across site sequence - % from TCA phase total; based on C3.9.20a. Note the increasing size of the Phase assemblage.

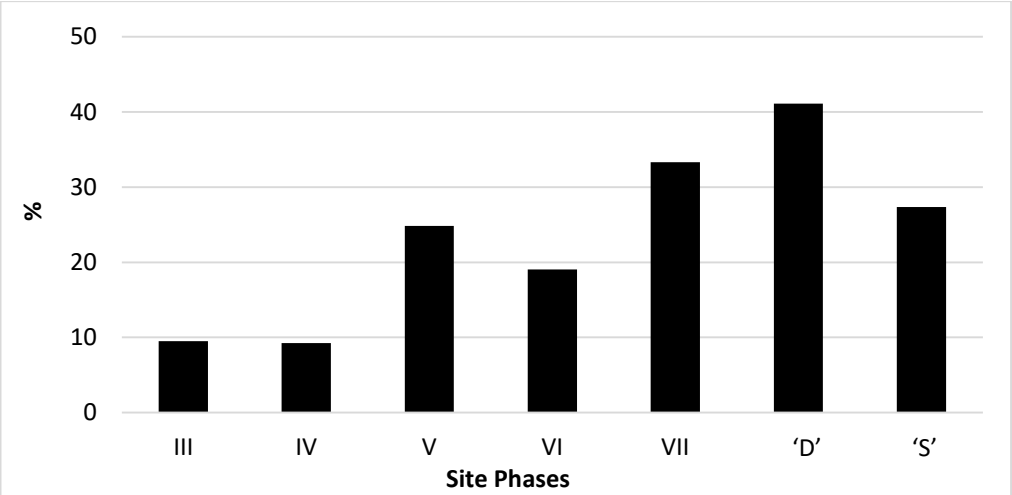


Figure 3.21: 'ME' assemblage across site sequence - % from ICA phase total; based on C3.9.20b.

The Mantai Middle Eastern assemblage is more diverse than any other origin group. Middle Eastern wares are probably the best studied among all of the Indian Ocean region ceramics (Figure 3.22). This makes it possible to analyse them under various categories such as glazed and non-glazed.

3.3.9.1 Glazed ware

271 sherds representing 11 wares make up the Middle Eastern glazed ware assemblage, all of which are tablewares. These are grouped into two categories based on glaze types: Alkaline and Opaque. Their occurrence is very similar from Phase V to the 'Disturbed' (Figure 3.23). Only Alkaline types occur on the 'Surface'. Alkaline types (2%) are numerically larger compared to the Opaque glazed types (0.5%).

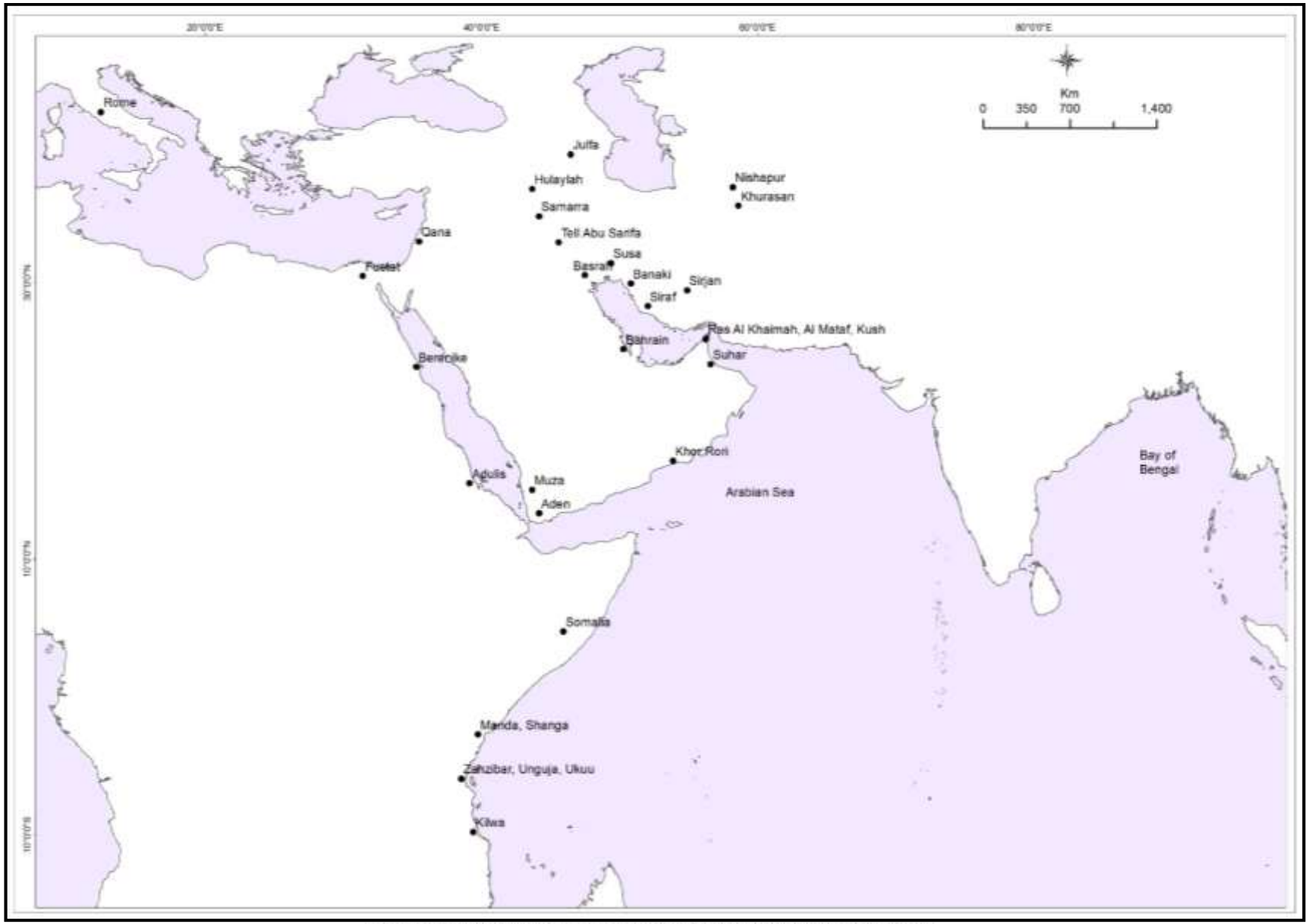


Figure 3.22: Middle Eastern ware distribution (Bohingamuwa 2016)

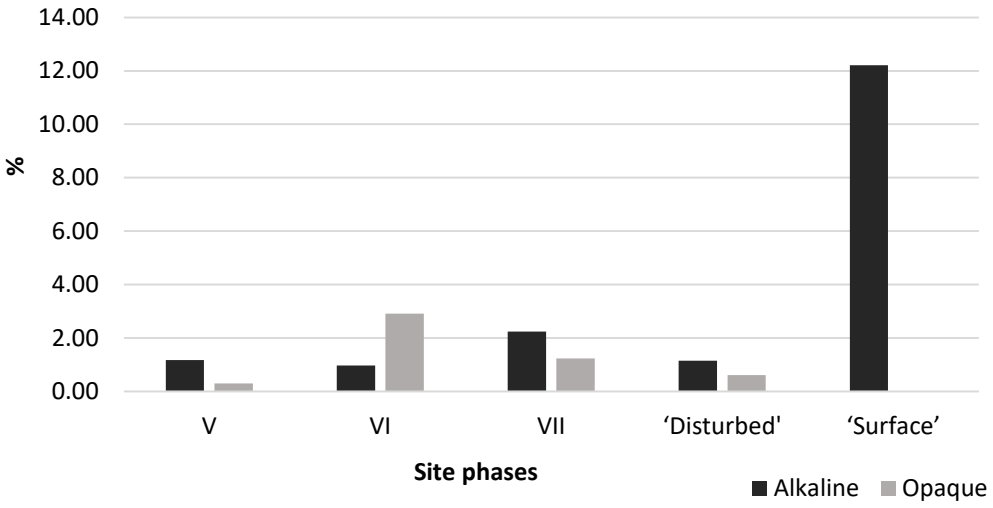


Figure 3.23: Distribution of AGW & OGW across site sequence - % from TCA phase total; based on C3.9.21.

Alkaline Glazed Wares (AGW)

AGW have an Alkaline glaze on both surfaces, although this can be confined to the interior surface and the rim. The glaze varies in colour from pale yellow through green to turquoise. These wares have a large geographical and chronological distribution (Kennet 2004:37) and are illustrated in Figure 3.22.

76% (208 sherds) of the Middle Eastern glazed assemblage have Alkaline glazes (C3.9.22a). Their occurrence is irregular and negligible before Phase VII after which all varieties consistently occur.[41] This pattern is consistent with the development of maritime trade in the Western Indian Ocean. Of the Alkaline varieties, TURQ.E, TURQ.DG, and TURQ.OF are the earliest to occur at Mantai. TURQ.DG has the highest number sherds.

[41] Sherds in Phases V (eight) and VI (one) could in fact be evidence of Sassanian period trade. A larger sample, however, is needed for such a conclusion.

The distribution of AGW wares clearly show the diversification and the increase in the assemblage after Phase VI (Figures 3.24 and 3.25).

Four variants of TURQ comprise the AGW assemblage at Mantai. These variations are primarily based on their different colours and over firing effects on the glaze, as well as on the state of their preservation as weathering have severely impacted their surface colour. Of the AGW, 40% are TURQ.DG, followed by 23% TURQ.E, 22% TURQ.OF and 15% TURQ.B. 20% of the AGW assemblage is found in Phase VII, with the vast majority coming from the 'Disturbed' and the surface (C3.9.22c).

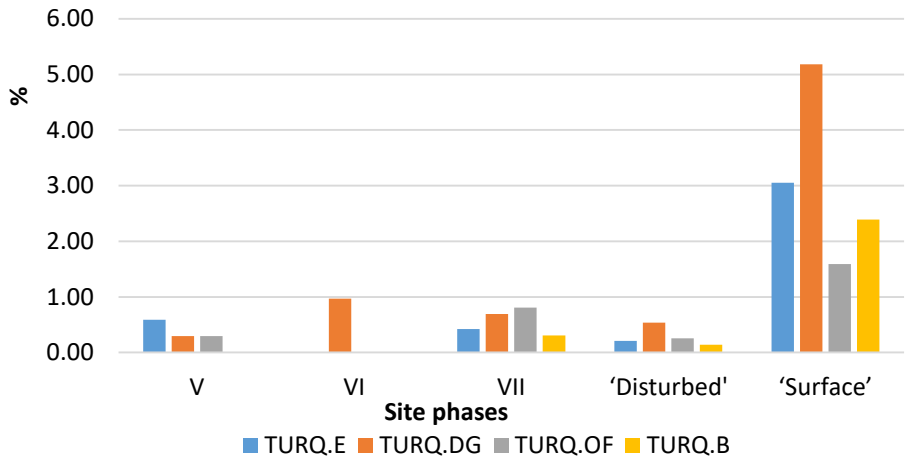


Figure 3.24: Alkaline glazed wares across site sequence - % from TCA phase total; based on C3.9.22a.

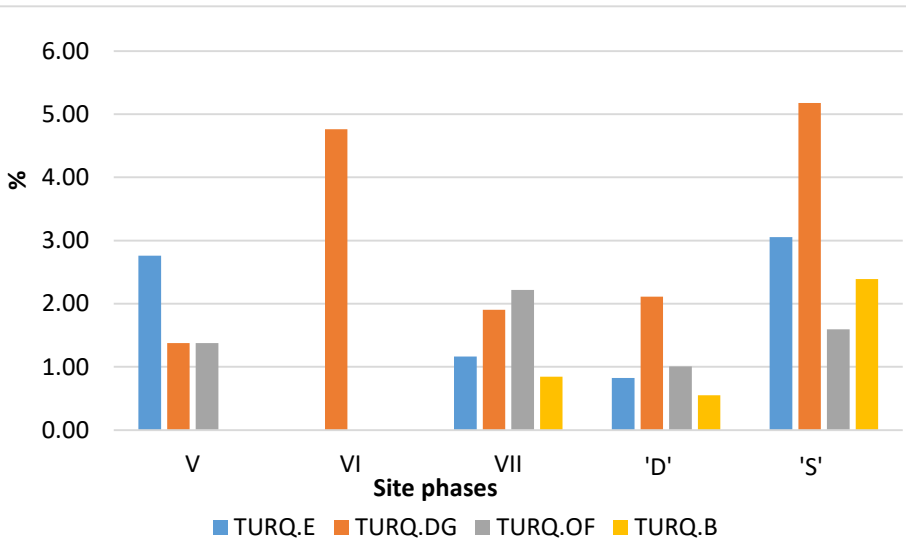


Figure 3.25: Alkaline glazed wares across site sequence - % from ICA phase total; based on C3.9.22b. Note the increase and the diversification of assemblege after Phase VI

AGW ware descriptions

Eroded Turquoise Glazed Ware (TURQ.E)

TURQ.E is a heavily eroded ware, probably due to salt action, where the surfaces are flattened and smoothed and then glazed with a light blue or green/ thick alkaline glaze over a fine pale yellow fabric with small voids. These are mostly wheel-turned wares and low to medium fired with a re-firing for the glaze. Some sherds have a ribbed decoration. It has parallels with Kennet's (2004) TURQ.5 and Priestman's (2005) ALK.1 and ALK.3.

Dark Green Turquoise Glazed Ware (TURQ.DG)

A ware with a dark green thick alkaline glaze over a fine pale yellow fabric with small voids, its interior often has a lighter blue glaze. Some sherds have a ribbed decoration while others have an applied clay 'cord' style raised decoration. It has parallels with Kennet's (2004) TURQ.4 and Priestman's (2005) ALK.1 and ALK.3.

Over Fired Turquoise Glazed Ware (TURQ.OF)

TURQ.OF is a heavily bubbled light blue/turquoise glazed ware with a pale yellow soft/medium fabric with abundant small voids and few inclusions. Over-firing damages the glaze and fabric, leaving a hard bubbly glaze residue on its surface. It has parallels with Kennet's (2004) TURQ general class and Priestman's (2005) ALK general class.

Blue Turquoise Glazed Ware (TURQ.B)

TURQ.B has a light to medium blue thick alkaline glaze over a fine pale yellow fabric with small voids, whose interior has often a lighter colour blue glaze. It has parallels with Kennet's (2004) TURQ.5 and Priestman's (2005) ALK.1 and ALK.3.

Although the AGW assemblage occurs from Phase V in the Mantai sequence, their main distribution is from Phase VII upwards, with 44% being surface finds.

These wares are illustrated in plate 3.6.

AGW rims and vessel forms

Six rims represent the AGW assemblage, of which a single sherd of TURQ.B belongs to TIN1 type tableware (C3.9.23). The TIN1 is a straight-sided deep bowl with a slightly everted rim, which is rounded at its termination. TURQ1 and TURQ2 rims are of storage vessels, probably

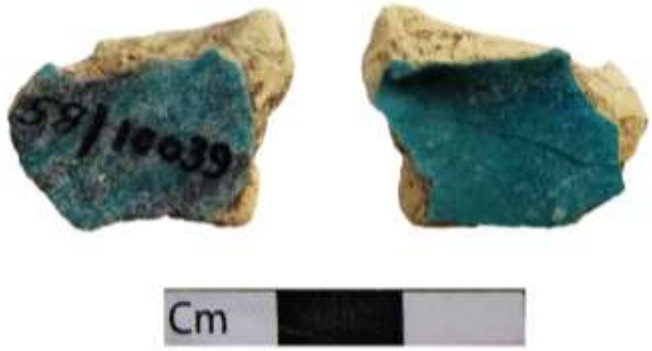
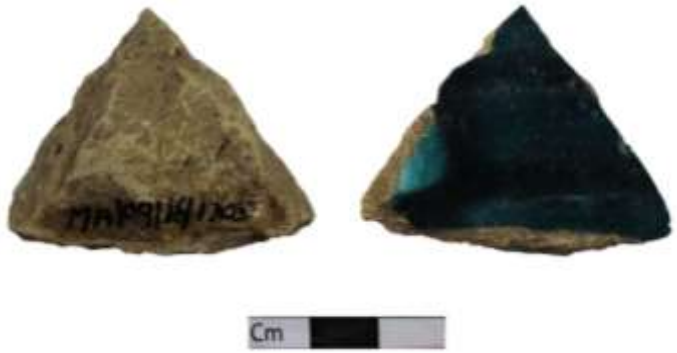
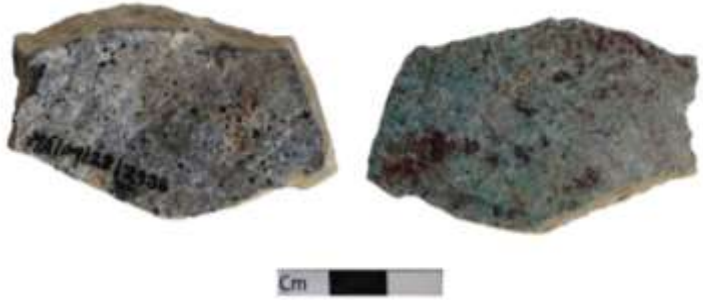
small water jars/jugs. TURQ1 has a slightly inverted curved rim with a small, smoothed, sharp internal lip and a larger rounded external lip that is slightly lowered. TURQ2 has a simple everted rim with a rounded square section. TURQ3 is a simple rounded square rim of a straight walled vessel. The fabric is very thick (16mm) for TURQ ware.

In view of the size and the inferred functions, even the storage jars, can be considered as domestic serving wares. Rim forms discussed above are illustrated in Plate 3.8.

AGW Summary

Nine AGW sherds occur in Phases V and VI, however, 96% (199 sherds) of them are recorded from Phase VII upwards. Although Phase V is dated to between the early 7th century and the early/mid-8th century, our AGW assemblage is likely to date from the late 7th century to the late 9th/early 10th century. This date range is consistent with that of Wijeyapala and Prickett (1984).

Plate 3.6

Selected Middle-Eastern wares–AGW	
TURQ.B	**TURQ.DG**
	
TURQ.E	**TURQ.OF**
	

Opaque Glazed Wares (OGW)

OGW has an opacified glaze that has "a finely-levigated cream-coloured calcareous body with limited coarse inclusions" (Priestman 2011:89–113, esp. 89). These wares are part of the Samara Horizon at Siraf, which Whitehouse (1979) and Tampoe (1989) date to the 7th century, although more recent work suggests that it should be the 9th century (Priestman 2011:105, 107).

Sixty-nine sherds of the Middle Eastern glazed ceramic at Mantai are opaque glazed, which runs across six different wares. They constitute only 0.5% and 2% for the TCA and ICA, respectively (Figures 3.26 and 3.27). Of OGWs, 73% are TIN and 10% SPL (C3.9.24c). The other wares are numerically insignificant, but historically significant. Chronologically, except TIN and MONOLUS, which appeared from Phase V and VI, all other wares occur only from Phase VII upwards.

Figures 3.26 and 3.27 illustrate the increase and diversification of the OGW assemblage from Phase VII upwards when Middle Eastern interactions were at their strongest. The assemblage during this period includes both transport and tablewares.

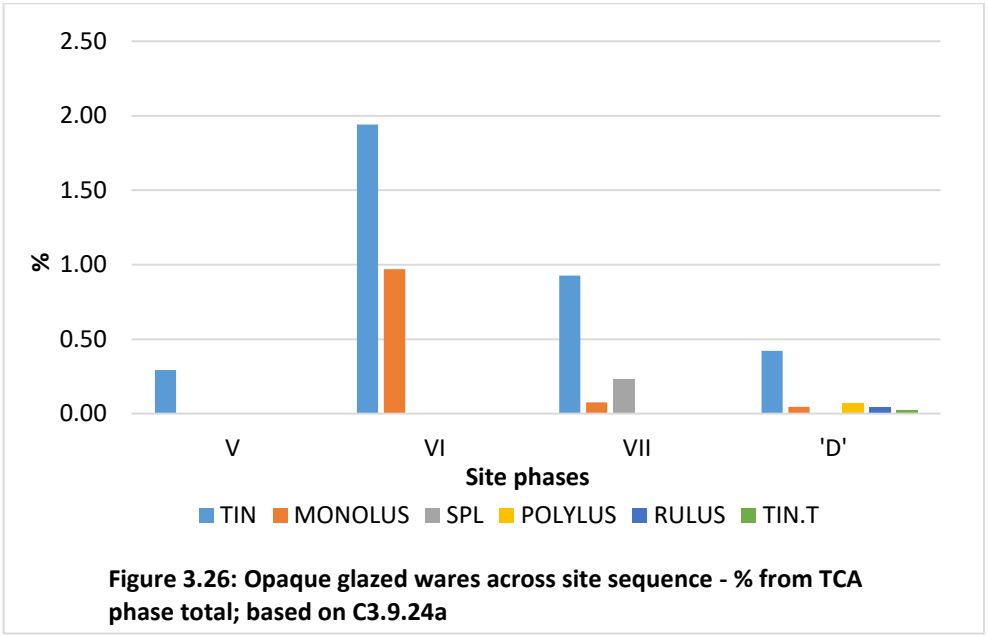


Figure 3.26: Opaque glazed wares across site sequence - % from TCA phase total; based on C3.9.24a

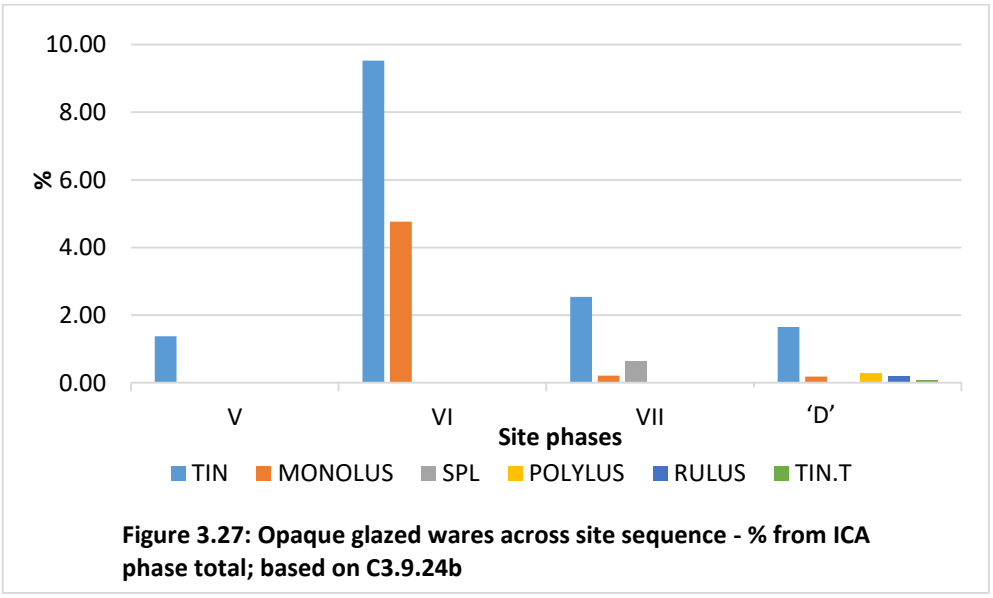


Figure 3.27: Opaque glazed wares across site sequence - % from ICA phase total; based on C3.9.24b

OGW selected ware description

Tin glazed ware (white opaque glaze) (TIN)

TIN is a tin glazed fine pale buff or pale yellow ware with a monochrome white opaque glaze, approximately 1mm thick on the interior and on most of the exteriors. The soft-medium fabric has few inclusions. It is a thin to medium (8–11mm) walled small bowl vessel form with a flat

or small ring foot base that is equivalent to Priestman's (2005) TIN.W1 and possibly some of TIN.W2 and also Kennet's (2004) YBTIN.

Tin glazed ware (Turquoise glaze) (TIN.T)

TIN.T has a turquoise opaque glaze over a pale buff or pale yellow soft fine fabric that has a few inclusions of pale, rounded sand grains. Small bowls are generally the vessel forms in this glazed ware. It is equivalent of Priestman's (2005) TIN.T.

Polychrome Lustre Ware (POLYLUS)

POLYLUS is a tin glazed fine pale buff/pale yellow ware with yellow, brown and gold polychrome painted decoration on a white slip background under a lustre/clear glaze. Its soft-medium fabric is glazed on its interior and most exteriors. They are wheel turned, low to medium fired and their fabric has few inclusions such as rounded sand grains. Small bowl vessel forms in this style have a flat or small ring foot base. It has parallels with TIN.ML and TIN.PL (Priestman 2005).

Monochrome Lustre Ware (MONOLUS)

This has a white/lustre glaze over yellowish brown monochrome painted decoration on a white slip background. It has a thin-medium fabric and is a wheel-turned walled ware that is glazed on the interior and most exteriors. It is low to medium-fired with few inclusions such as rounded sand grains. Small bowl vessels in this form have a flat or small ring foot base. It is similar to Kennet's (2004) Lustre and Priestman's (2005) TIN. ML.

Splashed Ware (SPL)

SPL is a distinctive wheel-turned, high-fired glazed ware with a pinkish fabric under a splashed design of green and yellow glaze on the interior surface. The exterior surface is glazed pale yellow with no design. The reddish yellow fabric has few white inclusions; possibly shell fragments. The vessel forms are only bowls. These resemble material that is equivalent to Priestman's (2005) SPL.GW.

Ruby Lustre Ware (RULUS)

RULUS is a wheel turned, soft to medium-fired ware with a white/lustre glaze over reddish brown and gold painted decoration on a white background. Vessels have a pale yellow soft-fine fabric with few inclusions, most likely rounded sand grains. RULUS are generally found in bowl forms with thin to medium vessel walls. They may include part of TIN.PL of Priestman (2005). OGW are illustrated in Plate 3.7.

OGW rims and vessel forms

Nineteen rims make up the OGW rim assemblage (Plate 3.8). Eleven of the rims are steep-sided deep bowls with an open orifice (C3.9.25). Only a single sherd of MONOLUS has a TIN2 type rim, which is everted. The termination of the rim is rounded and has a slight lump on the exterior surface just below the termination of the rim. All of the other sherds of TIN, SPL, POLYLUS and RULUS wares are a TIN1 type with a slightly everted rim, which is rounded at its termination as in the description of TURQ.B. TIN ware has the highest number of rims (seven) while all the other opaque glazed rims are represented by a single rim sherd.

OGW summary

While only five OGW sherds were found from Phases V and VI, more than 92% of them are from the Phases VII and the 'Disturbed'. The three sherds from Phase VIare probably derived from later periods. Similarly, sherds from Phase V seem to be intrusive or mixed (section 3.1). The 'Surface' recorded no OGWs and it is not clear if this is due to the sampling bias or due to the changing pattern of the production/supply and demand chain.[42] Thus, the OGW assemblage at Mantai dates to about the 9th–10th centuries, during the peak of maritime trade between China and the Middle East.

The distribution of glazed wares illustrates the cultural-commercial networks between regions across the Indian Ocean. The occurrence of various container wares at Mantai, and interior urban centres such as Anuradhapura and Tissamaharama, indicates the significance of Sri Lanka as a market in this east–west maritime trade (discussed in Chapter 5).

3.3.9.2 Middle Eastern Non-glazed assemblage

Twenty-four wares and 748 sherds comprise the Middle Eastern non-glazed assemblage (C3.9.26a). The selected non-glazed wares represent 94% of the total non-glazed assemblage (C3.9.26b). The Middle Eastern non-glazed ware assemblage (NGW) is illustrated in Figures 3.28 and 3.29; Plate 3.9.

Excluding TORP in Phase V, the occurrence of NGW (IWW, PREGG, PATO, BUF and LISV) before Phase VII is numerically insignificant. The presence of NGW increases from Phase VII to the 'Surface', which matches the pattern of maritime trade in the Western Indian Ocean.

[42] OGWs tends to be quite fragile and easily destroyed in left exposed on the surface for some time.

TORP and PATO collectively account for 53% of the NGW assemblage and represent 3% and 12% of the TCA. These two wares are closely related, although PATO is a slightly later introduction in our assemblage.

IWW and PREGG are tablewares that display a similar chronological distribution and might have been part of the same Persian Gulf trade-exchange package (C3.9.26d from the NGW). LARV, with 27% of the NGW assemblage, is the next largest category. They, along with LIM and EGG, are distributed from Phase VII onwards and are also a part of the Persian trade.

Plate 3.7

Selected Middle-Eastern wares–OGW

TIN



TIN.T



RULUS



MONOLUS



POLYLUS

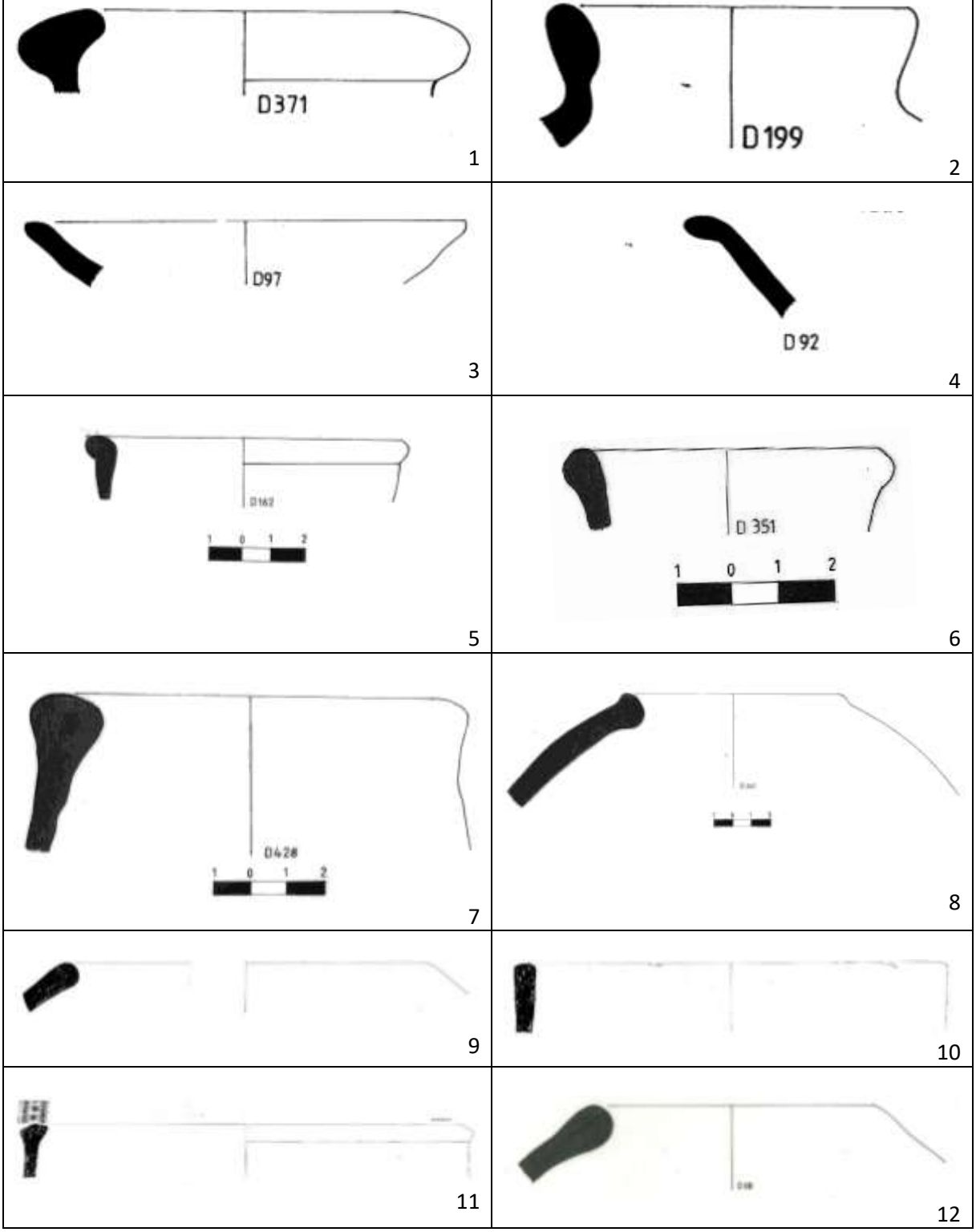


SPL



Plate 3.8

ME rims



1. TURQ1 2. TURQ2 3. TIN1 4. TIN2 5. IWW1 6. IWW2 7. TORP1 8. TORP2 9. LARV1 10. LARV2 11. LARV4 12. PATO

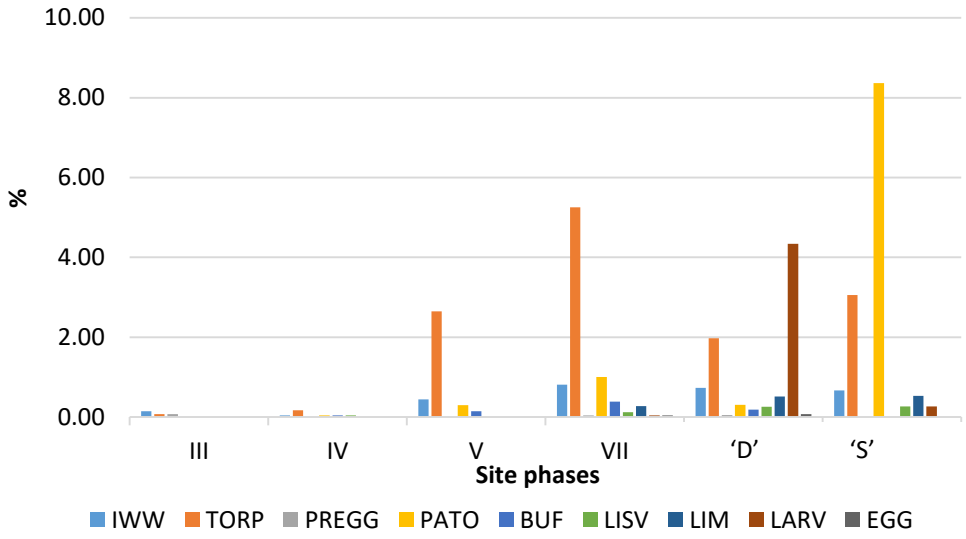


Figure 3.28: Selected 'ME' non glazed wares across the site sequence - % from TCA phase total; based on C3.9.26b

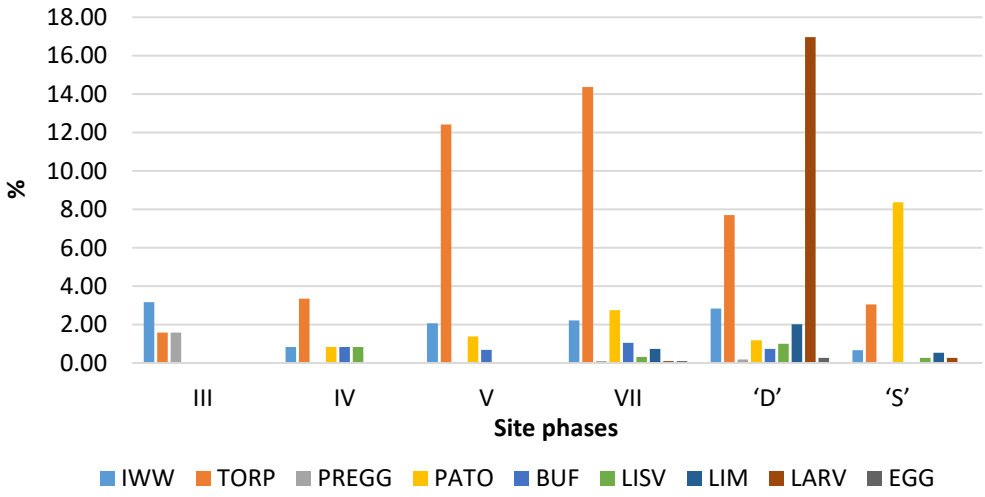


Figure 3.29: Selected 'ME' non glazed wares across the site sequence - % from ICA phase total; based on C3.9.26c

Selected ware descriptions—Storage/transport wares

Torpedo Jar Ware (TORP)

TORP is a large, wheel made storage/transport jar made from sandy clay, with a hard-fired fabric, which is then coated with bitumen on the interior to make it watertight. The bitumen may be degraded and occasionally not present. The body is generally pinkish buff in colour.

The fabric contains well-sorted red and white sand grains (<1mm) and voids throughout the whole section. This ware parallels Kennet's (2004:85) TORP. Priestman (2005:208–209) splits this ware into four sub-wares. His TORP.3 and TORP.4 relate to this ware and his TORP.1 relates to PATO, which could be a later version of TORP or made for different purpose. Similar shapes are also found in PATO. Except for a single sherd in Phase III, their main distribution starts from Phase IV, the highest (51% of TORP) being in Phase VII, followed by the 'Disturbed'.

Pale Torpedo Jar Ware (PATO)

PATO is a pale slightly softer version of TORP, possibly a later development for storage/transport of different materials. The fabric is hard-fired and the interior surface is bitumen lined. It is a large vessel with a closed narrow mouth, with a base/foot that was probably similar to TORP vessels. This ware has parallels with part of Kennet's (2004:85) general TORP grouping and relates to Priestman's (2005:208–209) TORP.1 and possibly TORP.2. The distribution of PATO is similar to that of the TORP, appearing in Phase IV and increasing from Phase VII, with the highest numbers of sherds (60%) being found on the surface.

Buff ware (BUF)

BUF is a medium-fired large thick-walled (16–18mm) storage vessel made of pale buff fabric, with long linear voids within the fabric and well-sorted pale sand grains (>1mm) strewn throughout the fabric. Its surfaces are smoothed, particularly on the exterior. It has parallels with Buff wares in other works including Kennet (2004:81) and the BW (SV) of Nanji (2011:60). Apart from two sherds in Phases IV and V, the distribution of BUF is confined to Phases VII, and the 'Disturbed'.

Large Incised Storage Vessel (LISV)

LISV have a thick, (21mm) hard pink fabric with a pale buff surface. Sandy inclusions with sparse shell fragments are present in the fabric. Incised wavy decorations run in a 10mm band around neck of vessel. The surfaces are flattened and smoothed. A thin cream slip or salt wash is applied to the external surface. LISV is a handmade storage vessel paralleled in Kennet (2004:78). Except for the single sherd in Phase IV, LISV is confined to Phases VII, the 'Disturbed' and the 'Surface'.

Lime Tempered Ware (LIM)

LIM has a medium thick, (approx.12 mm) brown coloured, lime tempered, coarse clay fabric with rough surfaces. It has sand and abundant lime inclusions whose density varies greatly. The surface and fabric colour vary significantly and occasional exterior surfaces are almost white. Its unburnt surfaces are fairly smooth. Very few of these sherds have paddle marks. LIM parallels Kennet's LIME (Kennet 2004:79). LIM is a late introduction and only found in Phases VII, the 'Disturbed' and the 'Surface'.

Large Red Vessel Ware (LARV)

LARV is a very thick, heavy and hard, but brittle ware for very large storage jars/vessels. Its red/orange outer fabric sandwiches a dark grey central fabric. It is a handmade ware with rough surfaces and distinctive rim forms, some of which have finger imprints along the top. LARV is a late introduction and only found in Phases VII, the 'Disturbed' and the 'Surface'.

Selected ware description—Table wares

Islamic White Ware (IWW)

Five variants of Islamic White Ware (IWW, IWW1, IWW2, IWW3 and IWW4) make up nearly 63% of the tableware assemblage at Mantai. This distinction is based on the fabric (Catalogue 3.5). IWW is generally thinner than 10mm with white or cream coloured fabric. It has a hard medium-fired fabric with surfaces flattened and smoothed. Some sherds have incised, grooved, ribbed or appliqué decoration on the exterior surfaces. IWWs forms are either a water jar or small bowl vessel types. They are similar to Kennet's (2004:77) WHITE and Priestman's WINC (2005:201–02), both of which are very broad classifications. Two sherds of IWW2 was found in Phase III and one of IWW4 in Phase IV, with the main distribution coming from Phase V to the 'Disturbed'.

Eggshell Ware (EGG) and Pale Red Egg Shell Ware (PREGG)

EGG has a wheel-turned fine fabric, made of well-levigated clay with small rounded lime inclusions. It has very thin walls (3–5mm) suggesting water vessels or fine tableware: they clearly were products of quality. Its surfaces are heavily smoothed during manufacture. The exterior is slightly burnished on some examples. EGG is hard fired, but brittle. It parallels Kennet's (2004:84) EGG.

The PREGG is probably a variation of EGG. It is separated due to a slight shift in colour, and the presence of sparse voids and black inclusions on the surfaces. PREGG also has characteristic finger impressions on its interior. Only two rim sherds for both variants were recorded. Single PREGG sherd was found in Phase III, with both wares occurring in Phases VII and the 'Disturbed'

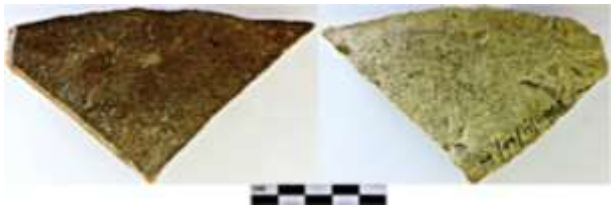
Non-glazed rims and vessel forms

Eighty-five rims comprise the Mantai NGW assemblage. Apart from IWW1 and IWW2, all rim types discussed here are closed large storage jar/vessels (C3.9.27; Plate 3.8). Nearly 85% of the Middle Eastern Non-glazed ware rims belong to four variants of LARV, the most common being the LARV1 and 2. IWW1 is an open mouthed shallow small tableware bowl. IWW2 is related to IWW1 and is probably a bulbous jar with a narrow neck and rim diameter and a closed mouth.

Non-glazed ware summary

Nearly 90% of the total Middle Eastern non-glazed assemblage belongs to large storage vessels (TORP, PATO, LARV, BUF, LISV and LIM). 59% of these are TORP and PATO, both of which are bitumen lined transport jars. The high percentages of large vessel sherds could be an over representation due to the brokenness effect of large vessels. Only 10% of the Middle Eastern Non-glazed are tablewares, of which nearly 63% belong to five variants of IWW. The non-glazed Middle Eastern assemblage is found between Phase III and the 'Surface' although more than 94% sherds were recovered from Phase VII onwards. The NGW may be dated to between the 3rd century and the 12th/13th century. Their individual dates are further discussed in 3.3.14.1.

Plate 3.9

Selected Middle-Eastern wares–NGW	
TORP	**PATO**
	
LISV	**LIM**
	
IWW	
	
EGG	**PREGG**
	

3.3.9.3 Middle Eastern Assemblage summary and discussion

There is a gradual increase of 'Middle Eastern' wares from Phases III (0.4% and six wares) to VII (12% and 24 wares), disregarding Phase VI (the wall). The Middle Eastern assemblage seems to have proliferated in the upper levels as is clear from the quantity of sherd/ware counts. With 63% of sherd counts, the Middle Eastern wares are dominated by large storage/transport jars, indicating the volume of traded cargo. Although only 37% of the Middle Eastern assemblage are tablewares, they represent 28 different wares. They included various fabrics and glazes of TURQ, IWW, TIN, LUSTRE and EGG. The demand for luxury/ tablewares indicates the emerging of an elite class in Sri Lanka. The source of these wares seems to be Iran, Iraq and the Gulf region (C3.9.1).

Carswell et al.'s (2013) analysis of the Chinese, Islamic and other imported pottery types is discussed in a single chapter focusing entirely on East-Asian wares. A few 'Islamic' ceramics are illustrated in photographs and their captions indicate that the assemblage included a small quantity of Turquoise-glazed Wares and Torpedo jars.

Our Middle Eastern assemblage at Mantai is comprised of Glazed and Non-glazed wares. All Glazed wares are tablewares and make up only 2% of the TCA. Since glazed wares at Mantai are exclusively imported, they are of great significance to the present study. AGW and OGW found at Mantai are also recorded from interior sites, such as Anuradhapura (Prickett 1990), and are widely distributed across the Indian Ocean (Tampoe 1989; Nanji 2011). The Middle Eastern glazed wares are well studied and dated around the Indian Ocean and can provide a chronological framework for maritime trade.

The Mantai non-glazed assemblage (NGW; 6.15% of the TCA) consists of storage/transport wares and table wares. Of the NGW table wares, IWW, EGG and PREGG are the only significant wares (10% of selected NGW). Our IWW is similar to WHITE of Kennet (2004:77) who suspected an Iranian or Iraqi origin. IWWs vary in our assemblage as well (Catalogue 3.5; cf. Morgen and Leatherby 1987:83; Kennet 2004:77). Although they occur from Phase III to the 'Surface', more than 90% IWWs, however, are found from Phase VII onwards. Kennet agrees on the date range of 9th to 15th/16th century for WHITE/IWWs.

Ninenty percent of seleced NGW are large storage/transport wares. Of these, TORP and PATO are the most important wares, which are recorded from many sites in Sri Lanka and across the Indian Ocean. Numerically, the most important storage/transport jars are LARV and LIM. Both wares appear in the Mantai sequence from Phase VII onwards. While the geographical distribution of LARV is unclear, LIM, which are possibly from Bahrain (Kennet 2004:79),[43] are recorded from the late Islamic period in Bahrain (Larsen 1983:292; Frifelt 2001:Figure 90), and the late 14th to late 16th century from al-Mataf and at Hulaylah (Kennet 1994 and 2004:79). LISV, which originates from Iran or even to Ras-al-Khaimah (Kennet 2004:78), is found from Somalia (Smith and Wright 1988), Sanjan in India (Nanji 2011:78–79), to Mantai. They might have been components of the Islamic cargoes arriving at Mantai and may be dated to between the early/mid-8th and the 12th/13th century, or based on Kenneth (2004:79–80) even as late as the 14th/16th century (see 3.3.14.1 and see Catalogue 3.10).

[43] LIME in (Kennet 2004)

The Middle Eastern assemblage is the largest and most diverse foreign group from Mantai. They provide the best data set for creating connections with the region hence they are integrated with similar findings across the Indian Ocean in Chapter 5.

3.3.10 Chinese assemblage

The Chinese assemblage is composed of 450 sherds representing 18 wares (C3.9.28; Table 3.9). All traded Chinese ceramics in the Indian Ocean are glazed (Zhang pers.comm.2014), as is the assemblage from Mantai. Their distribution across phases is given in Figures 3.30 and 3.31.

Table 3.9: Chinese ware and sherd counts across phases

Phase	III	IV	V	VI	VII	'Disturbed'	'Surface'	Total
Wares	1	1	3	2	13	13	7	18
Sherds	2	1	10	5	88	84	260	450

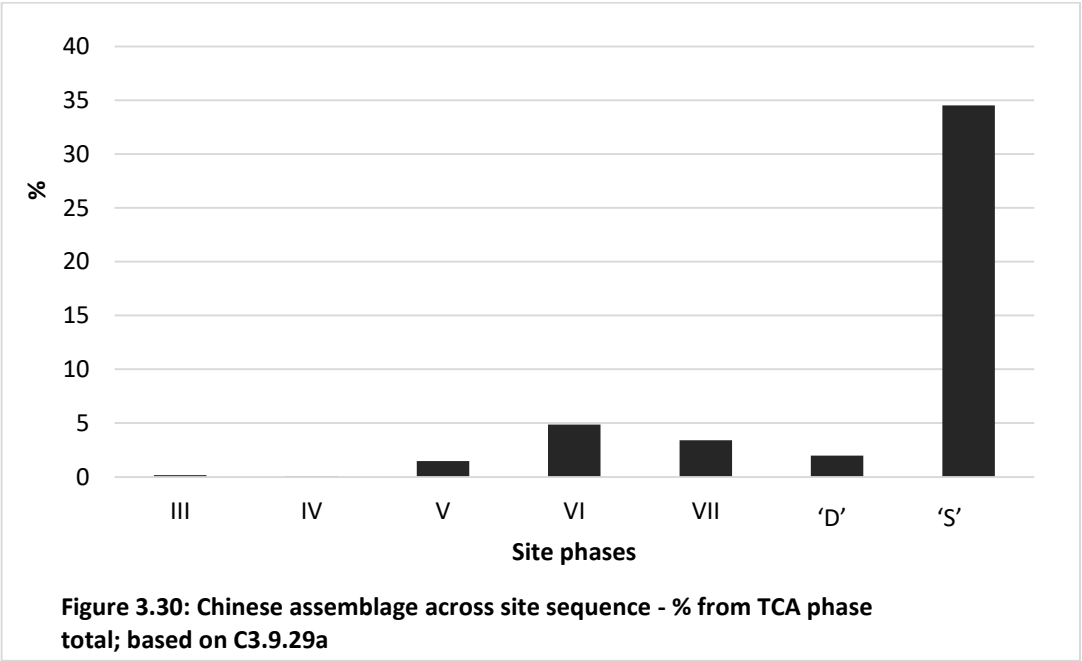


Figure 3.30: Chinese assemblage across site sequence - % from TCA phase total; based on C3.9.29a

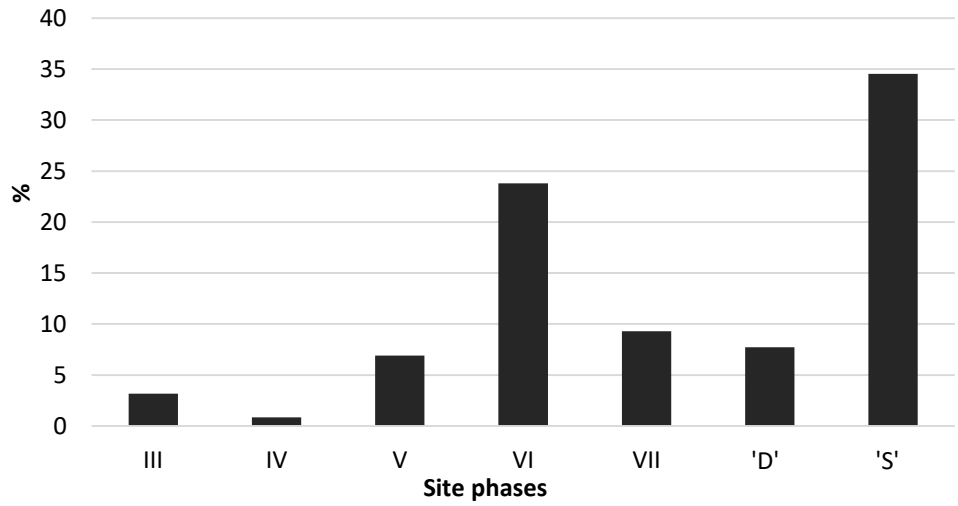


Figure 3.31 Chinese assemblage across site sequence - % from ICA phase total; based on C3.9.29b

The Chinese assemblage comprises 4% of the TCA and 14% of the ICA (C3.9.29a&b). Although Chinese wares appear in Phase III, their occurrence before phase VII is minimal and only accounts for 3% of the assemblage. Thus, the main concentration is from Phase VII onwards, including the 'Surface', which contained 58% of the total Chinese assemblage. Similarly, Chinese ceramics comprise nearly 35% of the total surface assemblage, which is much larger than that from the Middle East, which is otherwise the largest of the imported assemblages. The outstanding size of the surface assemblage indicates the continued arrival of Chinese ceramics (e.g., DING and Southern White Wares) up to *ca*. the 12th/13th century. The increase of Far-Eastern wares in the upper levels is accompanied by a proportionate decline in the Middle Eastern wares reaching the site reflecting the changing pattern of maritime trade.

This discussion is based on selected wares, which account for 94% of the total assemblage (C3.9.30a&b; Plate 3.10). The occurrence of Chinese wares in the early phases appears intrusive and they increased from Phase V (Figures 3.30 and 3.31). Phase VII, the 'Disturbed' and the 'Surface' contain over 91% of Chinese ceramics, which was also the peak of Chinese trade during which Mantai played a central role as a transhipping port. Of the selected

assemblage, DUSUN[44] dominates the Chinese assemblage in terms of its sherd count (63%), followed by CHANG (13%) and YUEC (7%) (Figure 3.32). Figure 3.33 shows the consistent occurrence and the diversification of the Chinese assemblage after Phase VII.

(GDC.1 & 2; SCC.1 & 2 are amalgamated into GDC and SCC general categories in Figure 3.32)

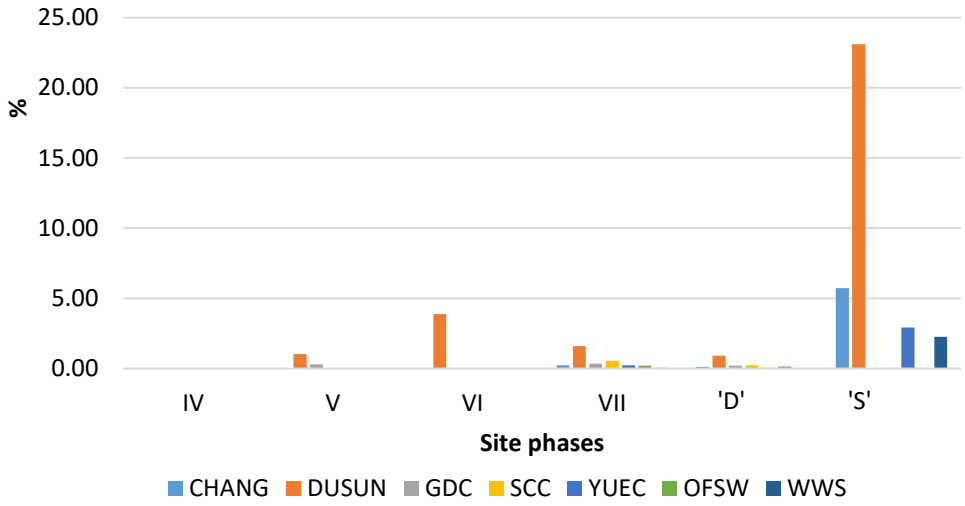


Figure 3.32: Selected Chinese assemblage across site sequence - % from TCA phase total; based on C3.9.30a

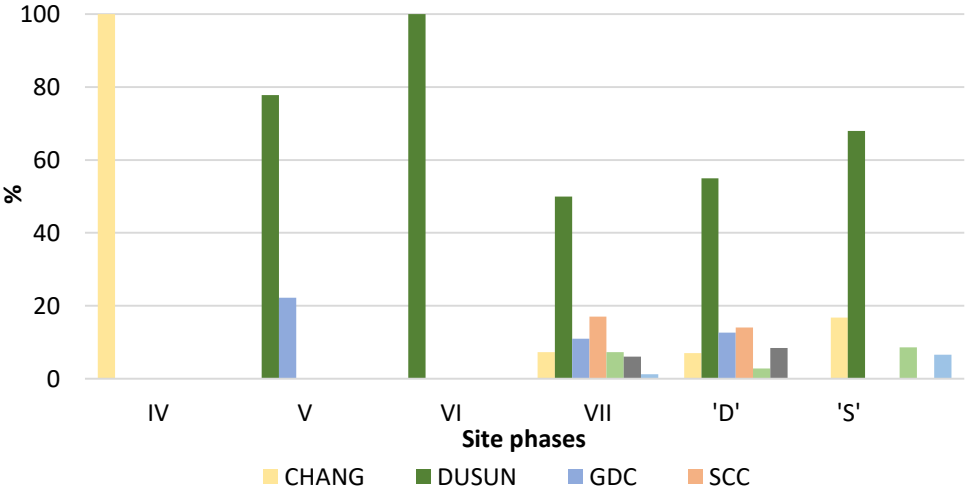


Figure 3.33: Selected Chinese assemblage across site sequence - % from Selected Chinese assemblage phase total; based on C3.9.30b. Note the increase of assemblage size and diversification of its composition after Phase VI

[44] Dusun is also known as Guangdong Stoneware (e.g., Sasaki 2004:59).

3.3.10.1 Selected ware descriptions

The Chinese assemblage is clearly divisible into storage/transport and tablewares.

Storage/transport wares

Dusun Ware (DUSUN)

DUSUN is wheel made with a hard fired thick grey fabric and a strong olive green glaze on both sides. It is a large storage/transport jar vessel with a flat base. Thick (13–18mm) vessel walls are the key feature of this ware. A fine fabric is used with very few inclusions; sub-rounded black grits (3mm) and very sparse 1mm voids. Occasional areas of red can be seen around the edge of glaze towards the base due to the oxidation of the slip where there is no covering glaze.

Table wares

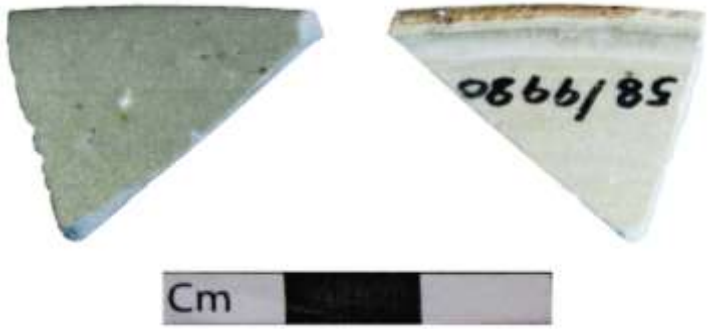
Changsha Ware (CHANG)

CHANG is wheel-turned, with a hard fired very fine pale yellow or pale buff stoneware fabric with a distinctive polychrome painted decoration below a clear strong un-glazed 1mm thick glaze. These thin (10mm) walled vessels have ring foot bases.

Yue Celadon Ware (YUEC)

YUEC is wheel-turned, in a very thin (3mm), fine, well-sorted and levigated stoneware. The greyish grey fabric contains no inclusions or voids. Its smoothed surfaces have a thin white glaze.

Plate 3.10

Selected Chinese ware	
DUSUN	**CHANG**
	
YUE	
	

3.3.10.2 Rims and vessel forms

Twenty-four rims are present in the Chinese assemblage, with DUS1 and DUS2 being the most commonly represented (C3.9.31). DUS1 rims are half rolled towards the exterior and smaller and thinner than the body of a jar. The interior surface of the rim is gently curved upwards and outwards. The top of the rim is rounded and unglazed. The DUS2 Storage Jar type rim is everted from an inward curving body. The termination of the rim has a rounded square profile. Both DUS1 and 2 are closed storage jars. The other DUSUN rim, GGW1, has an inverted rim and is a large stoneware bowl with an open orifice.

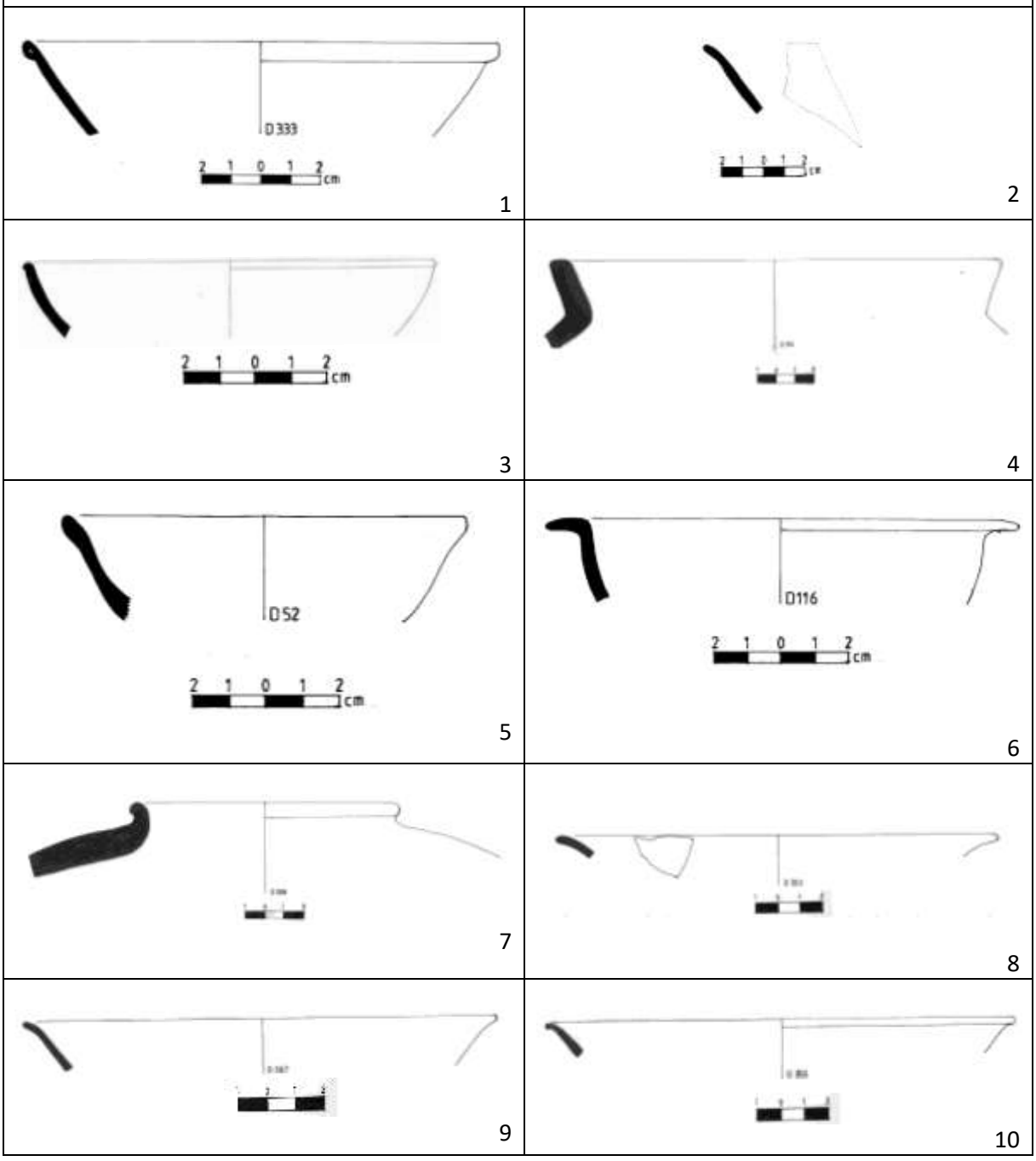
All Chinese tablewares, with the exception of OCW, are small or large bowls with open mouths. Of these, YUEC2 and YUEC1 of Yue Ware contain the highest number of rims. YUE2 has a simple everted thin rim, the interior of which is flat, it then curves gently outwards to the termination of the rim. There is a small protruding lip at the exterior termination of the rim. The top of the rim is rounded. YUEC1 is an everted rim of a small bowl, of which the interior surface curves outwards at the rim and meets its exterior surface creating a slightly pointed rim edge.

Although having a smaller sherd count, the number of Chinese fine tablewares present in our assemblage is greater than storage jars. Large vessels such as DUSUN might have been used for transporting cargo, including fine wares, as is clear from the Belitung wreck (Krahl et al. 2011).

Descriptions and drawing log of rims in C3.9.31 are given in Catalogues 3.8 and 3.9. Rim forms discussed here are illustrated in Plate 3.11.

Plate 3.11

Chinese rims



1. XING1 2. DING1 3. GGW2 4. DUS2 5. GGW3 6. TBW1 7. DUS1 8. GDC3.1 9. YUEC1 10. YUEC2

3.3.10.3 Assemblage summary and discussion

The identification of Other Chinese Ware (OCW—2 sherds) in Phase III as Chinese is tentative and the single sherd of CHANG in Phase IV also seems to be intrusive (or mixed; 3.7.5.1) since the date of CHANG is later than this phase. Graham (2013c:185) also notes that Chinese ceramic types typical of post-8th century production appear alongside local wares dated to between the 1st/2nd and the 5th/6th centuries at Mantai, suggesting that these sherds are intrusive. The few sherds in Phases III and IV in our excavation may fall into this category.

Chinese wares with a secure context are found from the upper level of Phase V and although small in numbers, sherds of both large storage jars and tablewares are found. Chinese ceramics increase from Phase VII upwards, with this phase producing 13 wares and 88 sherds, including 41 sherds of DUSUN storage/transport jar and 12 tablewares, including YUE, CHANG and SCC1. The profusion of Chinese ceramics in the succeeding phases is clearly visible by the presence of 76% Chinese sherds and 16 wares in the 'Disturbed' and in the surface sample. Together this indicates that by the time of Phase VI (early/mid-8th century), Chinese contacts were well established and reached their peak during the later part of this phase and into Phase VII. The majority of our Chinese assemblage, therefore, dates from *ca*. the late 7th/early 8th to the late 9th and the 10th centuries, with a small quantity of wares datable up to the 12th/13th centuries.

Carswell et al. (2013:231–269) provide good information about the Chinese wares, which includes Yue Celadon, Dusun, Changsha, Green Splashed White Wares. Regrettably, no clear statistical or stratigraphic details are available. Carswell et al. (2013) draws a comparison between the Chinese wares from Mantai and material discovered on the Belitung shipwreck

(Krahl et al. 2011) and from the site of Nishapur in north-western Kurasan (Iran) (Wilkinson 1976). They argue that, given the strong cultural commercial links between the royalty of Sri Lanka and China during this period the destination of the Belitung ship could have been Mantai (Carswell et al. 2013:223).

The composition of our Chinese assemblage is similar to that of Carswell et al. (2013), with DUSUN and CHANG the most dominant. Chinese and SEA wares provide an excellent basis for discussing Sri Lanka's interaction with the regions to the east of the island. Comparisons between the Far-Eastern assemblage and those of the Middle East reveal interesting patterns of interaction that contrasts with historical sources. The Middle Eastern ceramic evidence is much stronger at Mantai than those from the Far-East and perhaps even India until the beginning of the 11th century. The dominance of Chinese wares on the surface assemblage perhaps indicates continued Chinese connections and the decline of Middle Eastern connections during the latter part of the site's occupation. The occurrence of some Chinese sherds in the early phases of Mantai needs further attention. Historical records clearly indicate relations between Sri Lanka and China from at least the beginning of the CE (Werake 2003), which will be discussed further in Chapter 5.

3.3.11 Southeast Asian (SEA) assemblage

The possible SEA assemblage from Mantai is only tentatively identified.[45] It comprises only of nine wares and 79 sherds; which is 0.7% and 3% of the TCA and ICA. It is catalogued in C3.9.32 and summarized in Table 3.10. Figures 3.34 and 3.35 illustrate the distribution of the SEA assemblage. The occurrence of the SEA assemblage is similar to that of the Chinese as well as

[45] Possible SEA is written as SEA wares in the discussion.

the ceramic decoration dates discussed in 3.3.13.3 (cf. Solheim and Deraniyagala 1972). Only 13 sherds occur from Phase III to VI, after which sherd numbers and wares increase.

Table 3.10: 'SEA' wares across phases

Phase	III	IV	V	VI	VII	'Disturbed'	'Surface'	Total
Wares	1	2	2	1	6	6	3	9
Sherds	2	6	4	1	19	22	25	79

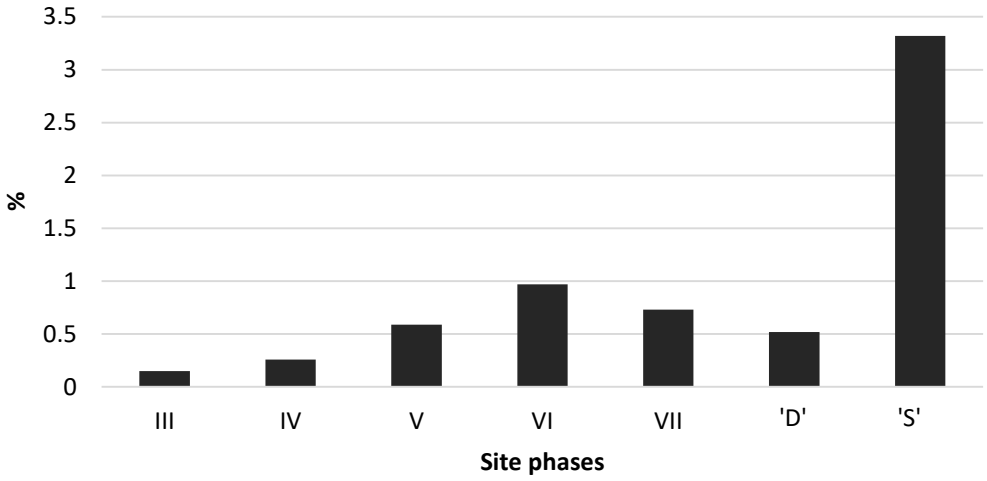


Figure 3.34: 'SEA' assemblage across site sequence - % from TCA phase total; based on C3.9.33a

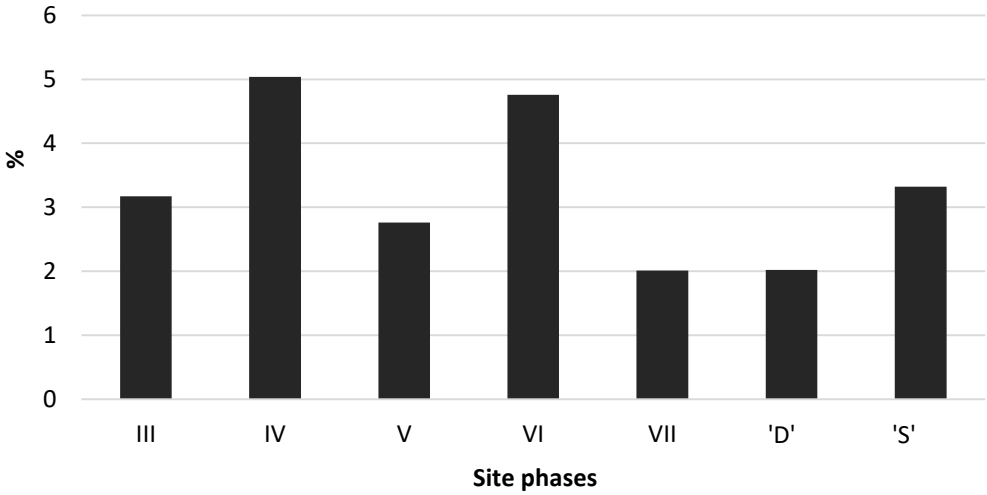


Figure 3.35: 'SEA' assemblage across site sequence - % from ICA phase total; based on C3.9.33b

3.3.11.1 Selected ware descriptions

The selected wares from the SEA assemblage are categorised as either glazed or non-glazed.

Glazed ware assemblage

Black Glazed Stone Ware (BLAG)

BLAG (Figure 3.36) is the only glazed ware in the assemblage from the SEA region (C3.9.34a&b). It is a wheel-turned ceramic in a hard fired fine grey stoneware fabric with sparse lime and black sand grain inclusions. It is covered with a thick opaque black glaze on both sides, with only the exterior smoothed before glazing.

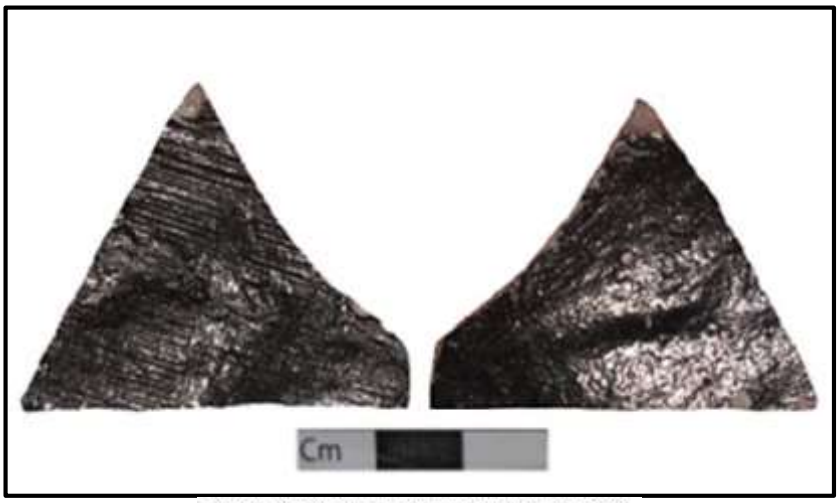


Figure 3.36: Black Glazed Ware (BLAG)

Non-glazed assemblage

Sixty-one sherds representing eight wares comprise the SEA Non-glazed assemblage. Of these only OFEW and PIOW are reasonably well-represented. As PIOW and MTIW can be more convincingly provenance to SEA on the basis of their decoration, these three wares will be dealt with in this section (C3.9.35a). OFEW, PIOW and HFEW are the most numerically significant (Figures 3.40 and 3.41) and the increase and diversification of the SEA assemblage after Phase VII follows a similar pattern to the Chinese assemblage. Also similar is that a few wares such as OFEW, HIT and PIOW occurred before Phase VII in limited quantities.

Over Fired Earthen Ware (OFEW)

OFEW (Figure 3.37) is a wheel-turned, over fired earthenware, which is pinkish grey in colour. The fabric is coarse and has white, mica and sand inclusions and abundant voids. Some sherds contained paddle marks and grooved lines on the exterior surface. The vessel form is unknown.



Figure 3.37: Over Fired Earthen Ware (OFEW)

Paddle Impressed Orange Ware (PIOW)

PIOW (Figure 3.38) is a thin (6–10mm) wheel turned, high-fired, orange ware with characteristic paddle marks on the exterior surface. Both surfaces are smooth. Some sherds have a sandwich fabric.

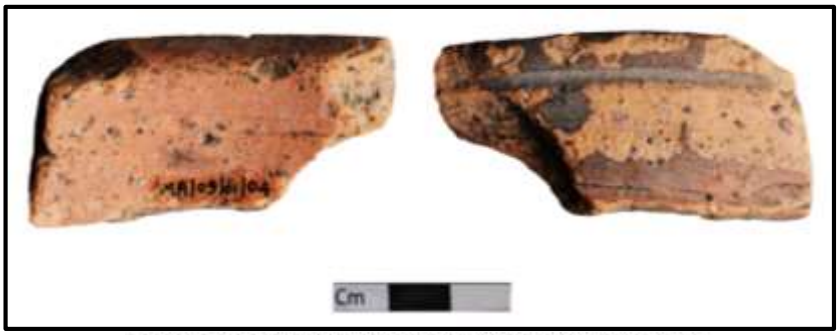


Figure 3.38: Paddle Impressed Orange Ware (PIOW)

Mica Tempered Impressed Ware (MTIW)

MTIW (Figure 3.39) is a thin (3.5mm), high-fired, two-toned fabric with mica-tempered surfaces. The exterior has characteristic paddle impressions. The fabric contains sparse red,

white (mica) and some sand inclusions and abundant voids. The reddish brown exterior and light reddish brown interior surfaces have slightly different colours.



Figure 3.39: Mica Tempered Impressed Ware (MTIW)

Both MITW and PIOW are tablewares and are discussed in detail under decoration.

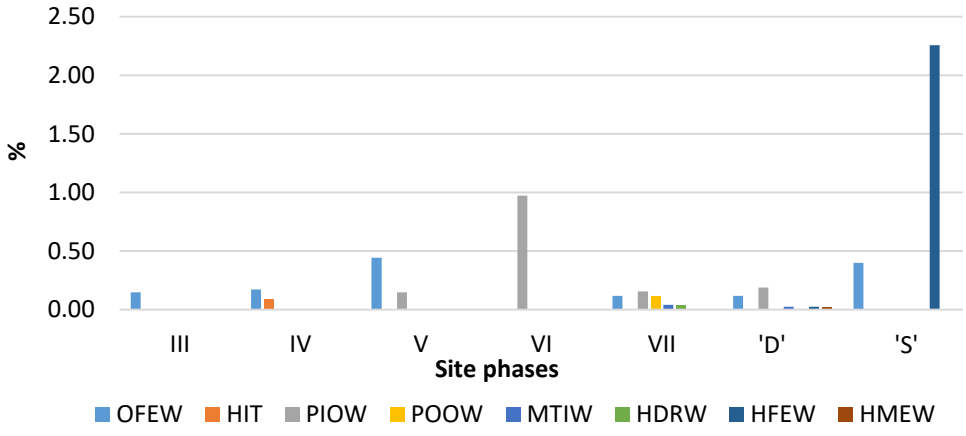


Figure 3.40: Non-glazed 'SEA' assemblage across site sequence - % from TCA phase total; based on C3.9.35a

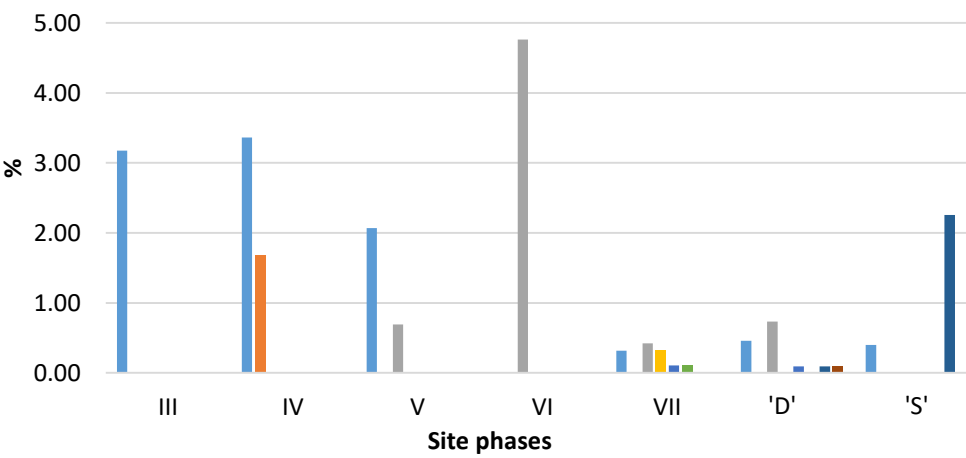


Figure 3.41: Non-glazed 'SEA' assemblage across site sequence - % from ICA phase total; based on C3.9.35b. Note the increase of assemblage size and ware composition from Phase VII upwards

3.3.11.2 Non-glazed rims and vessel forms

In the SEA Non-glazed assemblage, only HFEW and PIOW have rim sherds, which come from the 'Disturbed'. The single HFEW rim is of a storage jar and the PIOW is of a bowl (C3.9.36; Plate 3.12).

3.3.11.3 Assemblage summary and discussion

The distribution of the SEA wares at Mantai is similar to that of the Chinese wares. Two wares, OFEW and HIT have a small number of sherds in Phase III and IV. While the identification of these sherds as SEA is tentative, the occurrence of them at such an early stage, alongside similar early Chinese wares, requires further analysis. SEA wares did not increase until Phase VII, when the highest number of wares and sherds for the undisturbed phases are recorded. The 'Disturbed' and the 'Surface' have six wares of which HFEW and HMEW are the most significant 59% of SEA sherds are also found in the 'Disturbed' and the 'Surface,' indicating their increase after the 8th/9th century. Except for the POOW, PIOW and MTIW, which are fine tablewares, all of the other high-fired earthen wares are storage/transport vessels.

Solheim and Deraniyagala (1972) surveyed Sri Lanka in order to determine the Southeast Asian presence on the island, one of the main proxies for this being pottery. Apart from a few suspected paddle impressed sherds, they found only negative evidence. Furthermore, no previous research has reported any SEA ceramics from Mantai.[46] Consequently, the identification of SEA wares at Mantai, on the basis of their decorations (3.3.13) is significant. A number of paddle impressed wares such as OW had close similarities with sherds identified

[46] However, in a caption to a plate (Rn.1011, 3420 and 3421), Graham (2013:208) mentions the flat base of a large vessel (Very hard (? stone ware), fine off-white fabric with a glossy purple (?) glaze inside and out and externally glazed) of which the origin could be SEA or China.

as SEA at sites such as Kottapattanam (Karashima 2004:3–10). Further research, however, is needed on SEA assemblage.

3.3.12 'Imported.Unknown' ('Imp.Unk')

The 'Imp.Unk' assemblage comprises of 725 sherds representing 32 wares of diverse fabrics, firing, surface treatment and form. As they do not resemble any local types, all are considered as foreign and hence termed 'Imp.Unk'. The entire assemblage is unglazed (C3.9.37 and Table 3.11). The changing proportion of 'Imp.Unk' over time is clearly visible from Figures 3.42 and 3.43. The 'Imp.Unk' account for nearly 6% and 11% of the TCA and ICA, respectively.

Table 3.11: 'Imported.Unknown' ware and sherd counts across phases

Phase	II	III	IV	V	VI	VII	'Disturbed'	'Surface'	Total
Wares	1	7	11	19	2	19	21	12	32
Sherds	1	34	85	52	3	212	257	81	725

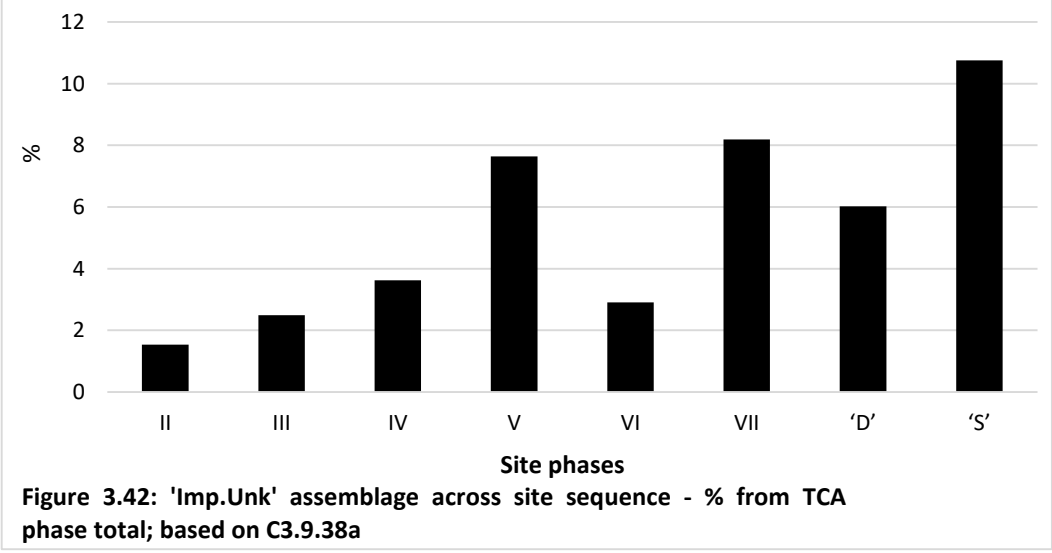


Figure 3.42: 'Imp.Unk' assemblage across site sequence - % from TCA phase total; based on C3.9.38a

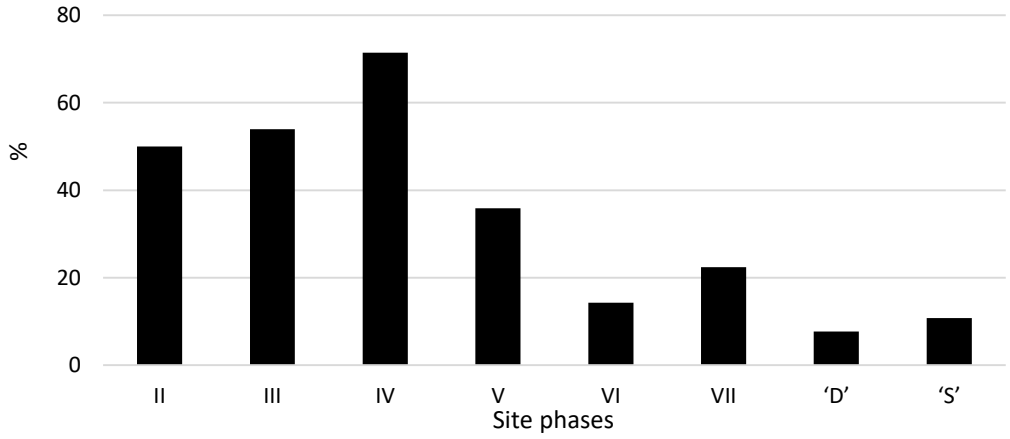


Figure 3.43: 'Imp.Unk' assemblage across site sequence - % from ICA phase total; based on C3.9.38b. Note the decrasing six from 'Imp.Unk' assemblage from Phase V due to the increase of other imported wares

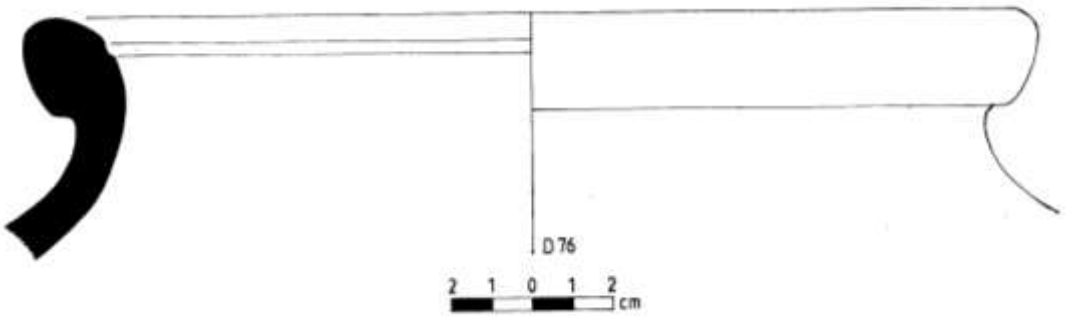
Figure 3.42 demonstrates the increasing proportion of 'Imp.Unk' wares (disregarding Phase VI) in relation to the TCA, with a minor decrease in the 'Disturbed'. The 'Imp.Unk' accounted for more than 50% of the ICA from Phases II to V (Figure 3.43). The proportional decrease in the size of the 'Imp.Unk' assemblage, albeit with an increase in both sherd and ware counts, is due to the increase in other imported wares in the later phases. Although this group of wares seems to date from *ca.* the late 1st century, the higher number of 'Imp.Unk' wares from Phase IV upwards may indicate growing connections with undetermined regions from about mid-3rd century.

3.3.12.1 Selected ware descriptions

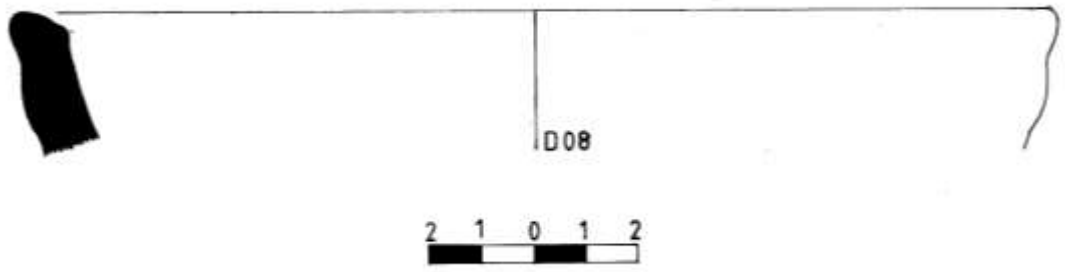
321 sherds representing five wares were selected for further discussion. These represent 3% and 10% from the TCA and the ICA, respectively (Figures 3.44 & 3.45). A higher proportion of 'Imp.Unk' in the early phases in the ICA and their gradual decrease in the upper levels is notable. Nevertheless, the arrival of new wares at Mantai from Phase V on suggests a wider range of geographic contacts than previously.

Plate 3.12

SEA rims



1



2

'Imp.Unk' wares (Plate 3.13) can be discussed under storage and table categories. In this section, only the numerically significant THBRW (112), HAFB (108), OBW (71) and the artistically diagnostic PROW and POW are discussed.

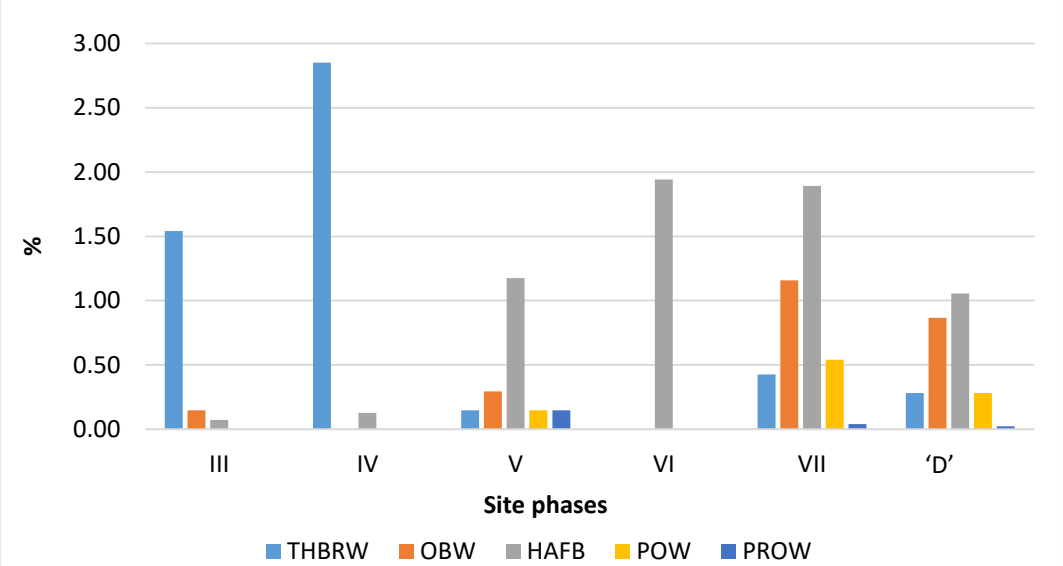


Figure 3.44 Selected 'Imp.Unk' assemblage across site sequence - % from TCA phase total; based on C3.9.39a. Note the diversification of assemblage composition from Phase V upwards

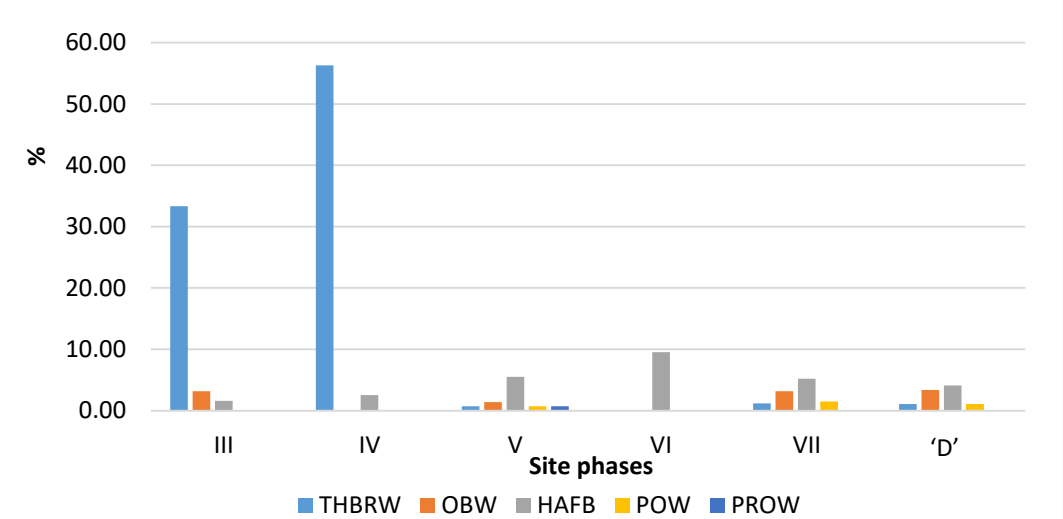


Figure 3.45: Selected 'Imp.Unk' assemblage across site sequence - % from ICA phase total; based on C3.9.39b. Note the proportionate decrease of assemblage size albeit the increase of sherd and ware count after Phase IV

Storage/transport wares

Thick Body Red Ware (THBRW)

THBRW is a wheel-turned, medium-thick (11–14mm), hard, reddish brown ware. Its fabric contains angular, sub-rounded, and rounded black and white inclusions. Some sherds have smooth exterior surfaces, which were probably once slipped. A few of the sherds have a black layer coating the interior surface. Paddle marks and grooved lines are noted on some sherds. Vessel forms are probably storage/transport vessels.

Hard Fired Buff Ware (HAFB)

HAFB is handmade, in a hard-fired buff/pale yellow, medium to thick-walled (11–13mm) fabric with occasional shell temper present on its surfaces. There is well-sorted sand temper with small linear and circular voids throughout the fabric, which feels sandy to the touch. Some examples have cratering on their exterior surface.

Tablewares

Orange-Brown Ware (OBW)

OBW is wheel-turned in a thin (4–9mm), high-fired, well-sorted fabric with very sparse inclusions and voids. Its surfaces are generally smooth with mica inclusions. Grooved decorations punctuate the interior and exterior of a few sherds for a multi-purpose tableware. The exterior surface colour varies from light red to red.

Painted Red and Orange Ware (PROW)

PROW is wheel-turned, in a thin (4–7mm), hard, well sorted and lavigated fabric with smooth surfaces. The exterior surface is painted with red lines and engraved with floral designs in between two ridges. The interior surface is slipped/polished (See 3.3.13).

Pale Orange Ware (POW)

POW is wheel-turned, in a thin (3–5 mm), hard, well sorted light red fabric with a smooth interior surface. Voids, sand grains and black inclusions are visible in the fabric and on the surfaces. Various decorations such as grooved and incised lines, ridges and engraved designs on the exterior surface as well as ribbing marks on the interior surface are noted.

3.3.12.2 Rims and vessel forms

Eighteen rims comprise the 'Imp.Unk' ware (C3.9.40). The form/function of seven of them is un-determined. Of the identified wares, nine are tablewares and only two rims represent storage/cooking wares. These vessel forms are illustrated in Plate 3.14.

3.3.12.3 Assemblage summary and discussion

'Imp.Unk' is clearly divisible into storage/transport and tablewares. 87% of them, representing 19 wares are storage/transport vessels; which is 20% of the ICA. Storage wares such as THBRW and HAFB are distributed from Phase III to the 'Surface' (C3.9.41). These large vessels of unknown foreign origins indicate large-scale trade and exchange networks with as yet unknown regions from *ca*. the late 1st century that peak around the 8th and the 9th centuries.

Ninety-four (0.7% of the TCA) sherds representing 13 wares could be classified as tablewares (C3.9.42), which make up 13% of the 'Imp.Unk'. They included deluxe wares such as PROW and POW (section 3.3.13). It is likely that they were of Indian or SEA origin, which is discussed under decorations. Tablewares mainly occur from Phase V onwards and both storage and deluxe vessels continued to reach Mantai until the last phases of its occupation.

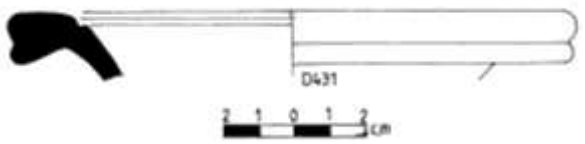
The 'Imp.Unk' assemblage indicates contact with wide geographical regions, international trade in large cargos and the demand for luxury wares at Mantai from about the beginning of the CE. The wares in the 'Imp.Unk' are unknown from local assemblages and they could be derived from South Asia (exclusive of Sri Lankan), SEA and the Middle East. It is unlikely that any are from China, as all of the Chinese assemblage from Mantai is glazed. Interestingly their widespread distribution across phases is somewhat different to all other origin groups. Their highest concentration is in Phase VII and the 'Disturbed', which coincides with the peak of east–west trade around the 8th and 9th centuries. Further studies are needed to establish their precise origin. An initial attempt is made at this using decoration for a few wares.

Plate 3.13

Selected Imported.Unknown wares	
THBRW	**HAFB**
	
OBW	**PROW**
	
POW	
	

Plate 3.14

'Imp.Unk' rims



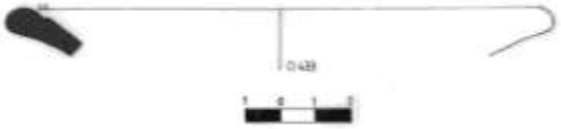
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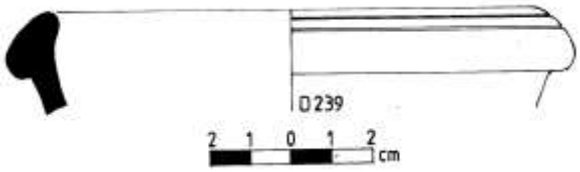
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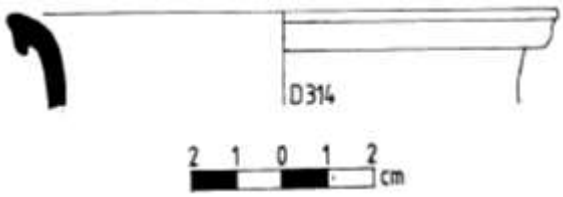
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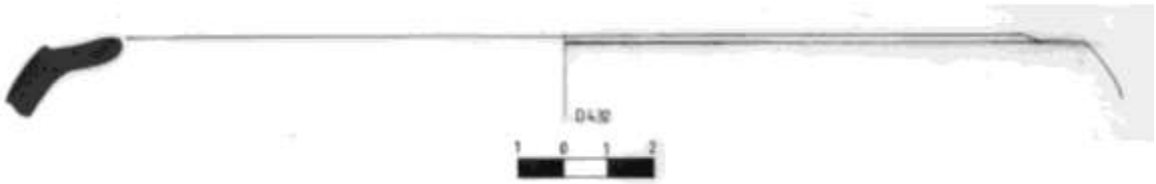
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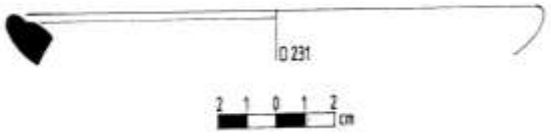
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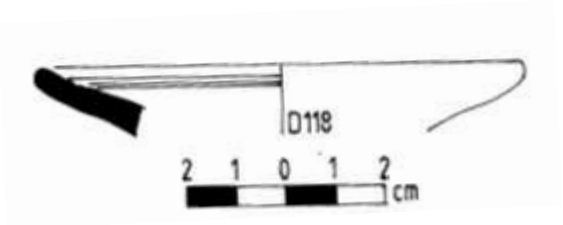
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3.3.13 Ceramic surface treatment and decorations

A total of 7,090 sherds (58%) of the Mantai TCA are either decorated or treated on their exterior, interior or on both surfaces. Of these, 79% are local while 20% (1380 sherds) imported (Table 3.12; C3.9.43a&b). Stylistic variations, such as the surface treatments and decorations are considered as temporal markers (Lertrit 2004:8) and are used for dating ceramic assemblages. Decorations such as 'cord marks', 'stamping', 'incising', and 'punctuating', of which the origin is assigned to SEA (Lertrit 2004) are widely distributed, including in India and Sri Lanka. The Mantai assemblage includes most of these decorations.

Table 3.12: Surface treated and decorated ware summary

Origin	Sri Lanka	'Ind/SL'	India	ME	China	SEA	'Imp.Unk'	'Unk'	Total
Total	5664	17	420	319	450	42	164	14	7090

In this study, slipping, polishing, burnishing, glazing and painting methods are discussed under 'surface treatment'. All other methods such as paddling, incising, and grooving used for decorating pots, are discussed under 'decorations'. In some cases, however, these two categories overlap as surface treatments and decorations are found in the same vessel (Table 3.13).[47]

Table 3.13: Surface treated and decorated wares

Total	Surface treated	Decorated	Surface treated *cum* decorated
7090	3769	1382	1939

With regards to decoration, the present analysis considers only one attribute per sherd with sherds having more than one attribute grouped as 'multiple decorations'. This attribute-based seriation is then used to infer the dating of ceramics and to trace cross-cultural interactions.

[47] Treating ceramic decorations and surface treatment under separate headings does not mean that the relationship between two is rejected, but to record that in most cases they cover different proportions of the vessel.

While the complete ceramic surface treatment and decorations are given in catalogue 3.2, this section deals with the most significant decorations and surface treatments.

3.3.13.1 Surface treatment

5,708 (47% of the TCA) sherds from the Mantai assemblage demonstrate surface treatments (C3.9.43a). Figures 3.46 & 3.47 illustrate the dominance of slipping across the sequence, particularly during the early phases. The increasing amount of glazing from Phase V onwards marks the arrival of wares from the Middle East and Far-East.

Slipping accounts for nearly 82% of the sherds with a surface treatment. Though slipping runs across 17 different wares (C3.9.44a), 96% of the slipped sherds belong to RESL. Chronologically, slipping is found from Phase II to the 'Surface'. Glazing, the second largest category of surface treatment, is discussed under Middle eastern and Far-eastern assemblages (see C3.9.45a&b).

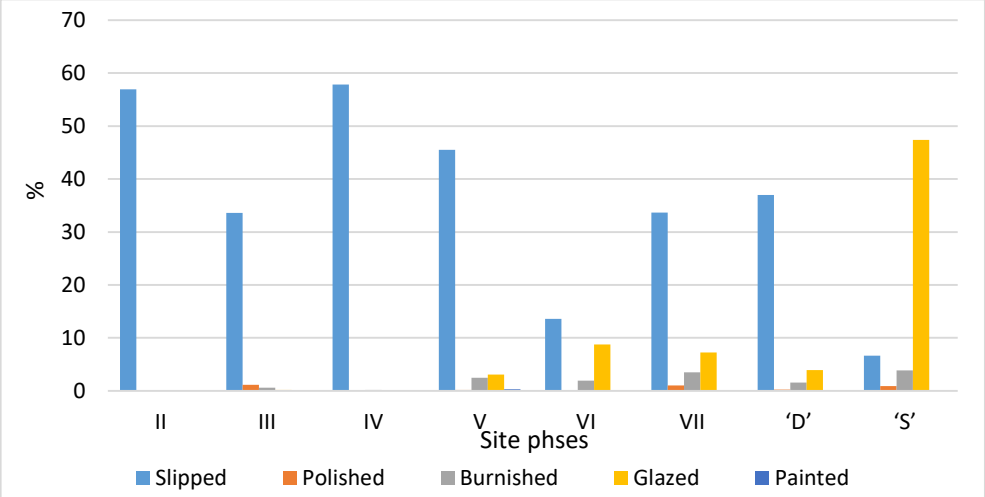


Figure 3.46: Distribution of surface treated ceramic assemblage across site sequence - % from TCA phase total; based on C3.9.43a. Surface treated sherds reflect the diversification of the assemblage and regional/external contacts

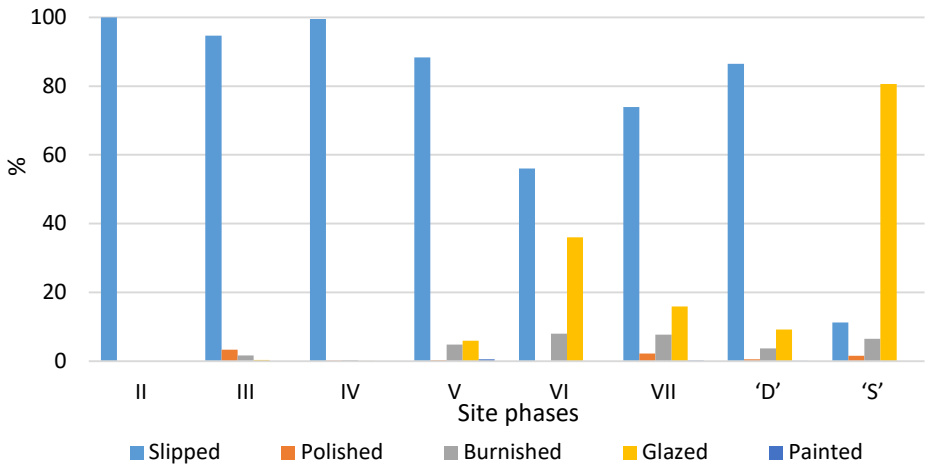


Figure 3.47: Distribution of surface treated ceramic assemblage across site sequence - % from surface treated phase total; based C3.9.43b

3.3.13.2 Decorations

Exterior and interior decorations were present on 3,321 sherds (C3.9.46). Only 147 (4.4%) have interior decorations and are documented in C3.9.47a&b, they are not discussed any further here (Plates 3.15 and 3.16).

3.3.13.3 Exterior decorations

Twenty-one variables were considered when analysing exterior decorations (C3.9.48a&b), however, only six of which account for more than 1% of the total decorated sherds and consequently the discussion here is restricted to these.

3,109 sherds (26% of the TCA) comprise the selected exterior decorated sherd assemblage (C3.9.49b). Paddled decorations (83%) dominate the group, with grooved lined decoration being the next most common category (10%; C3.9.49a).

Paddle impressed, stamped, cord marked, and incised surface decorations are historically significant for tracing cross-regional interactions and dating. They have been recovered from a large geographical area covering South Asia, SEA and China from the Neolithic/Iron Age to the Early and Middle Historic periods (Sharma 1967; Rao 1977; Goswami and Roy 1977; Sharma et al. 1980; Singh 2002, Solheim and Deraniyagala 1972, Behera 1994; Misra 2001; Bellwood 2005:94, Cherian et al. 2007; Selvakumar 1996; Rajan 1994). Pottery termed 'mat impressed', 'basket impressed', 'incised', 'cord impressed', 'paddle impressed' or 'stamped' wares (e.g., Wheeler et al. 1946; Sharma 1960) are collectively termed as 'Paddle Impressed/Stamped Wares' (PI/ST) in this study.

While Solheim (1972), Karashima (2004), Rao (2004) and Selvakumar (2011) assign a Chinese/Southeast Asian origin to these PI/ST wares, Bellwood (1997, 2005) suggests an Indian origin. Thus the earliest occurrence of PI/ST in the Late Iron Age and Early Historic period in India may have been imports from SEA, after which they were produced locally. PI/ST of Indian and Southeast Asian traditions, as well as their local production, occur at Mantai. In distinguishing these three groups, both the decoration and fabric were considered and published material from Sri Lanka (Solheim and Deraniyagala 1972), India (Selvakumar 2011; Karashima 2004; Rao 2004) and SEA (Bellwood 1997, 2005) were compared.

'Paddle impressed/ Stamped Wares (PI/ST) of SEA origin

Six wares, distinguished by minor variations in their fabric, are included in the SEA PI/ST group (Figures 3.48 and 3.49). Only 22 sherds were found. The sample size of the decorated imported assemblage is also only 10.6%, of the TCA[48] of which the majority come from China and the

[48] Excluding 'Ind/SL'

Middle East. SEA sherds in India are also few in number (Selvakumar 2011:200). Considering the historical significance of these wares, they are discussed below.

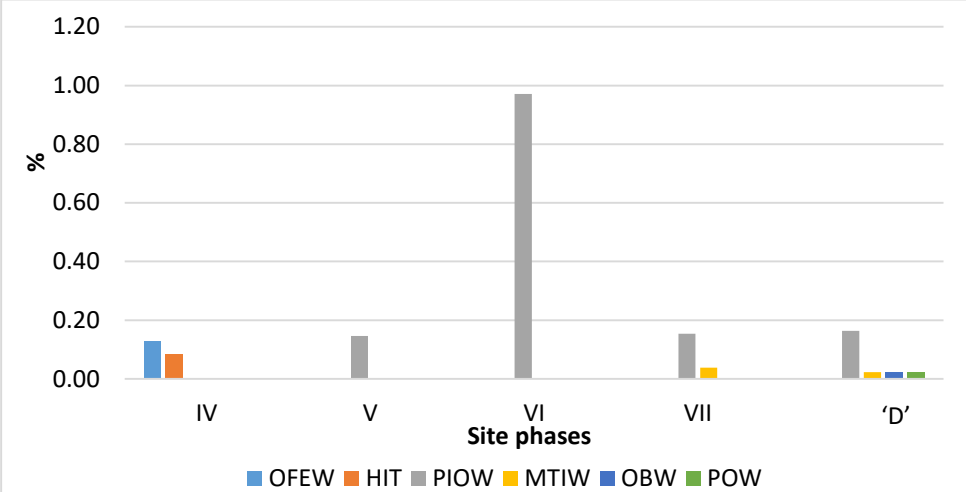


Figure 3.48: PI/ST wares of 'SEA' origin across site sequence - % from TCA phase total; based on C3.9.50a

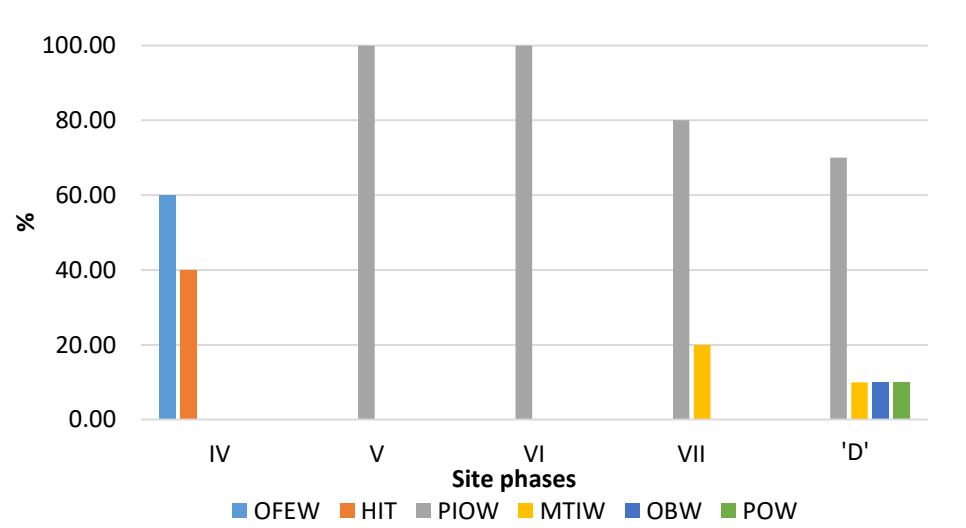


Figure 3.49: PT/SI wares of 'SEA' origin across site sequence - % from PI/ST wares of 'SEA' origin phase total; based on C3.9.50b. Note the dominance of PIOW from Phase V upwards and diversification of the PI/ST assemblage after Phase VII

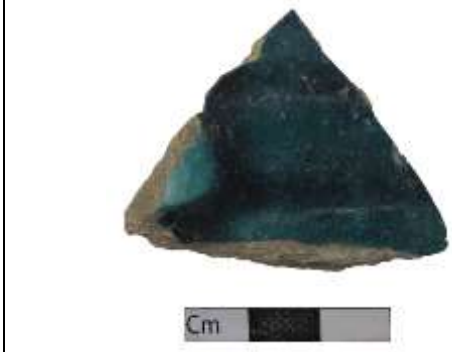
Plate 3.15

Ceramic decorations	
Banded	
	
Grooved lines	
	
Incised lines	
	
Paddle Impressed	
	

Plate 3.16

Ceramic decorations cont.

Ribbed





Stamped







Of the six wares of SEA origin, PI/ST, PIOW make up 59% of the assemblage, followed by OFEW (13.6%), HIT and MTIW (9% each). Of these, PIOW occurs from Phase V to the 'Surface'. As a group the main concentration of PI/ST ware are from Phase VII upwards.

In assigning an origin to the Mantai ceramic assemblage, both OBW and POW were considered as 'Imp.Unk' (3.3.12). As indicated in Plate 3.17, their decorations closely match those identified as coming from SEA wares at Kottapattanam (Selvakumar 2011) and with the published Sri Lankan material (Solheim and Deraniyagala 1972; Karashima 2004). The decorations of PIOW in particular, clearly match those of the Kottapattanam Stamped Wares, which are identified as SEA (Sasaki 2004:16–20, Pl.5:1–2, 6:1–2, 12:48–50). Moreover, the fabric of these wares shows close affinities to wares identified as SEA at Mantai.[49] Similarly, the palm leaf paddle impressions and incised/grooved decorations of MTIW closely resemble those of the Kottapattanam Stamped Wares (Rao 2004:11–15, Pl.5:2, 6:2; Sasaki 2004:16–20, Pl.12:48–49), for which reason they are included in this group. Therefore, these wares may tentatively be considered as SEA in origin.

At Mantai PI/ST occurs between Phases V and the 'Disturbed', with the highest concentration being in Phases VII and the 'Disturbed'.[50] Thus, these decorations may be dated to between the early 7th and early/mid-8th/9th centuries. This dating matches with the 'Carved Paddle Impressed' and 'Incised' Wares (i.e., PI/ST) reported from Sri Lanka by Solheim and Deraniyagla (1972: esp.31, 38). In their study, apart from the sherds from Kudumbigala where

[49] these wares were shown to the specialist in SEA wares who agreed with the identification (e.g., Mcguire pers.com 2014).

[50] Disregarding 5 sherds of OFEW (3) and HIT (2)

pottery levels are dated to AD 100–500, all other ceramic finds are dated between AD 600 and 1000.

'PI/ST' ware' of Indian origin

There is another group of PI/ST (six) wares with coarser and heavier fabric that closely resemble the Paddle Impressed/Stamped Ware of Indian origin identified by Selvakumar (2011). These are considered as possible Indian wares in this study (Figures 3.50 & 3.51). Of these, MTSW, which occurs from Phase V to the 'Disturbed', accounts for 78%, followed by MTBIW (9%) and FIG (7%). An increase of PI/ST decorated Indian wares is seen from Phase VII upwards. They seem to date from the early 7th century to the 12th/13th centuries.

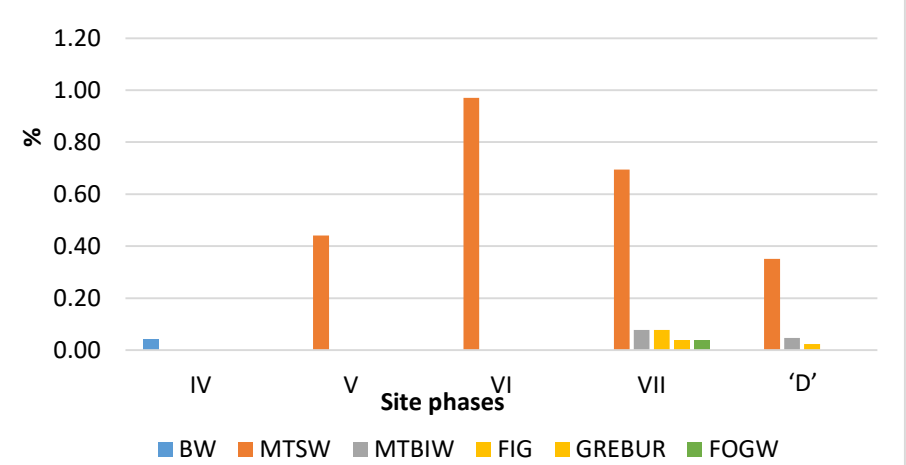


Figure 3.50: PI/ST wares of Indian origin across site sequence - % from TCA phase total; based on C3.9.51a

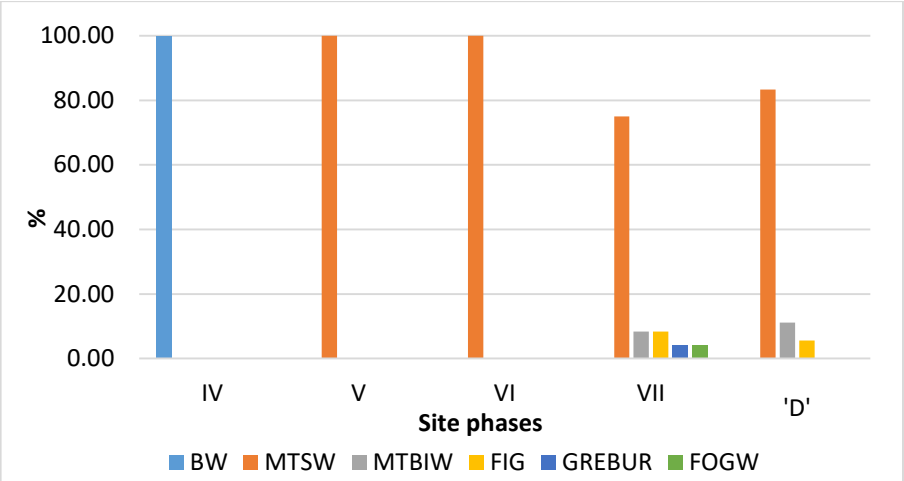


Figure 3.51: PT/SI wares of Indian origin across site sequence - % from PT/SI wares of Indian origin phase total; based on C3.9.51b. Note the diversification of assemblage from Phase VII upwards

'PI/ST' ware' of Sri Lankan origin

The highest number of sherds with PI/ST decoration is recorded in the Sri Lanka origin group. They appear before SEA PI/ST wares, their speculated ancestors, in Mantai.

Of 8871 local sherds within the assemblage, 2992 sherds are decorated. Only 124 have interior decorations (C3.9.50a&b). Of the exterior decorated sherds, PI/ST accounts for 2510,[51] of which 2485 sherds are Paddle Impressed (PI) (C3.9.53a&b). The PIs run across six local wares (C3.9.54a&b; Figures 3.52 & 3.53). Of these, RESL (62%) and PLRE (33%) account for 95% and occur across the sequence while BRWO (2.5%) and TBRW (1.3%) are the only other significant PI decorated local wares. The PI decoration occurs across the Mantai local assemblage and pre-dates the PI/ST of SEA and Indian origin.

[51] Comprises PI, IL, ST

Plate 3.17

Karashima 2004	Bohingamuwa 2016
MTSW	
	
MTIW	
	
PLOW	
	

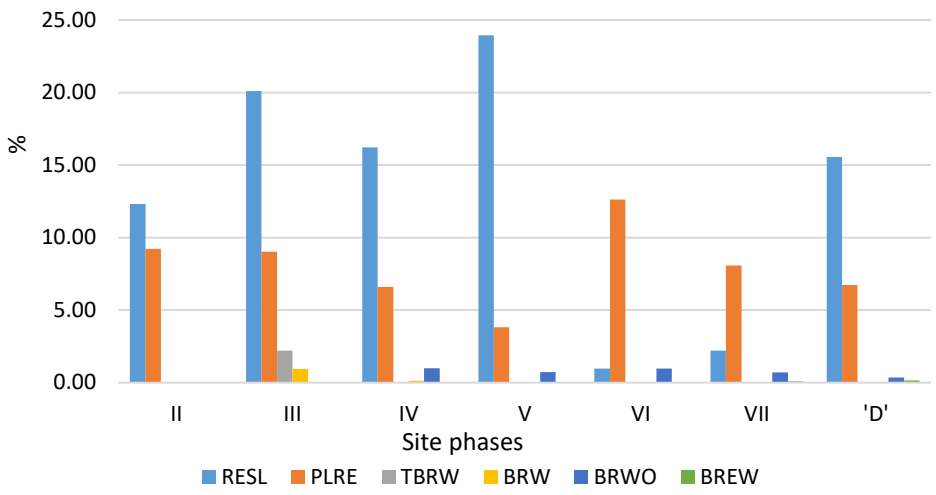


Figure 3.52: PI wares of local origin across site sequence - % from TCA phase total; based on C3.9.54a

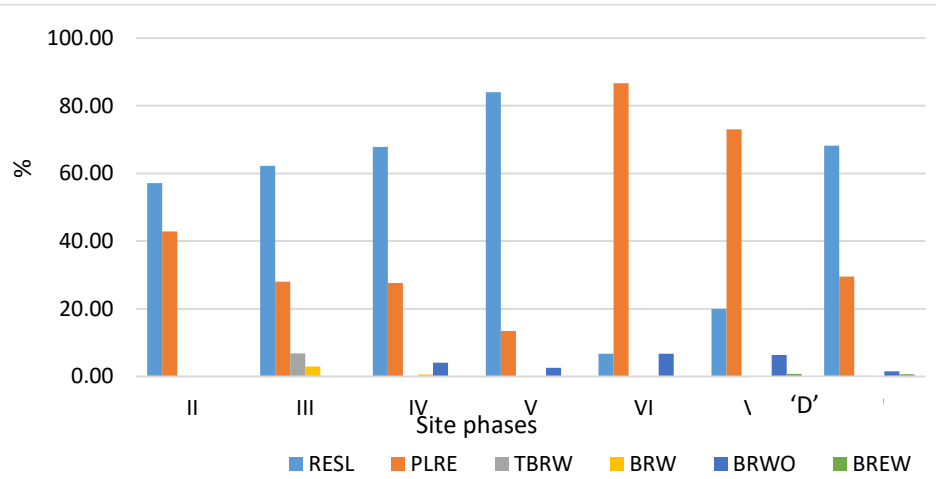


Figure 3.53: PI wares of local origin across site sequence - % from local PI phase total; based on C3.9.54b. Note the pre-eminance of RESL and PLRE across the sequence

3.3.13.4 Red on White Painted Ware (RWPW)

Two sherds of RWPW, a ware which is widely reported from the island, were found from Phases V and VII in our assemblage (C3.9.55; Figure 3.54). Their origin has been assigned to South Asia, India and Sri Lanka and dated from the 4th to 9th centuries (see Deraniyagala 1972:7; Wickramagamage et al. 1983:363; Bandaranayake et al.1984; Carswell and Prickett

1984; Wijeyapala and Prickett 1986:49; Prickett 1990:163; Schenk 2001:73–74, 2005:357–364).[52]

RWPW is significant for both dating and their provenance, which suggests external links. The fabric of our RWPW sample is uncommon in Sri Lanka and Indian colleagues (e.g., Selvakumar and Chakabarthi pers.comm.2011) have noted its closeness to Gujarati and Gangetic delta clay (Catalogue 1.1), possibly indicating its non-local production. Therefore, like Prickett-Fernando (1990, 2003a), I assign an Indian origin to RWPW, until further verification. Based on stratigraphy, our RWPW can be dated to between the early 7th century and late 9th centuries. This fits in with our C14 dates and the previously published dates from Mantai and elsewhere mentioned above, which in combination suggests that RWPW on the island seems to occur from around the 4th to *ca.* the late 9th century.



Figure 3.54: RWPW sherds recovered from Mantai

[52] Prickett (1990) has also reported this from Mantai, although statistics are unavailable. While the number of RWPW sherds recovered from many sites in Sri Lanka are few, comparatively larger samples are reported only from Tissamaharama (26) and Abhayagiriya (11).

3.3.13.5 Summary

All paddle impressed, stamped, punctuated and incised decorations that are considered as being of SEA origin, are present in the Mantai assemblage, 80% of which are paddle impressed. As such, PI is important for tracing possible trade networks and inter-regional connections (Table 3.14).

Table 3.14: Paddle Impressed Wares across origin (Ext. & Int.)

Origin	Sherd count	% (out of total decorated sherd of relevant origin group)	Occurrence Begin (Phase)	Occurrence end (Phase)
'SEA'	18	69.23	V	'Disturbed'
India	9	5.77	IV	'Disturbed'
Sri Lanka	2494	83.36	II	'Disturbed'
Total	2521			

Table 3.14 gives the sample size of the different origins of PI and their first and the last appearance at Mantai. The PI decorated Sri Lankan wares occur in contexts several centuries earlier than those of the SEA. This is at contrary to general scholarly opinion (Bellwood (1997; 2005) that favours SEA PI/ST as the predecessors of Indian and Sri Lankan productions. Whether this techno-typological tradition was introduced from SEA or India, PI seems to have become the most preferred/applied decoration in the local ceramic industry following its introduction to the island.

It is reported elsewhere (Walker and Santoso 1977; Solheim et al. 1956; Peacock 1959; Solheim 1990; Ardika and Belwood 1991; Ardika et al. 1993) that the early period of SEA PI/ST co-existed with Rouletted Wares. At Mantai, however, PI/ST of SEA origin occurs during the Middle Historic Period and coexists with the glass bead trade, as it does at sites in SEA (Lertrit 2004:26). Thus, it appears that, at least during the Middle Historic Period, PI/ST and glass bead networks were linked. Mantai is considered as one of the main centres of glass bead production and an important node within this network.

RWPW, the significant decorated ware, seems to occur on the island from *ca.* the 4th to the late 9th century. They are widely distributed in small numbers mostly in urban and religious centres, indicating their use by the elite or for religious purposes. Their likely source seems to be India.

3.3.14 Chapter summary and discussion

This chapter attempted to place the Mantai ceramic assemblage in its stratigraphic and chronological contexts in order to make inferences about Mantai's role in Indian Ocean trade and the role that Sri Lanka played in general (discussed in Chapter 5).

It demonstrated the chronological distribution of the main wares from the geographic provenance areas and suggested dates (see C3.11). While assigning dates, sherds/wares identified as being intrusive or residual were disregarded. Similarly, a ware represented by a single sherd or a low sherd count was disregarded if it appeared outside its accepted time period. The 'Disturbed' and the 'Surface' were taken to represent the same long chronological period from *ca*. after the 8th/9th century to the 12th/13th centuries. Therefore, if a given ware was sufficiently present on the 'Surface' it was taken to represent the entire time period (of 'Disturbed' and 'Surface') even if that ware was absent in the 'Disturbed'.

3.3.14.1 Chronological distribution of ceramic and suggested dates

The following discussion is confined to selected wares and ware groups. Unless stated otherwise, dates assigned in this section are based on the occurrence of a given ware in the Mantai sequence. The internal dates for the entire ceramic assemblage are given in Catalogue 3.10. The date ranges for the selected wares are presented in Figures 3.55 to 3.61 below.

Local and 'Ind/SL' assemblages are closely related. Some of the 'Ind/SL' ceramics are suspected to be local, although the separation is difficult. These two assemblages account for 73% of all ceramics from Mantai. They are found from *ca.* the 2nd century BC to the 12th/13th centuries AD and may be illustrated by the occurrence of two main wares, RESL and PLRE, which collectively make up 71% of the Mantai assemblage. Although BRW was probably introduced to Sri Lanka as part of the Early Iron Age Megalithic tradition (*ca*. 1000 BC) from South India, our assemblage is entirely local (*contra* Mohanty 2013:220–221). Furthermore, BRW continues until *ca*. the early 7th century, rather than ceasing around AD 300 (*contra* Schenk 2001:125). The inverted firing technology used for BRW continued in use until the 12th/13th century, as seen from the occurrence of BRWO and TBRW later in the Mantai sequence. The presence of GRAPH (early/mid-8th to late 9th century), predominantly a Southern Sri Lankan ware, as evident from the Tissamaharama (Schenk 2001) and Kirinda (Catalogue 7.2-Kirinda3), and the occurrence of identical rim types as well as vessel forms across the island, may indicate the transfer of technology through clan alliances, periodically re-enforced by marriages, and may suggest internal trade. Local and 'Ind/SL' assemblages are mostly domestic kitchenwares, with 80% being decorated, the majority of which are 'Ind/SL'. The decorations themselves indicate close relations between workshops across regions. The chronological distribution and suggested dates for these two ware groups are given in Figures 3.55 and 3.56.

The Indian assemblage from Mantai in Carswell et al. (2013) is dated to between the 1st/2nd century to the 5th/ 6th century (Mohanty 2013:222). It included wares such as NBPW and RPW (REPO), dated to between the 4th-3rd century BC and the 1st-3rd century AD, respectively (Ibid.:213–227). Our Indian assemblage does not include any NBPW and mostly consists of

GWF and REPO (RPW). Although GWF is closely related, considerable variations are noted (Chapter 5). While ROUL in our assemblage dates from *ca*. the late 1st century to the late 2nd/early 3rd century, GREW, which is generally considered to have been ancestral to the ROUL, dates from *ca*. the late 1st century to the late 9th century, in our assemblage. FIG belongs to the same time period as GREW, while FIMIG, GREBUR and TTGW, the other related wares, could be dated to between *ca*. the early 7th and the late 9th century, if not later. Some of these wares, such as TTGW, seem to be local imitations. REPO in our assemblage dates from *ca*. the mid-3rd century to the late 9th century (cf. Prickett-Fernando 2003a:73). The Indian assemblage, the earliest imported ceramics at Mantai, links the island to various regions in India, from the Gangetic Plains in the north, to Southern India and to Gujarat on the western coast. The occurrence of REPO and ROUL at Mantai also connects Sri Lanka to wider Indian Ocean networks, stretching from Southeast Asia in the East to the Persian Gulf, Red Sea and East Africa in the west. Figure 3.58 illustrates the chronological distribution and suggested dates for the main Indian wares at Mantai.

From around late 1st century, another group of wares appeared, consisting mainly of large storage/transport vessels. Although generally considered to have been foreign, it has been impossible to identify their exact provenance and they have been termed 'Imp.Unk'. They seem to have been used as cargo wares, indicating the import of foreign goods. From around the same period, similar luxury tablewares reached Mantai. Both of these groups continued to arrive until the 12th/13th century. Their likely origin is SEA or India, an interpretation supported by their decoration. The chronological distribution and suggested dates for these two ware groups are given in Figure 3.57.

The earliest of the Middle Eastern wares are non-glazed wares, particularly transport/storage vessels. Of the non-glazed tablewares, IWW (six sherds) in Phases III to V seem to be intrusive/mixed.[53] They occur consistently from Phase VII onwards and date from the 9th century to the 12th/13th centuries. Kennet (2004:77) dated the upper boundary of IWW (WHITE) at al-Mataf to the 15th/16th century. EGG occurs from Phase VII to the 'Disturbed', and could be dated from the mid-8th to the late 9th centuries, possibly continuing into the 10th century. Disregarding the single sherd in Phase III, the occurrence of PREGG is similar to that of EGG. Considering the known dates of PREGG from other sites (Kennet 2004:83),[54] however, the lower age boundary of these wares may be dated to the 9th century.

Non-glazed transport/storage vessels chronologically belong to three groups. TORP, PATO and BUF, are the earliest and date to between the mid-3rd and the late 9th/10th centuries, although the volume increased only after the early 7th century. Disregarding the single LISV sherd in Phase IV, LISV and LARV, the second group, dates from early/mid-8th century to the end of occupation. LIM, the third group, occurs from Phase VII to the 'Surface' and therefore dates from early/mid-8th to 12th/13th centuries. Our LIM is similar to that of Kennet (2004:79–80), though his assemblage is dated from the 14th to the 16th century. Thus, our Mantai LIM assemblage has an earlier beginning. The highest concentration of these groups, however, is found after the 8th century. These transport wares, which are unlikely to have reached Sri Lanka due to their intrinsic ceramic value, may indicate their arrival as parts of cargos at Mantai. It is difficult, however, to ascertain the size of the cargo on a vessel from the number of artefacts found at a site/port, unless the size of vessels and the frequency at which they

[53] WHITE (our IWW) was present from very early (date not given) at Kush, becoming prominent by 9th century (Kennet 2004:77).

[54] His REE.EGG is similar to our PREGG

called at the port is known as it is possible to have many small shipments or one big ship arriving the ports.

Of the Middle Eastern glazed wares, AGW, which occurs from Phase V to the 'Surface' and hence dates from around the late 7th century to late 9th/early 10th century, was the first to reach Mantai. Differentiated primarily for the preservation and the nature of their glaze, AGW's all belong to the same type of turquoise glazed tablewares. OGW, on the other hand, is more varied and comprises of a number of different wares. Disregarding five sherds from earlier phases, 92% of the OGW is from Phase VII and the 'Disturbed'. OGW from other known sites are dated to between the 9th century and 11th century (Priestman 2001:91–92 Plate 5). In our assemblage, wares such as TIN.T and POLYLUS may date to *ca*. the 11th/13th century, although their sherd counts are negligible (see Priestman 2005:67; Prickett-Fernando 2003a:74). They may reflect the presence of an affluent class that demanded imported wares in the port city and the capital Anuradhapura, with which Mantai was closely linked.

The Middle Eastern assemblage from Mantai is very similar to that from Siraf (Tampoe 1989) and Sanjan (Nanji 2011). Based on ceramics, Tampoe (2003:77–95) suggests strong relations between Siraf and Mantai. Iran, Iraq and Bahrain are identified as the originating areas for the Middle Eastern wares at Mantai (Chapter 5). Figure 3.60 illustrates the chronological distribution and suggested dates for the main wares of the Middle Eastern assemblage.

In the Chinese assemblage, the single Changsha sherd in Phase IV is clearly intrusive/mixed, while the few sherds in Phases V and VI may belong a group of early Far-Eastern wares (see Graham 2013c:185). The main occurrence of Chinese ceramics is from Phase VII onwards.

Thus, the Chinese assemblage, with the exception of DUSUN, which occur from the late 7th/early 8th century, may date from around the mid-8th century. As was the case with the Middle East, the earliest Chinese wares are also large storage/transport vessels such as DUSUN. Although small in numbers, the tableware assemblage is more varied and comprises a number of wares. Disregarding the single Changsha sherd in Phase IV, three sherds of GDC.1 and XINGW in Phase V and the single NCGP in Phase VI, all other table wares date from *ca*. the early/mid-8th to the 12th/13th centuries (Figure 3.61).

Except for few sherds, which occur from Phases III to VI, SEA wares consistently occur from Phase VII onwards and thus date from the early/mid-8th century to the 12th/13th centuries. Consisting of both large storage vessels and tablewares, their occurrence is similar to that of Chinese ceramics. The current understanding of SEA wares in Sri Lanka is far from satisfactory. An attempt was made to strengthen this by analysing decorations. PI/ST decorated ceramics of SEA origin at Mantai occur during the Middle Historic period and seem to have co-existed with and perhaps been linked to the glass bead trade (C3.9.52a&b).

Indian wares were the first to appear *ca*. the late 2nd century BC in our assemblage. Nonetheless, among all of the imports, Middle Eastern material stands out for both its ware and sherd count, particularly during the 9th and 10th centuries. Out of all Far-Eastern, Middle Eastern and 'Imp.Unk' ceramics, the bulk of the ware types seem to be for storage and transport. The diversity of Chinese and Middle Eastern tablewares is also noteworthy. This diversity is likely related to the range of ships coming to Mantai from many different areas in China and the Middle East. It is also possible that the goods were collected at a central emporium before being loaded onto ships destined for Mantai. The appearance of imported

ceramics is considered as evidence of relations with distant countries (Schenk 2001:126). Therefore, judging by these ceramics, Phase VII witnessed a growth of external contacts, trade and exchange, which coincided with the peak of East–West trade in the Indian Ocean.

The quantity of the ware and sherd count in the disturbed upper deposits and on the surface indicates the continuity of Mantai. Of the imported ceramics, over 11% Middle Eastern and Far-Eastern wares postdate the 11th century. Table 3.14 provides the summary of sherd counts to their origin in the undisturbed and disturbed phases as well as on the surface.

Notes on the Chronological distribution of selected wares from Mantai (below):

In the tables below, darker shading represents the *in situ* occurrence of wares within the site stratigraphy, whereas lighter shading highlights possible intrusive and residual sherds. Where material in the 'Disturbed' and the 'Surface' could be clearly identified as residual it has been marked in lighter shading. If such identification was not possible they are marked in darker shading with a question mark. Since the dates of SEA, 'Imp.Unk' and 'Ind/SL' wares are unknown their occurrence in the stratigraphy dates them. Dates marked with an asterisk (*) represent the estimated range for a given ware based on both its occurrence in the site stratigraphy and known ceramic dates from other sites.

Figure 3.55: Chronological distribution of Mantai selected local wares								
	II 2nd C. BC-Mid-1st C. AD	**III** Late 1st- late 2nd/early 3rd C. AD	**IV** Mid-3rd-early 7th C. AD	**V** Early 7th-early/mid-8th C. AD	**VI** Early/mid-8th C. AD	**VII** Early/mid-8th-Late 9th C. AD	**'Disturbed'** Post-8th/9th-12/13th C. AD	**Suggested dates**
RESL								2nd C. BC- ca. 12th/13th C. AD
PLRE								2nd C. BC-12th/13th C. AD
BRW				1		1	8	2nd C. BC-Mid 3rd/ and possibly up to early 7th C. AD
BRWO								Mid 3rd C.-12th/13th C. AD
TBRW								Late 1st to Early 7th C. & Early/mid-8th to 12th/13th C. AD
GRAPH								Early/mid-8th - Late 9th C. AD

Figure 3.56: Chronological distribution of Mantai selected 'Ind.SL' wares								
	II 2nd C. BC-Mid-1st C. AD	**III** Late 1st- late 2nd/early 3rd C. AD	**IV** Mid-3rd-early 7th C. AD	**V** Early 7th-early/mid-8th C. AD	**VI** Early/mid-8th C. AD	**VII** Early/mid-8th-Late 9th C. AD	**'Disturbed'** Post-8th/9th-12/13th C. AD	**Suggested dates**
BPW								Late 1st C.- Late 2nd/early 3rd C. AD
BBUR								Late 1st C.- Early/mid-8th C. AD
TRSW								Mid-3rd C. – 12th/13th C. AD

Figure 3.57: Chronological distribution of Mantai 'SEA' wares

	III Late 1st- Late 2nd/early 3rd C. AD	IV Mid-3rd-Early 7th C. AD	V Early 7th-Early/mid- 8th C. AD	VI Early/mid-8th C. AD	VII Early/mid-8th-Late 9th C. AD	'Disturbed' Post-8th/9th-12/13th C. AD	'Surface' Post-8th/9th-12/13th C. AD	Suggested dates
OFEW	■	■	■		■	■		Late 1st C.- 12th/13th C. AD
PIOW			■	■	■	■		Early 7th – 12th/13th C. AD
MTIW					■	■		Early/mid-8th- 12th/13th C. AD
HFEW						■	■	Post-8th/9th C.–12th/13th C. AD
BLAG					■	■	■	Early/mid-8th C.-12th/13th C. AD

Figure 3.58: Chronological distribution of Mantai selected Indian wares

	III Late 1st-Late 2nd/early 3rd C. AD	IV Mid-3rd-Early 7th C. AD	V Early 7th-Early/mid 8th C. AD	VI Early/mid 8th C. AD	VII Early/mid-8th-Late 9th C. AD	'Disturbed' Post-8th/9th-12/13th C. AD	'Surface' Post-8th/9th-12/13th C. AD	Suggested dates
ROUL		1			2			Late 1st C.– Late 2nd/early 3rd C. AD
FIG								Late 1st C.- Late 9th C. AD
GREW								Late 1st C.- Late 9th C. AD
TTGW								Early 7th C.– Late 9th C. AD
GREBUR								Early 7th C.– Late 9th C. AD
FIMIG								Early 7th C.– Late 9th C. AD
REPO						2	7	Mid-3rd C. – Late 9th C. AD
IRPW								Early/Mid-8th C. – Late 9th C. AD
RWPW								Early 7th C.- Late 9th C. AD
MTSW								Early 7th C.- ca. 12th/13th C. AD

Figure 3.59: Chronological distribution of Mantai 'Imp. Unk.' Wares

	III Late 1st-Late 2nd/early 3rd C. AD	IV Mid-3rd-Early 7th C. AD	V Early 7th-Early/mid 8th C. AD	VI Early/Mid 8th C. AD	VII Early/Mid-8th-Late 9th C. AD	'Disturbed' Post-8th/9th-12/13th C. AD	'Surface' Post-8th/9th-12/13th C. AD	Suggested dates
THBRW								Late 1st C.- 12th/13th C. AD
HAFB								Late 1st C.- 12th/13th C. AD
OBW								Late 1st C.-12th/ 13th C. AD
PROW								Early 7th C.- 12th/ 13th C. AD
POW								Early 7th C.- 12th/ 13th C. AD

Figure 3.60: Chronological distribution of Mantai Middle Eastern Glazed wares

	III Late 1st-Late 2nd/early 3rd C. AD	IV Mid-3rd-Early 7th C. AD	V Early 7th-Early/mid 8th C. AD	VI Early/Mid 8th C. AD	VII Early/mid-8th-Late 9th C. AD	'Disturbed' Post-8th/9th-12/13th C. AD	'Surface' Post-8th/9th-12/13th C. AD	Suggested dates
Alkaline Glazed Wares								
TURQ.E								Early 7th C.- 12th/ 13th C. AD
TURQ.DG								Early 7th C.- 12th/ 13th C. AD
TURQ.OF								Early 7th C.- 12th/ 13th C. AD
TURQ.B								Early/Mid-8th–12th/ 13th C. AD
Opaque Glazed Wares								
TIN			2	2				9th C.- 12th/ 13th C. AD*
MONOLUS				1				9th C.- 12th/ 13th C. AD*
SPL								9th C. AD*
POLYLUS								9th C.- 12th/ 13th C. AD*
RULUS								9th C.- 12th/ 13th C. AD*
TIN.T								9th C.- 12th/ 13th C. AD*
Un-glazed Wares								
IWW	2	1	3					9th C.- 12th/ 13th C. AD*
TORP								3rd C.-12th/13th C. AD*
PATO								Mid 3rd C.- 12th/13th C. AD
BUF								Mid 3rd C.- 12th/13th C. AD
LISV								6th C. - 12th/13th C. AD*
LIM								Early/mid-8th to 12th/13th C. AD
LARV								Early/mid-8th – 12th/ 13th C. AD
EGG								Early/mid-8th – 12th/ 13th C. AD

Figure 3.61: Chronological distribution of Mantai Chinese wares

	IV Mid-3rd-Early 7th C. AD	V Early 7th-Early/mid 8th C. AD	VI Early/Mid 8th C. AD	VII Early/mid-8th-Late 9th C. AD	'Disturbed' Post-8th/9th-12/13th C. AD	'Surface' Post-8th/9th-12/13th C. AD	Suggested dates
CHANG	1						Early/Mid-8th – 12th/ 13th C. AD
DUSUN							Early 7th C. – 12th/ 13th C. AD
GDC		2					Early/Mid-8th – 12th/ 13th C. AD
SSC							Early/Mid-8th – 12th/ 13th C. AD
YUE							Early/Mid-8th – 12th/ 13th C. AD
WWS							Early/Mid-8th – 12th/ 13th C. AD

3.3.14.2 Regional comparison and general patterns

Although our Mantai ceramic sample is small and derived from a small excavation and surface survey, the material is similar in ware composition to that of Carswell et al. (2013). Since the Carswell's report cannot be used quantitatively our findings are compared with those of Prickett-Fernando (1994:309) who gives useful statistical details for long-distance imported (Chinese and Middle Eastern) wares from earlier Mantai excavations (1982–1984). Similarly, Carswell and Prickett 1984 (64:Table 1) provides quantitative details for the diagnostic ceramic types from the Mantai field season in 1980. Table 3.15 summarises our quantified ceramic data for Middle East and Far-East with those mentioned above.

According to Carswell and Prickett (1984:64), 53% of their assemblage was Middle Eastern and 47% Far-Eastern. Similarly, the quantified data of Prickett-Fernando (1994: Table 3) is confined to the Chinese and Islamic wares (Middle Eastern wares) of which sherd count-wise information is available only for former. The ratio between these is 1:1.4, which is very important, as the Islamic wares (59% of the total of these two wares) outnumber Chinese. In our assemblage the ratio between the Chinese and Middle Eastern assemblages is 1:2.3. Thus Prickett-Fernando's data tally closely with our own findings, confirming strong Middle Eastern trading relations at Mantai over those from China at least until the beginning of the 11th century. This material evidence is significant since it contrasts with both texts, which are explicit about island's strong relations with India, China and SEA and even with the Mediterranean over the Middle East, and the contemporary paradigms of Sri Lanka's external interactions.

The texts illustrate Sri Lanka's far-ranging external connections; however, they do not accurately reflect the scale and intensity of such interactions with different regions. The archaeological record, by contrast, appears to have been shaped mainly by traders and their actions. In the following chapters, I argue that trade was more important for Sri Lanka's interactions with the Middle East and the Mediterranean, whereas the island looks towards India, SEA and China for religious and cultural matters. Neither the texts nor the material culture tell the full story, for which a critical approach towards both is necessary.

Table 3.15: Middle-Eastern vs. Far-Eastern ceramics

3.15a: Mantai (1980-1984) Long-distance imported ceramics sherds- All contexts

Chinese	Sherds count
Yue	310
Yue related scraped patch	30
Changsha	416
Dusun Jars	1164
"Cream" ware	64
Tang white ware	161
Tang glazed earthen ware	2
Black striated glazed stone ware	36
Purple glazed	28
Green glazed earthen ware	13
Song and later	16
Other	48

3.15b: Chinese vs. 'ME'

	Prickett- Fernando (1994)		Bohingamuwa (PhD work)	
Origin	Sherd count	%	Sherd count	%
Islamic	3304	59.08	1026	69.51
Chinese	2288	40.92	450	30.49
Total	5,592		1476	

3.15c: Carswell & Prickett (1984): Mantai excavation 1980: Diagnostic ceramic types

Origin	Sherd Count	%	Dating
FE	307	46.94	Late 8th - 11th C.AD
NE(ME)	347	53.05	Late 8th - 11th C.AD

The ceramic assemblages from different geographical provenances fluctuated in terms of sherd count of individual wares and the number of wares present over time, reflecting the changing pattern of interactions with the region of their origin. The timing of first interactions with different regions is clear, although the nature of these interactions is less so. Trade and commercial exchange could have been the central mechanism through which most of the wares discussed here arrived at Mantai, while a small quantity of luxury/table wares could have arrived as gifts and religious offerings.

According to the ceramic record in our assemblage, the island's earliest external interactions were with northern India, which later spread to southern and eastern parts of India. It should, however, be noted that, except for those characteristic wares, Sri Lankan and Indian wares are indistinguishable for which reason I have created the 'Ind/SL' category. Therefore, pottery from South India may be invisible although actually present during the early stages. Considering the strong cultural connections between the two regions clearly visible from the Early Iron Age Megalithic practices including the use of BRW, the presence of South Indian pottery is more than likely. Contact with the Middle East is mainly with Iran, Iraq and the Arabian Gulf. While interactions with China seem to be mainly with the southern and northern parts, the specific regions of SEA cannot be identified. The interactions with the Middle East and regions yet unknown ('Imp.Unk'), however, predate and are more extensive than those of Far-East, which contrasts with the historical sources and questions the present understanding of Sri Lanka's external interactions, which are further discussed in Chapter 5.

CHAPTER 4

BEADS AND OTHER NON-CERAMIC ARTEFACTS FROM MANTAI

4.1 Introduction

Non-ceramic artefactual evidence for Sri Lanka's external connectivity is quantitatively limited, the only possible exception being late Roman coins (see Bopearchachi 1990, 1999; Weerakkodi 1997). Beads and other non-ceramic artefacts, however, provide an interesting data set that challenges the passive role assigned to local agents in international trade (Chapter 7.3.1). These non-ceramic artefacts are the products of less-privileged local artisans, lapidary workers, craftsmen, gem miners and agriculturists, though production might have been partly controlled by elites. An exportable commodity, beads were traded at local ports, most probably by native traders actively participating in maritime trade, to foreign merchants (Chapter 7.3.1). There were various trade guilds such as *Puga* and *Nigama* that were operating during the early and mediaeval periods in Sri Lanka through which these items might have been collected.

This chapter documents the beads and other non-ceramic artefacts found during our investigations at Mantai. Of the non-ceramic artefacts indicative of external connections, beads are the largest category and are among the best known Sri Lankan products that were traded internationally. I, therefore, examine beads in detail in Part I with bangles and other materials introduced briefly in Part II. The results from this chapter are put into a wider connective framework in Chapter 6.

Part I: Bead assemblage

4.2. Mantai bead assemblage

Beads are the second most numerous category of archaeological finds at Mantai, which has long been considered one of the main bead production centres in Asia. According to Francis (2002; 2013a:349), Mantai traded beads with 'the entire known world' for over two millennia. Our studies provide clear material evidence for both bead production and trade from the 2nd century BC to the 12th/13th century AD. While evidence for on-site bead production is ample, imported beads, albeit limited, represent varieties of the contemporary maritime bead trade. Since Mantai remained the terminus for east–west trade for nearly a millennium (Francis 2013a:368; Procopius I.20.9–1; Cosmas II and IX) its bead assemblage provides a unique opportunity to study the local bead industry, Asia's maritime bead trade and Sri Lanka's external connectivity into the 12th/13th century. Key to this, however, is placing the Mantai assemblage in its stratigraphic and chronological context and quantifying the assemblage.

4.3 Previous studies

Francis (2013a:349–369) analysed 2322 beads from Carswell's (et al. 2013) Mantai excavations and compared these beads with those from various sites across the Indian Ocean. Hannibal-Deraniyagala (2013:370–373) re-classified the same assemblage and compared them with those of Tissamaharama. None of these publications, however, were available during my bead analysis. Since these publications became available while writing, our assemblage is compared with those of Carswell's. Despite the lack of stratigraphic and quantified data, the analyses of Francis and Hannibal-Deraniyagala are useful for the identification of beads and reconstructing trade networks.

4.4 The present study

This bead analysis aims to provide adequate quantified data in relation to Mantai's stratigraphy, which is securely dated and provides an important basis for dating bead production and trade in pre-modern Sri Lanka (Chapter 2.6).

Part I of this chapter is roughly divided into two parts. First, it analyses beads based on a number of criteria such as raw materials used, bead forms, colours, methods of manufacture, finishing and evidence for on-site production across site phases and presents various categories of statistical data related to them. Then the origin/provenance of beads is discussed in order to establish bead networks. Our findings are mainly compared with those of Carswell et al. 2013 and occasionally from other sites. Full integration of beads from Tissamaharama, Anuradhapura, Kantharodai and selected sites across the Indian Ocean is undertaken in Chapter 6. To save space and for clarity, data are presented in tables and graphs, while all raw data are available in catalogues. Relevant definitions of bead conventions and geographical/origin regions are given in the catalogue 4.1 and 3.1.

4.4.1 Bead classification methodology

Bead analysis is challenging due to the numbers that they are usually found in, their variability (typology, size, colour, material used and technology) and continued use beyond their period of manufacture and trade, as well as their potential as heirlooms for the intrinsic cultural, social, economic and symbolic/ ritualistic values that they possess (see e.g., Karklins 1985; DeCorse et al. 2003:77–110; Sprague 1985).

One of the earliest and most comprehensive typo-technological analyses undertaken, based on bead morphology, was by Beck (1928). His classification was primarily based on bead form/shape but he (1928: B) also stressed the significance of describing attributes such as the perforation, colour, material and decoration. While the bead nomenclature introduced by Beck remains almost unchallenged to-date, his meticulous bead classification, however, is now considered less practical (Francis 2002:223) and others have since either simplified or adopted it with modifications (see Hannibal-Deraniyagala 2001:203–226; Somadeva 2010: 176-195 - for Sri Lanka).

The bead analysis undertaken for this thesis is essentially a typo-technological study based upon morphological attributes, though limited compositional analyses were also undertaken (Chapter 4.11). In describing beads, Beck (1928) was followed. However, his classification of beads was simplified to for easy comprehension (Figure C1.3). Like Cayron (2006:5), I also analysed the beads based on their style (colour and diaphaneity), technology (methods of manufacture) and form (shape and size). Following the recommendations of DeCorse et al. (2003:77-110) this methodology was augmented by also recording bead manufacturing method inclusive of end treatments, measurements and bead decorations. The methodology adopted in sampling was discussed under 1.1.4.2 in catalogue.

4.5 The Mantai bead assemblage and phase summary

A total of 1580 beads were recovered from Mantai (Table 4.1; Figure 4.5). With regards to their form and nomenclature, beads were classified based on a slightly modified version of Beck (1928), supplemented by the methodology of a number of later publications, such as

Francis (2002; 2013a) and Hannibal-Deraniyagala (2001; 2013).[55] No beads were recorded from Phase I and hence it is excluded from all discussions.

Table 4.1: Distribution of beads across the sequence; % from the TBA Phase assemblage									
Phases	**II**	**III**	**IV**	**V**	**VI**	**VII**	**'D'**	**'S'**	**Total**
Number of beads	19	120	255	24	29	346	741	46	1580
%	1.20	7.59	16.14	1.52	1.84	21.90	46.90	2.91	100

While beads first appeared in Phase II, the highest number of beads (346) from undisturbed phases is recorded from Phase VII. However, 47% of the total bead assemblage was recovered from the 'Disturbed', illustrating the continuity of bead production throughout site's occupation.

4.6 Synthetic bead assemblage (SBA)

1272 beads (more than 80%) of the total bead assemblage (TBA) at Mantai are synthetic (C4.3.1).[56] The synthetic material was classified as being glass, suspected glass and undetermined (Figure 4.6), with glass beads being predominant, making up 78.2% of the TBA. Synthetic beads are found from Phase II to the 'Surface' and hence can be dated to between the 2nd century BC and the 12th/13th century AD.

4.6.1 Glass Beads

Glass beads (Figure 4.1) are generally the largest category of many bead assemblages across the Indian Ocean (e.g., Horton 1996:328; Abraham 2013) with a few exceptions such as at Kodumanal, India (Rajan 1996, 1999; Kelly 2013:87). This is true for all three sites studied for this thesis as well.

[55] See Catalogue 1.2 for methodology

[56] Bead terms are defined in catalogue. Synthetic are those made from materials that have undergone a chemical synthesis through processes such as heating, melting and cooling.

At Mantai, 97% of the synthetic beads are manufactured from glass (C4.3.2a; Figures 4.7 and 4.8). With the exception of Phase II, glass beads account for above 90% of the Synthetic bead assemblage (SBA) in all phases, indicating the predominance of glass bead production throughout the occupation. Large-scale production of glass beads requires an enormous amount of glass (Chapter 6.4.1).



Figure 4.1: Glass beads from Mantai

4.6.2 Glass bead classes

Beads were classified according to their form in relation to their division, group, sub-group, family and class. The present discussion, however, is primarily based on bead class (Catalogue 1.1; Plate 4.1). Oblates (46.3%) are the most common bead form at Mantai and dominate phase assemblages from Phase II to the 'Disturbed' (Figure 4.9). Cylinders (34.8% of the GBA), which seem to have become more popular after early/mid-8th–late 9th century, are the second most common bead form. Oblates and cylinders together account for 81% of the assemblage (C4.3.4) and they have a nearly similar distribution pattern occurring from Phase II to the 'Surface'. This suggests that Mantai specialized in the production of these classes of beads. The phase assemblage size of these two forms varies slightly across phases, though cylinders

have a more consistent presence from Phase VII upwards. No such pattern is visible in the distribution of other forms. Discs and tubes have a similar distribution pattern, though tubes are absent in Phases III and V. Discs (3.8%) and tubes (0.7%), however, are represented by only small quantities. Nevertheless, disc beads are historically significant for their origin and distribution (Chapter 6.4.3.5). Thus glass beads, the largest category at Mantai, were produced throughout the occupation, but the main bead types and colours produced throughout were very limited.

4.6.3 Methods of manufacture

Different bead production processes leave refuse unique to each stage in that process (see Kanungo 2004:149). Therefore, understanding the method of manufacture is considered an important criterion in bead analysis (Sleen 1973:16; DeCorse et al. 2003:77–110). In this study, the method of manufacture and the stages of production (termed finishing, discussed below) are considered as the main evidence for on-site bead production. Beads made of 11 different methods were identified, with the principle ones being drawn, wound, moulded, folded and pinched and hand-made (Figure 4.10; see Catalogue 1.1). Of these, 91.5% of the glass beads across all periods were made using the drawn technique. This is also the most common method for glass bead manufacture at many sites in the Indian Ocean (see Sprague 1985:87; Abraham 2013:244).

Beads made using other techniques are rare. Though moulded and wound beads appear from Phase IV[57], beads made of these techniques occur more consistently from Phase VII upwards.

[57] Disregarding single suspected moulded bead in Phase III.

4.6.4 Glass bead finishing

The *Chaîne opératoire* of bead production has been assessed, *inter alia*, for delineating different stages and the intensity of production over time (e.g., Kelly 2013). Segmentation in the stages of production has been interpreted as evidence of control over production (Kenoyer 1989, 1991, 1995, 2000). Here, I break down bead assemblages into different stages of production to reveal the ratio between finished products and production debris. I consider a high percentage of production debris as the main evidence for on-site production. This is the main criterion adopted to determine the provenance of the beads. The finishing of beads was categorized into the following groups; finished, finishing unknown, half-processed and wasters (Catalogue 4.1; Figures 4.2&4.3).



Figure 4.2: Production debris of glass and stone beads

Of the glass beads recovered, only 28.3% are finished beads, while finishing of 14.5% remains undetermined, due to the weathering/fragmentation of the material (Figure 4.11). Half-processed (50%) and wasters (7%) account for nearly 57% of the GBA, illustrating on-site production of glass beads.



Figure 4.3: Possible evidence of on-site bead production (half processed and wasters)

4.6.5 Glass bead colours

Colour and surface lustre are the most striking attributes of beads. They reveal production technology, pigments employed and help to isolate assemblages and their provenance. Bead colour (Figure 4.4) is an important parameter in bead classification; with Beck (1928:1) admitting that colour is more important than form in describing certain beads. DeCorse et al. (2003:77–110) also advised the recording of bead colour. The Munsell[58] and 'eye colour' of every bead was individually recorded (see Catalogue 4.2.12), although only eye colours are considered here.



Figure 4.4: Different coloured glass beads recovered from Mantai excavation

[58] Munsell Bead Colour Book (2012 year revised/2012 production)

In our assemblage, 39% of the GBA are red, followed by blue (27%), green (16%) and yellow (14%) coloured beads (Figure 4.12). While black beads are rare, beads of other colours are numerically insignificant (C4.3.7). Red, green and blue are the only colours which occur consistently from Phase II to the 'Surface'. All other coloured beads, including yellow appear only from Phase III upwards and occur inconsistently in a few phases. Francis (2013a:364) mentions that at Arikamedu, yellow beads were rare and likely a by-product of the attempt to produce green beads. At Mantai, however, yellow beads account for 14% of the GBA. White and clear beads are extremely rare. Relative proportions of beads of different colours fluctuated inconsistently across phases. Red was clearly the most preferred colour throughout.

Blue beads seem to have been increasingly desired after Phase IV, while green remained consistent during the same period. Our sample was, however, derived from a small trench and the surface assemblage is too small to understand general patterns.

4.6.6 Glass bead surface lustre

Bead surface lustre was one of the bead qualities DeCorse et al. (2003:77–110) recommended recording. In our assemblage, bead surface lustre was documented under five variables: very shiny, shiny, dull, dull with traces of shininess and uncertain (Figure 4.13). Examples of beads with all types of surface lustre occur from Phase II to the 'Surface'. Nearly 82% of the Mantai bead assemblage had very shiny (77.3%) or shiny surfaces. Even some of the beads with dull surfaces contained traces of shininess, which may suggest that the dullness of these bead surfaces is a result of weathering and hence part of the former. This extraordinary surface

lustre is the signature of Mantai IPB glass beads, presumably a desirable 'selling point', with the majority of them being produced for the maritime bead trade.

Plate 4.1

Selected classes of beads	
Cylinder	
	
Oblate	
	
Disc	Spherical
	
Bi-cone	Truncated bi-cone
	
Tube	
	

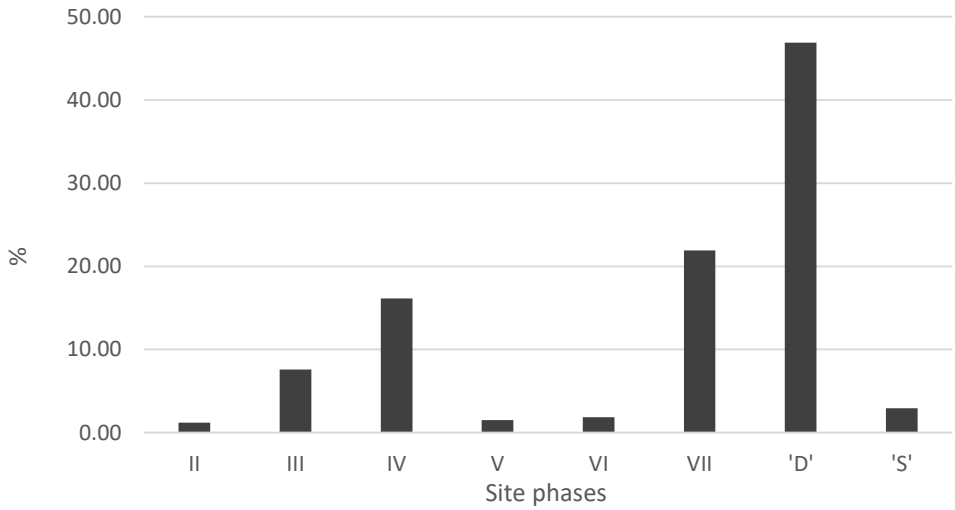


Figure 4.5: Bead distribution across phases and surface - % from TBA phase total; based on Table 4.1



Figure 4.6:Synthetic bead distribution across site sequence - % from SBA phase total; based on C4.3.2a

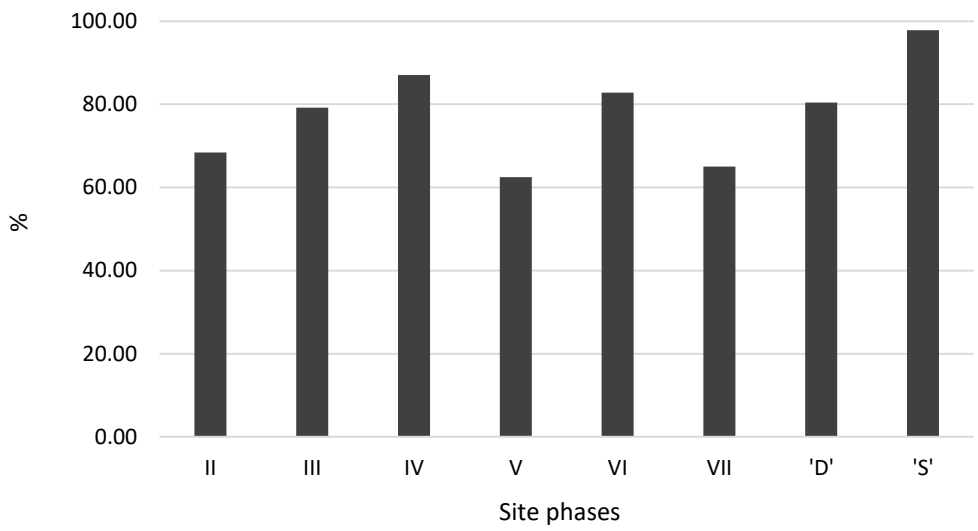


Figure 4.7:Glass bead distribution across site sequence - % from TBA phase total; based on C4.3.3a

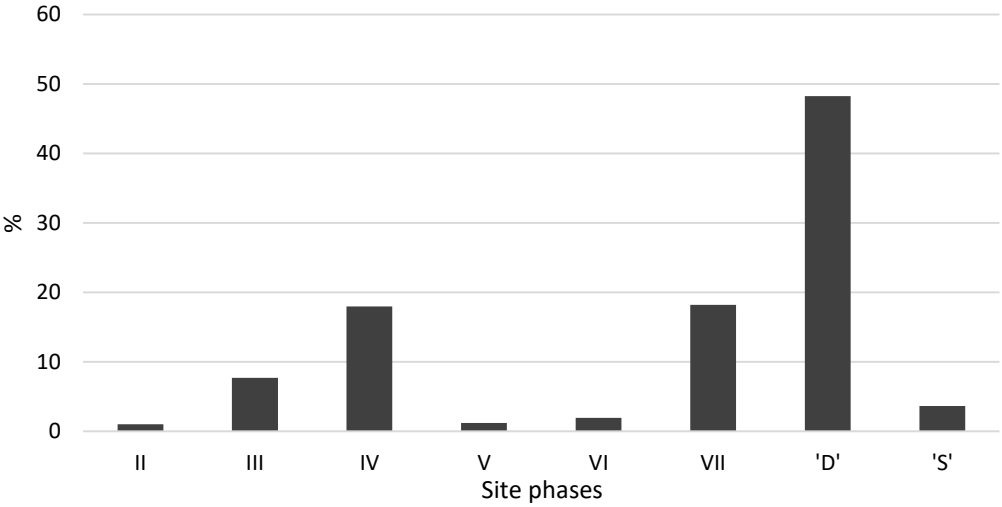


Figure 4.8:Glass bead distribution across site sequence - % from GBA phase total; based on C4.3.3b

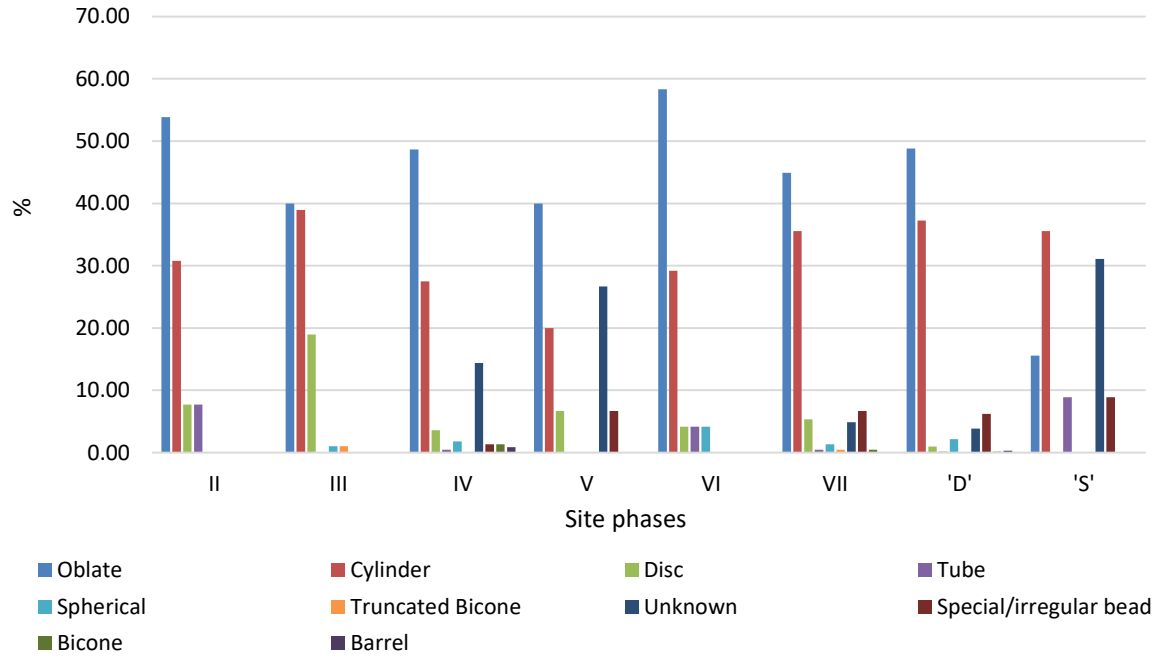


Figure 4.9: Glass bead classes across site sequence - % from GBA phase total; based on C4.3.4

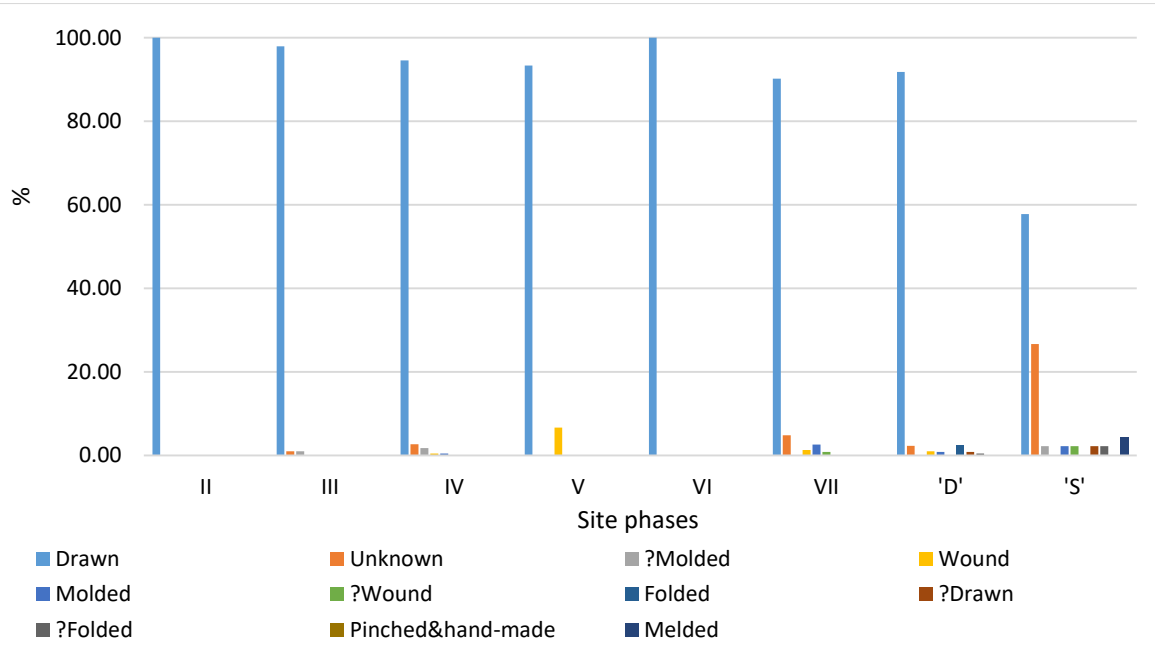


Figure 4.10: Methods of manufacture across site sequence - % from GBA phase total; based on C4.3.5

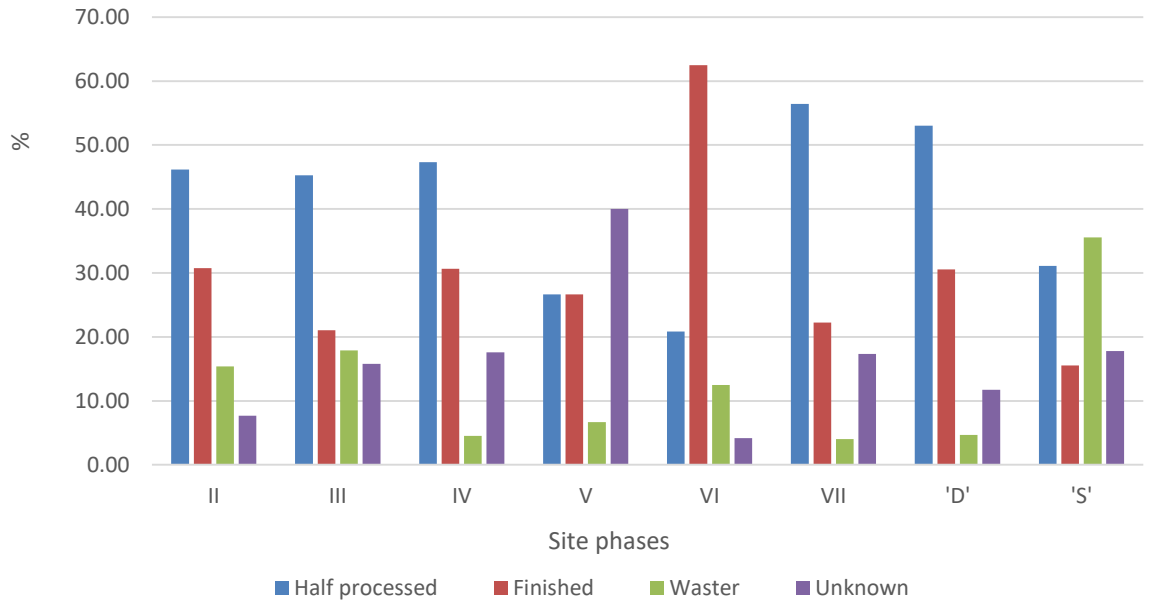


Figure 4.11: Bead finishing; evidence for on-site production across site sequence - % from GBA phase total; based on C4.3.6

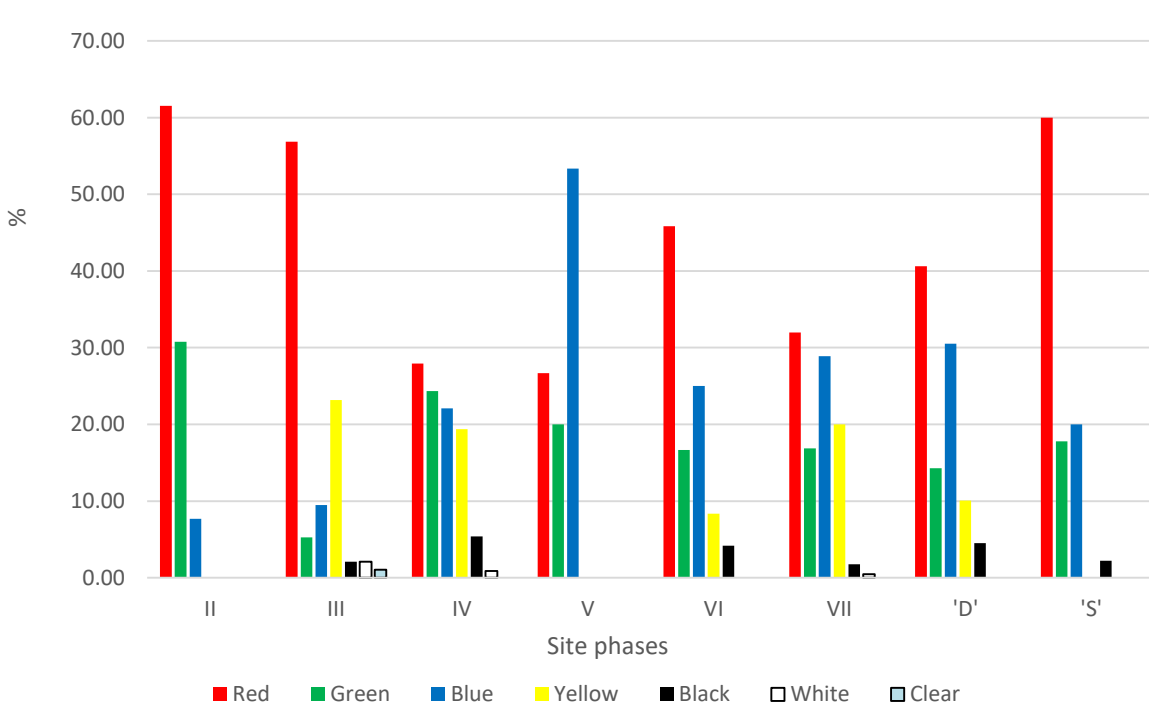


Figure 4.12: Bead colour distribution across site sequence - % from GBA phase total; based on C4.3.7 (Note the predominance of red, blue, green and yellow)

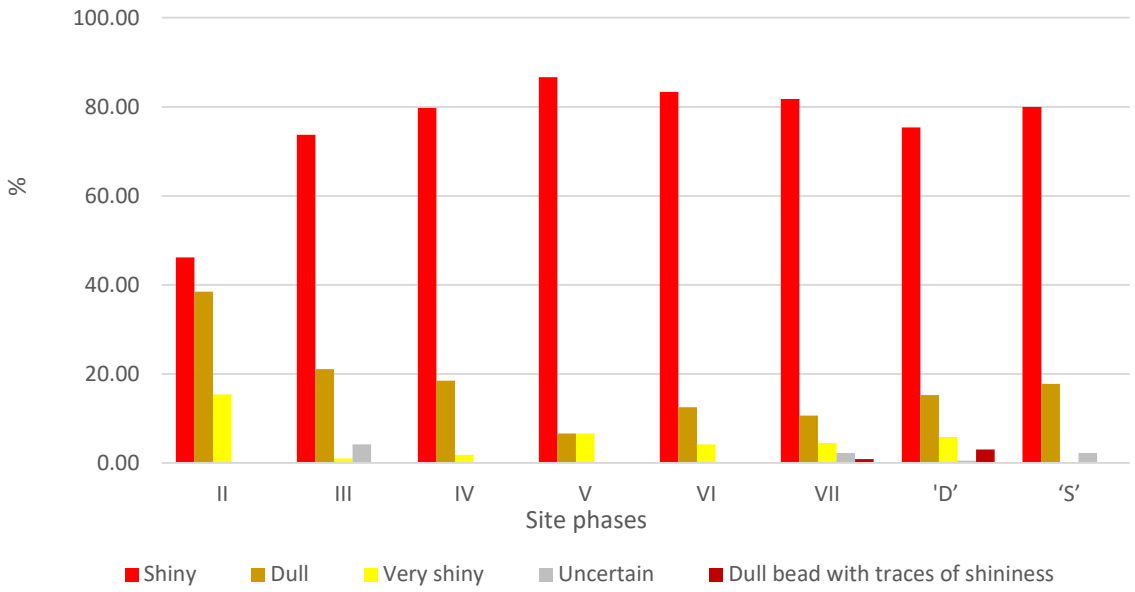


Figure 4.13: Surface lustre of glass beads across site sequence - % from GBA phase total; based on C4.3.8

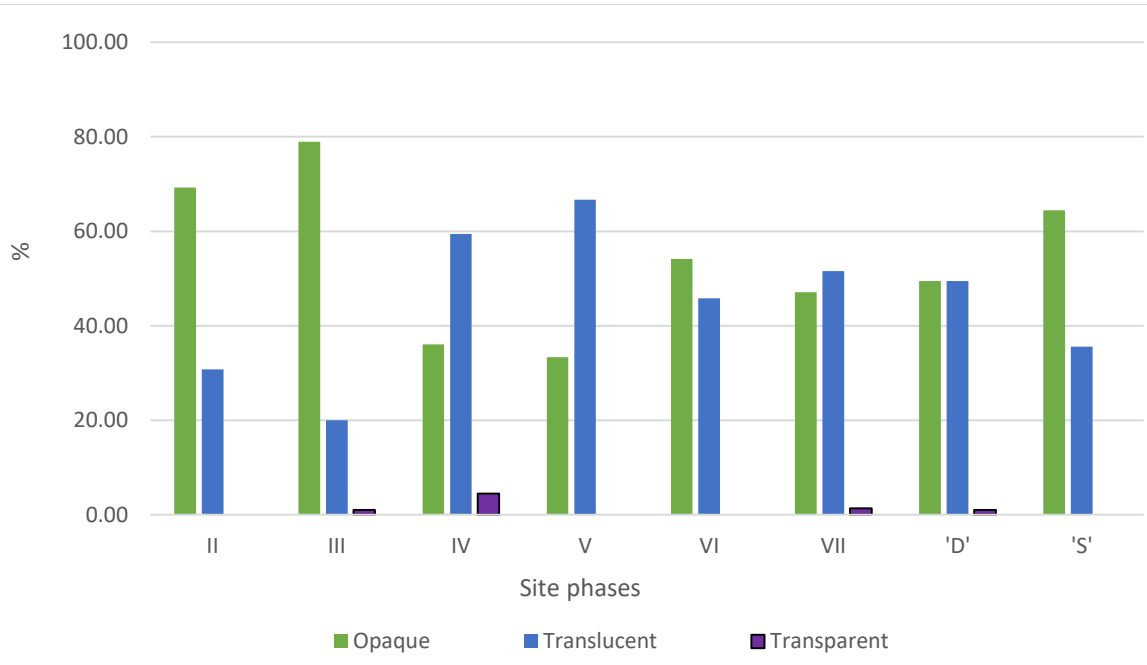


Figure 4.14: Diaphaneity across site sequence - % from GBA phase total; based on C4.3.9

4.6.7 Glass bead diaphaneity

DeCorse et al. (2003:77-110) recommended recording the diaphaneity[59] of beads in morphological studies. Generally, diaphaneity is measured for glass beads only (Grillo and Aultman 2014:11–12). Following Karklins (1985:112) and Grillo and Aultman (2014:11–12), diaphaneity of beads is described here using the terms opaque, translucent and transparent.

Approximately half of the glass beads were classed as opaque (49.6%), while the other half (48.8%) were identified as translucent. They occur from Phase II to the 'Surface', illustrating their production throughout the occupation of the site (Figure 4.14). A larger phase assemblage of opaque coloured beads occurs in the first two phases and on the 'Surface' compared to the middle phases—exempting Phase VI. This is similar to the pattern of occurrence of red coloured beads. In contrast, a higher proportion of translucent beads are recorded from Phase IV compared to the 'Disturbed'. The number of transparent beads is limited to 20 (1.6% of the GBA) and they occur only in few phases.

4.6.8 Glass bead summary

57.2% of the glass beads found at Mantai are production debris, which clearly indicates on-site production. Beads are also produced throughout the main phases of occupation of the site. The number of main bead types (oblates and cylinders) produced and their colours (red, blue and green) are limited, but the percentage of very shiny and shiny is very high. This is clear evidence for craft specialization. Mantai produced beads at a greater level than would have been required for purely local consumption. I argue, therefore, that Mantai specialized in producing a selected range of glass bead types aimed at the wider maritime bead market.

[59] Diaphaneity is the amount of light that can pass through the bead's body.

4.7 Organic beads

At Mantai Organic beads (Figure 4.15) - those made of any animal and plant material- are limited to 61 items, i.e. 3.9% of the TBA (C4.3.10a), a figure that might be related to their poor preservation at the site. Of the organic beads, shell (37) and suspected shell (14) collectively account for more than 83% (C4.3.10b), however, this is a mere 3.23% of the TBA (Figure 4.17&4.18). Three pearl beads and an ivory bead (Figure 4.16) were also recovered. The pearl beads, in particular, are very significant as Mantai was situated adjacent to the famous pearl banks of the Gulf of Mannar. Both local and foreign historical records such as *Arthashastra* (2.11.2) (4th/3rd BC) and *Mahavamsa* (*Mv.*7:50), recount Sri Lanka's role in the pearl trade since the middle of first millennium BC (Chapters 6.6.4.1&7.2.2.1). The pearls were recovered from Phase VII and 'Disturbed', which suggests a date between the early/mid-8th and the 12th/13th. Other organic beads found at Mantai are made of fish vertebrae and teeth and clay.[60]



Figure 4.15: Organic beads

[60] Clay is not organic, but included here as there are only 2 items.



Figure 4.16: Ivory bead

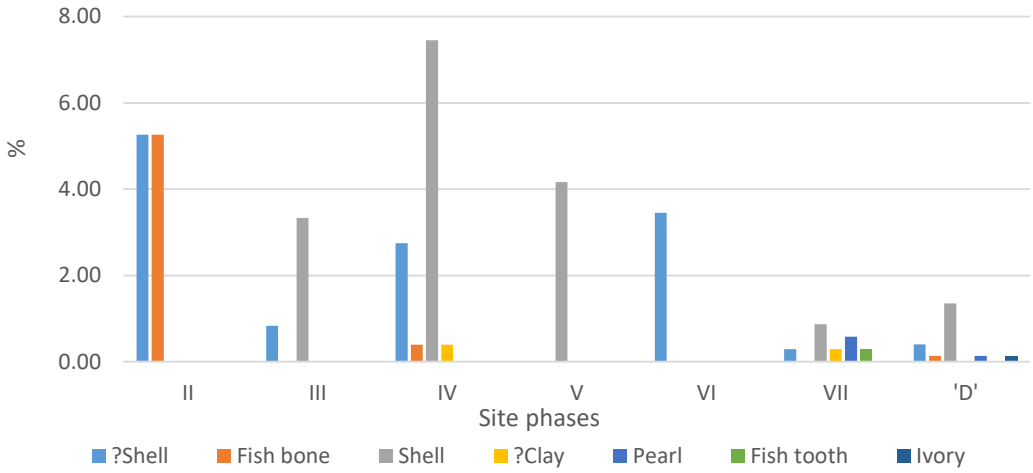


Figure 4.17: Organic bead distribution across site sequence - % from TBA phase total; based on C4.3.10a

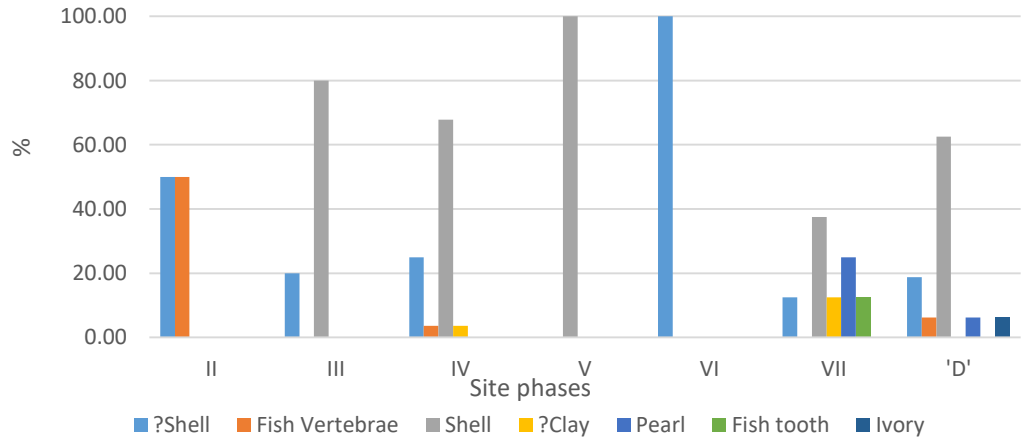


Figure 4.18: Organic bead distribution across site sequence - % from OBA phase total; based on C4.3.10b

4.8 Stone beads

At 238 items, or 15% of the TBA, are stone beads that are the second largest category of beads found at Mantai (Figure 4.21&4.22). They occur consistently from Phase III to the 'Surface', the highest concentration, however, being in Phases VII (97) and the 'Disturbed' (110).

Our stone bead assemblage (StBA; Figure 4.19; Plate 4.2) comprises of beads made of 10 identified minerals and one unidentified material. Of these, carnelian (140) and quartz (22) are the largest categories. Quartz beads dominate the early assemblage with carnelian becoming more important from Phase V onwards, at which time quartz decreases (below). Beryl, lapis lazuli, suspected agate, onyx and 'unidentified' varieties occur only in the 'Disturbed'. All of these mineral/stone beads occur as single items except for beryl (four) and lapis lazuli (two). A single agate waster/fragment was also found in Phase VII. Though it appears to be an unpolished fragment, there is not sufficient evidence to say whether this type of bead was made at the site. Eight chert wasters are found in Phases III, VII and the 'Disturbed'. Therefore, it seems that they were worked at the site. While the distribution of stone beads is illustrated in Figures 4.21and 4.22, the significant imported and local beads are discussed below.



Figure 4.19: Stone beads

4.8.1 Carnelian

Only 19 carnelian beads are reported by Carswell et al. (2013). In our assemblage, carnelian beads account for 59% of the stone bead assemblage and are the most numerous. Of these, two are finished beads, one of which shows evidence of drilling from both ends. Another two are half-processed, with one being mis-drilled and the other example being dimpled at both ends with one of its ends broken while drilling. The remaining 136 (97.1%) of the carnelian finds are wasters or production debris (Figure 4.20). This strongly suggests that the carnelian beads were made at the site, although the material itself was imported as it does not occur naturally in Sri Lanka.[61] While carnelian occurs from Phase III, only 4.7% of them are found up to and including Phase VI. All of these are wasters, indicating on-site production from their earliest appearance. The majority (94%) of Mantai carnelian beads are recorded from Phases VII and the 'Disturbed', demonstrating the increase in carnelian working after *ca.* the 8th century AD. This increase of carnelian, an imported material, ties in with the increase in the east–west maritime trade (discussed below).

4.8.2 Lapis lazuli

Of two suspected lapis lazuli beads found from the 'Disturbed', one is a finished bead while the other is a half-processed one. More evidence is needed before it is possible to conclude that they were also processed at the site. Lapis lazuli does not occur naturally in Sri Lanka and are further evidence for raw material imports. Francis (2013a:366, 2002:149–150) also reports

[61] However, there are suggestions that agates were converted to Carnelian by treating them with heat (Deo 2000:29; Carter 2013:207). Pathmakumara (pers.comm. 2015) believes that Chert, which are available in the Island, could have been heat treated for converting them into Carnelian.

lapis lazulis[62] from the Carswell et al. excavations from deposits dated to between the 4th and the 10th centuries.

4.8.3 Quartz

Quartz beads were the largest stone bead category from Carswell et al. (2013) with 28 examples (26.2%). In our assemblage, 22 quartz items/beads are found from Phases III, V, VII and 'Disturbed'. 72.2% of the quartz beads/items are wasters while another 0.8% are half-processed. Two clear quartz fragments show evidence of drilling from both ends, one of which was broken in the process. Thus, there is strong evidence for the on-site production of quartz beads. Nevertheless, compared to the production of other types of beads at Mantai, quartz working does not seem to have been undertaken to any significant scale. The little production there was, appears to have diminished over time.

The absence of finished quartz beads products may indicate that there was no local demand for this type of bead, since the raw material they were manufactured from was abundantly available in Sri Lanka (see Cooray (1967) 1984; Dissanayake et al. 2000). There are references to the quartz of Sri Lanka in both Ibn Sina and al-Beruni (Imam 2003:166), indicating the export of the raw material or finished quartz products, such as beads, to places such as the Middle East. A similar situation is reported from Kodumanal (Kelly 2013; Rajan and Athiyaman 2011, 108).

[62] 4 or less it says

4.8.4 Garnet

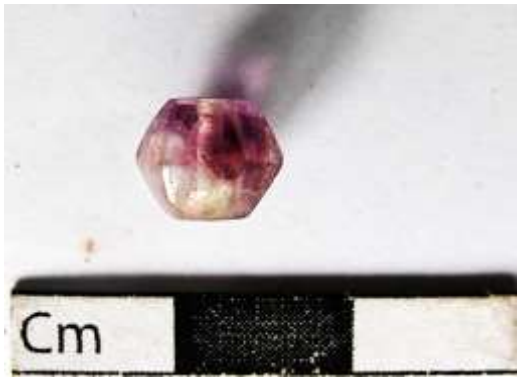
In our assemblage, garnet beads/items accounted for 23.5% (56 items) of the StBA, making garnet the second largest category of stone beads. They are found from Phase III to the 'Disturbed' consistently, with their highest occurrence in Phases VII and 'Disturbed'. This contrasts Hannibal-Deraniyagala's (2001; 2013:372) concerns about the lack of interest in garnet, a mineral abundantly available in Sri Lanka, by bead workers.

Except a single finished bead, which is perforated from both ends, the garnet beads are all wasters/production debris, which may indicate production at the site. Sri Lanka has a rich source of garnets (Cooray 1984; Dissanayake et al. 2000:11) and these stones are said to have been exported to places such as Mediterranean (Quast and Schussler 2000:86), Oman (Rosch et al. 1997:763–783; Hannibal-Deraniyagala 2005) and Southeast Asia (Carter 2012; Dussubieux 2001) during the early mediaeval period. The garnet beads rarely occur in archaeological contexts in Sri Lanka. The rarity of finished beads at Mantai may indicate that production of garnet beads were exported, possibly because there was likely no internal market for commodities for which the raw material was commonly available.

4.8.5 Amethyst

Amethyst is found widely across Sri Lanka, specifically in the wet zone (Cooray 1984; Dissanayake et al. 2000) and was another highly sought after gemstone in the west (*Geographia* 4.1). However, only two amethyst wasters, from Phase VII and the 'Disturbed', were found in our Mantai excavations. Their appearance post-dates the 8th century. Also only four amethysts are reported from the Carswell et al. excavations. This lack of amethyst beads may indicate that the stone itself was exported as an unfinished material.

Plate 4.2

Selected types of stone used for making beads	
Carnelian	**Agate**
	
Amethyst	**Garnet**
	
Lapis Lazuli	**Quartz**
	

4.8.6 On-site production

238 stone beads were discovered during our excavations at Mantai, about 15% of the TBA. Taken as an assemblage, 95% of the stone beads are wasters, while 1.7% are half-processed. These two categories together account for 97% of the total stone assemblage. Only 3% belong to finished beads (Figure 4.24). This clearly indicates the on-site production of stone beads. Even beads made from raw materials unavailable in Sri Lanka, such as carnelian, were made at the site. Although beads made of locally available rocks and minerals were produced at the site, they are comparatively rare, particularly finished beads most probably because they were exported. The finding of Sri Lankan garnets at sites in Oman and Southeast Asia (Section 4.8.4) may support this claim and also that unprocessed rocks and minerals themselves would have had export markets (Chapter 6.5.1.3).



Figure 4.20: Evidence for on-site production of Carnelian beads

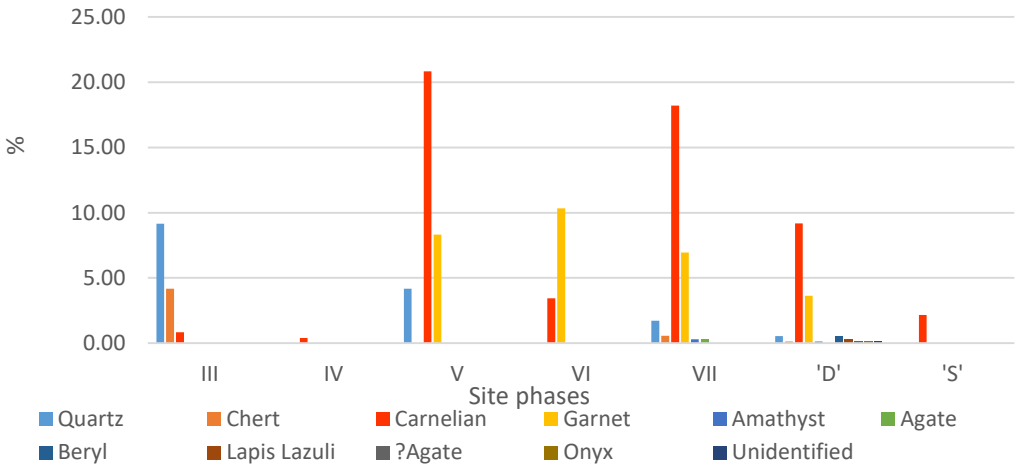


Figure 4.21: Stone bead distribution across site sequence - % from TBA phase total; based on C4.3.11a

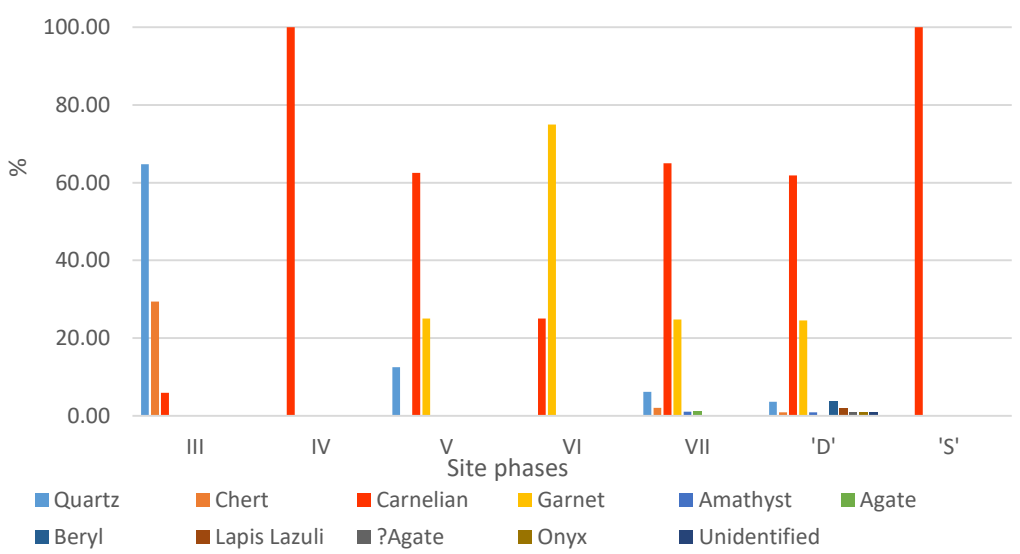


Figure 4.22: Stone bead distribution across site sequence - % from StBA phase total; based on C4.3.11b

4.8.7 Discussion

The stone bead assemblage (StBA) derives from a sequence datable from *ca.* early/mid-1st century to the 12th/13th century. Therefore, it contrasts Francis's (2002:142) claim that Mantai stone bead industry was not only the least impressive of all of the early Indo-Pacific bead-working sites, but also had a late beginning for bead manufacturing around the 7th or 8th century. Francis's (2013a:365) assemblage comprised 107 stone beads or 4.6% from total of 2322 beads he studied.

4.9 Metal beads

A single gold bead (Figure 4.23), probably in an unfinished state, recovered from Phase VII may indicate the making of jewellery at Mantai.



Figure 4.23: Gold bead

4.10 Bead origins

The origin of the beads is vital to establish Sri Lanka's external interactions. The Mantai bead assemblage is comprised of objects drawn from seven different provenances (C4.3.14; Figure 4.25). The identification of bead provenance is based on evidence for on-site production and published works.[63]

In our assemblage, 91% (1432) of the beads are locally made (C4.3.14). A total of 349 (24.4%) of local beads are finished while 44.3% are half-processed and 21.6% are wasters. The finishing of 8.6% of beads is unknown while two beads found are in their natural form. All of the beads

[63] Identification of bead origins were based on publications such as Wheeler et al. (1946); Basa (1993); Deo (2000); Hannibal-Deraniyagala (2001; 2013); Francis (2002; 2013b); Deraniyagala (2004); Kanungo (2004) and Coningham et al. (2006) for South Asia; Glover (1989); Rosch et al. (1997:763–783); Theunissen et al. (2000); Glover and Bellina (2001:191–215); Schussler et al. (2001); Francis (2002; 2013b); Bellina (2003); Dussubieux et al. (2008:797–821; 2009; 2010; 2012); Carter (2012, 2013) for the Middle East, Southeast Asia and other regions.

from Phases II and VI are local. Exempting Phase VI, the number of local beads decrease from Phase V upwards in response to the increase of 'Unknown' and other imported beads. Although a few Indian (three) and Middle Eastern (five) beads appear in Phase IV, the regular occurrence of imported beads began in Phase VII, which ties in with the expansion of Indian Ocean trade.

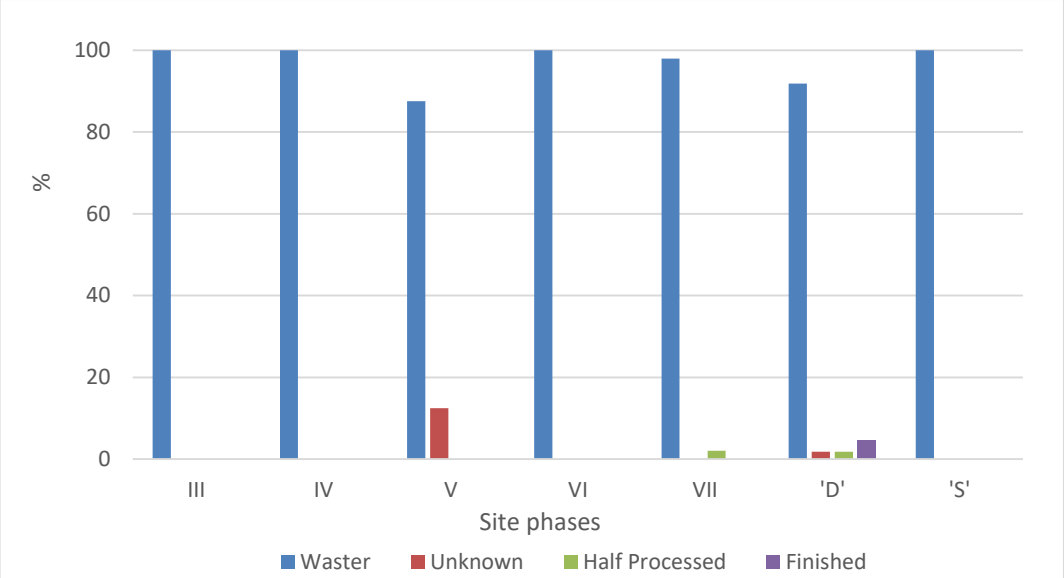


Figure 4.24: Evidence of on-site production across site sequence - % from StBA phase total; based on C4.3.12

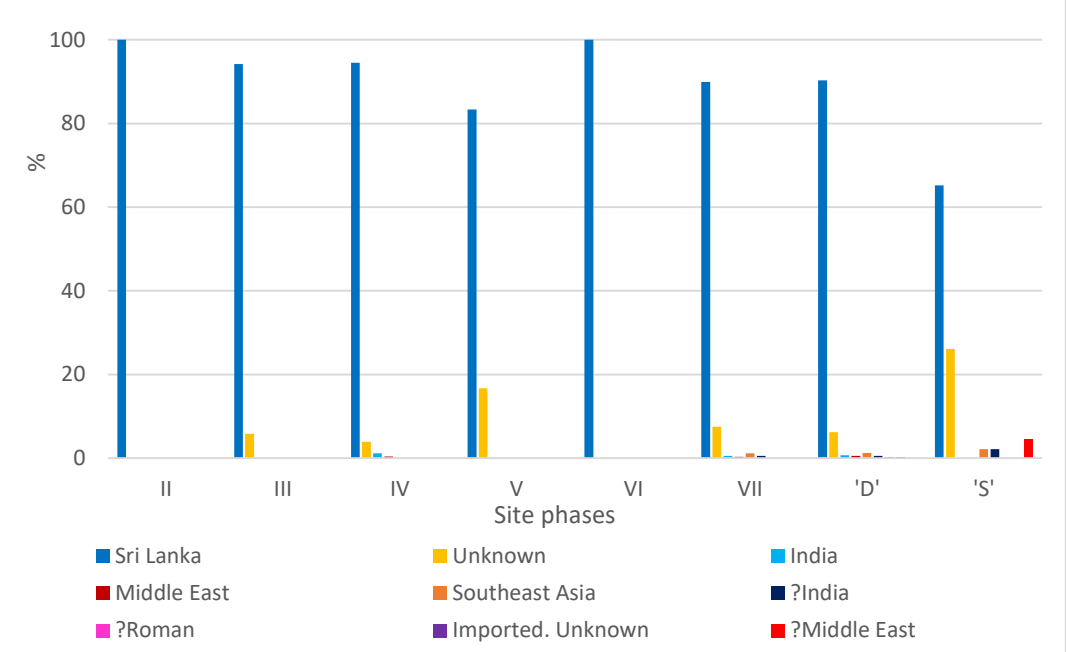


Figure 4.25: Origins across site sequence - % from TBA phase total; based on C4.3..14; Note the decrease size of local bead assemblage from Phase V upwards and the corresponding diversification of the assemblage.

4.10.1 Sri Lankan beads

1432 beads (91%) of the TBA are locally made and their production extends from Phase II (*ca.* the 2nd century BC) to the 'Surface' (12th/13th century AD) (C4.3.15a). Of the locally made examples, three types representing 21 beads (1.47%) are 'special bead types'.[64] Of these, 14 are locally made segmented beads. Two are *Stupa* beads, while five are longitudinally striped beads (C4.3.15b). These special beads (Plate 4.2) are discussed first.

4.10.1.1 Segmented (local) beads

Segmented beads are those made from drawn glass tubes by creating bulges by means of squeezing along their length and then cutting off the bulges as single or multiple beads. The origin of segmented beads is generally assigned to the Middle East, though an Asian origin, including Sri Lankan, has not been ruled out (Francis 1989a:Figure 9.2; 2002:96, Colour plate 22, 2013a:355–356).

The segmented beads from Mantai are made, with the influence of Islamic segmented beads, using both folded and segmented techniques. They are black/dark blue in colour and longitudinally stripped, mostly in white (Francis 2002:96). Evidence for their production at Mantai is clear from three incomplete beads (Ibid.:96; colour plate 22).

Our Mantai assemblage contained 14 segmented beads, which are identical with those that Francis identified as being locally made. They are found only in the 'Disturbed' and post-dates the 8th/9th century. Thus they are a later introduction and never became an important bead at Mantai.

[64] See bead definitions

4.10.1.2 Longitudinally striped beads

Francis (2013a:364–365) identified several by-products of Indo-Pacific Beads (IPBs) industry at Mantai, one of which was longitudinally striped beads. These are made by cutting beads from drawn glass tubes and they contain longitudinal strips. Three such beads are recorded from Early Historic contexts from the Carswell et al. (2013) excavations. The tube ends of these beads are found at the site providing evidence for their on-site production (Francis 2013a:365). These beads are found widely, for example, from Iran (e.g., Oda 1966) and from Oc Eo, Takua Pa, Sungai Mas, Khlong Thom in SEA (e.g., Malleret 1962).

Only five longitudinally striped beads are found in our assemblage. Except a single bead in Phase IV, all of these beads occur after Phase VII. Therefore, their production might have begun *ca.* the mid-3rd century, but they were made more regularly after the early/mid-8th century.

4.10.1.3 *Stupa* beads

The *Stupa* beads[65] are flat tabular beads with raised ends on both sides and a slight swelling in the centre. Most of these have collars around the apertures. The majority of these beads are moulded from drawn glass tubes, while a few have been made from the wound technique and glass lumps (Francis 2002:137–138). *Stupa* beads made out of semi-precious stones are reported from Jetavana *Stupa* (4th/5th centuries AD) at Anuradhapura (Ueyama and Nozaki 1993:71, 83; see Chapter 6).

[65] The Stupa bead derives its name from Buddhist Stupas based on a resemblance of form (Francis 1991:98, 2002:138).

Our investigation at Mantai produced only two *Stupa* beads from Phase VII (*ca.* the early/mid-8th century) and the 'Surface' (late 9th century). Francis (2013a:361) also reports only two *Stupa* beads from contexts dated to the 1st and 8th centuries. Therefore, it would appear that Mantai did not produce many *Stupa* beads.

Stupa beads are reported from Southeast Asia and provenanced to Sri Lanka (Hannibal-Deraniyagala 2013:372). Considering their large occurrence, I argue that these beads had their origin and main production centres in Southern Sri Lanka and had a ritualistic purpose. Buddhist networks were responsible for their distribution in Buddhist regions across Southeast Asia (Chapter 6.4.3.5).

4.10.2 Other local beads

The larger category of the Mantai local beads are regular rounded and regular faceted divisions of various classes. They are identified as being local due to a higher percentage of production debris (60.6%). The most significant types, which can be used for reconstructing the bead trade and internal and external connectivity are discussed below. Oblates (76) and cylinders (71) are the larger categories of which the distribution is very similar across the sequence, though the former is not found in Phases V and VI, where only three cylinders occur. Other beads identified as local, except perhaps irregular beads (16), are numerically insignificant. None of these can be used for establishing internal networks or external links.

4.10.2.1 Disc beads

Discs are discoidal beads with a round transverse form (Figure 4.26). They are cut out of drawn solid glass tubes, which are generally larger than those used for making Indo-Pacific beads.

They are approximately 1mm in thickness and 1cm in width. Perforations in these beads are comparatively larger and asymmetrical and are therefore considered to have been drilled by employing tools/techniques other than mechanical devices such as a bow drill. In some cases, perforation is said to have been made by chipping or pecking (Francis 2002:136). Their surfaces, rough corners and edges were ground as indicated by the presence of polish in many beads. These beads are identified as having been made in Sri Lanka, though similar finds are found elsewhere (Francis 2002:136–137; Hannibal-Deraniyagla 2001:208).

Disc beads are the dominant types in sites such as Anuradhapura, Kantharodai/Jaffna and Tissamaharama (Chapter 6.4.3.5). Tissamaharama has produced the highest number of disc beads in Sri Lanka (Weisshaar and Wijeyapala 1993). Francis (2002:138) measured 253 disc beads from Tissamaharama and dated them to between the 2nd century BC and the 5th/6th centuries AD.

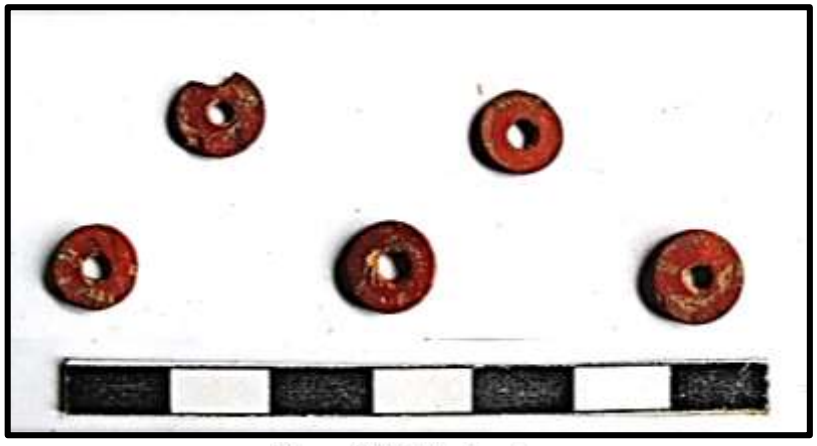


Figure 4.26: Disc beads

Only 47 disc beads (4.2% of the local assemblage) were discovered in our excavations at Mantai, although the evidence suggests that they were produced throughout the site's occupation. First appearing in Phase II, their highest concentration is in Phases III, IV and VII. While disc beads are numerous at Kantharodai, the low density occurrence at Mantai suggests that discs were never a main bead form made there. This indirectly supports my argument

that Mantai specialized in selected glass bead types (oblates and cylinders) throughout its occupation for maritime trade.

4.10.2.2 Indo-Pacific Beads (IPB)

IPBs are monochrome beads cut and shaped out of drawn glass tubes (Figure 4.27).[66] They rarely exceed 5mm in diameter and are often round in cross section, though their profiles vary significantly to include forms such as oblate, discoidal and tubular. IPBs are made in a limited range of colours, with various shades. The glass composition of these beads varies as well (Hannibal-Deraniyagala 2001; Francis 2002, 2013a).

With 64.4% (936) presence, IPBs are by far the largest category of local beads made in our assemblage. They occur across the sequence dating from *ca.* the 2nd century BC to the 12th/13th century. IPBs are generally considered to have been first made at Arikamedu (Francis 2002, 2013a). Contemporaneously with Mantai, IBPs were made at a number of other sites in both India and Southeast Asia. Nevertheless, given that more than 60% of the IBPs recovered in our excavations comprise of half-processed and production debris, it is likely that the entire assemblage was made at Mantai.

The process of making drawn beads are explained in many works (e.g., Basa 1993; Kanungo 2004) and more specifically by Francis (2013a:362); it involved making the glass, drawing or pulling out tubes, cutting them into short parts, and re-heating to smoothen the cut ends. Though clear evidence of glass production such as furnaces is lacking, evidence for on-site

[66] IPBs were also known as trade wind bead' and 'Mutisalah'. See van der Sleen (1956; 1958; 1973) and Lamb (1965).

production of IPBs and the amount of glass beads produced at Mantai would suggests a local sources of glass for bead making. The discovery of melted glass tubes and beads and drips, splatters, and glass chunks are considered as unmistakable evidence for glass and glass bead making at Mantai (Francis 2013a:362). Francis (Ibid.) also found glass chunks of red, orange, blue and green colours, which are the most common colours used for Indo-Pacific beads at Mantai.

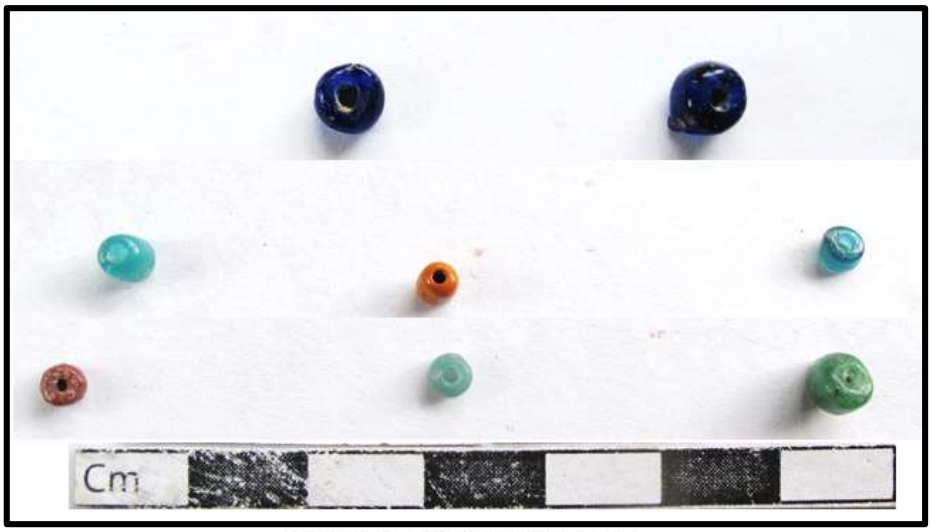


Figure 4.27: Indo-Pacific Beads

Table 4.2 summarises our IPB assemblage from Mantai. Percentages are given from both the TBA and Local Bead Assemblage (SLBA). The discussion below, however, is based on the former.

IPB assemblage

Table 4.2: Indo Pacific beads across phases % from TBA & SLBA phase assemblage

Phase	II	III	IV	V	VI	VII	'D'	'S'	Total
IPB	**11**	**72**	**194**	**10**	**22**	**162**	**444**	**21**	**936**
% from TBA	57.89	60.00	76.08	41.67	75.86	46.82	59.92	45.65	59.24
% from SLBA	57.89	63.72	80.50	50.00	75.86	52.09	66.37	70.00	65.36

With 936 beads, IPBs are by far the largest bead type recovered from Mantai. They occur from Phase II to the 'Surface', indicating production throughout site's occupation (Figures

4.28&4.29). In Phase II, IPB account for 58% of the TBA. This increases to 60% and 76% in the next two phases. Phase IV has the largest number of beads (194) from the undisturbed phases. The low density of artefacts from Phase V is proportionate to the soil removed and Phase VI is the wall. In Phase VII (162) and 'Disturbed' (444) the bead count increases considerably, however, their phase assemblage size decreases to 47% and 60% indicating the increase in the production/consumption of beads other than IPBs.

Thus, disregarding the decrease in Phase V, and VI, a progressive increase in IPB production across phases in our excavation is clearly visible. By the mid-3rd century, IPB production was in full swing and it further proliferated from *ca.* early/mid-8th century, the highest concentration, however, being after 8th/9th century, when east–west trade was at its peak. The decrease of phase assemblage size of IBP in Phase VII and 'Disturbed' does not indicate any decline of IPB production, but rather diversification of the local assemblage.

Evidence of on-site production and craft specialization

The evidence for on-site production is the main basis of our identification of the origin of beads. This is achieved by analysing bead assemblage based on stage of their production, termed finishing. 54% beads of the IPB's comprise half-processed while 7% are wasters (Figure 4.30). Only 30% are finished beads, clearly indicating on-site/local production of IPBs from *ca.* the 2nd century BC to the 12th/13th century AD**.** At Mantai, one of the four main centres of IPB production and major contributors to Asia's maritime bead trade, import of these beads was likely unnecessary.

In the following sections, IPBs are analysed under a number of categories. Such analysis permits inter-regional comparisons when assemblages from other sites are analysed under the same criteria.

IPB 'division' and 'class'

With regards to their 'division', 94.4% IPBs are regular rounded beads. While the 'division' of 4.2% IPBs remain undetermined, regular faceted and irregular beads are negligible. All undetermined beads are fragments (Figure 4.31). The most practical classification of bead form, however, is based on their class. The Mantai IPB assemblage is dominated by oblates (51.4%) and cylinders (41.4%) (Figure 4.32). Collectively, they account for more than 92% of the IPB assemblage. All other identifiable forms (tubes, spheres, barrels and irregular) jointly comprise less than 3% of the total IPBs. The rest are fragments; hence their class remains undermined.

Thus, the Mantai IPB assemblage is essentially regular rounded oblates and cylinders. Specialized production of a few glass bead forms suggests the demands of the contemporary maritime bead trade and the presence of lapidary workers who specialized in these forms.

IPB diaphaneity, surface lustre and colour groups

Diaphaneity, colour and surface lustre are important factors in studying IPBs. They provide information concerning technological limitations, resource availability, and even choice of colours at given points in time. Of the Mantai IPBs, 1.5% are transparent, 58% are translucent, with the rest being opaque. The latter two groups are distributed from Phase II to the 'Surface', while transparent beads appear after Phase III (Figure 4.33).

83.5% (782 beads) of the surface lustre of Mantai beads are shiny, while 22 (2.4%) beads are very shiny (Figure 4.34). 13.5% (126) beads have dull surfaces while the surface lustre of 0.6% (six) beads remains uncertain due to weathering. As all IPBs are locally made, the high proportion of extremely lustrous surfaces shows the technological advances of local bead manufacture and serves as evidence of craft specialization.

The distribution of bead colours at Mantai is given in Figure 4.35. Red (34%) and blue (31%) dominate the IPB colour groups, collectively accounting for 65% of the total IPBs. They occur from Phase II to the 'Surface'. Green (18.5%) and yellow (12.7%) are the other important IPB bead colour groups. The chronological distribution of these colours is similar to those of red and blue, though yellow was introduced in Phase III. Other IPB colour groups (black 2.9%, white 0.32%, clear 0.11%) are numerically negligible and occur from Phase III upwards.

4.10.2.3 Local bead summary

Considering the specialized production of a few select bead forms, the focus on a few colours and degrees of diaphaneity, and the high degree of surface lustre obtained, Mantai bead makers highly specialized in producing attractive beads for export markets. Interestingly, this demand/preference seems to have persisted for nearly 1500 years almost unchanged.

The local bead assemblage is dominated by glass beads. While no glass making furnaces were found, some indirect evidence is present for on-site glass production. Of the local beads, 64.36% are IPB. The Mantai the IPB industry seems to have specialized in oblates and cylinders. The glass bead assemblage, inclusive of IPBs, is produced throughout the site's occupation. Evidence of stone beads is comparatively limited. However, they occur

consistently from Phase III (*ca.* late 1st century) to the 'Surface'(12th/13th century). They comprise those made from locally available raw materials as well as those that are imported. In both cases, however, there is strong evidence for on-site production. Therefore, in most cases, though raw materials were imported, actual production seems to have taken place at the site.

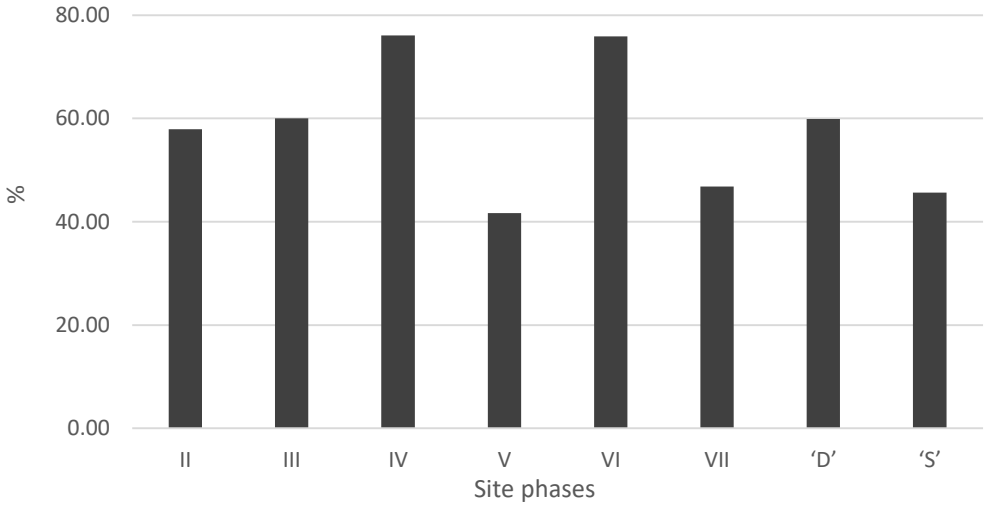


Figure 4.28: IPB across site sequence - % from TBA phase total; based on Table 4.2

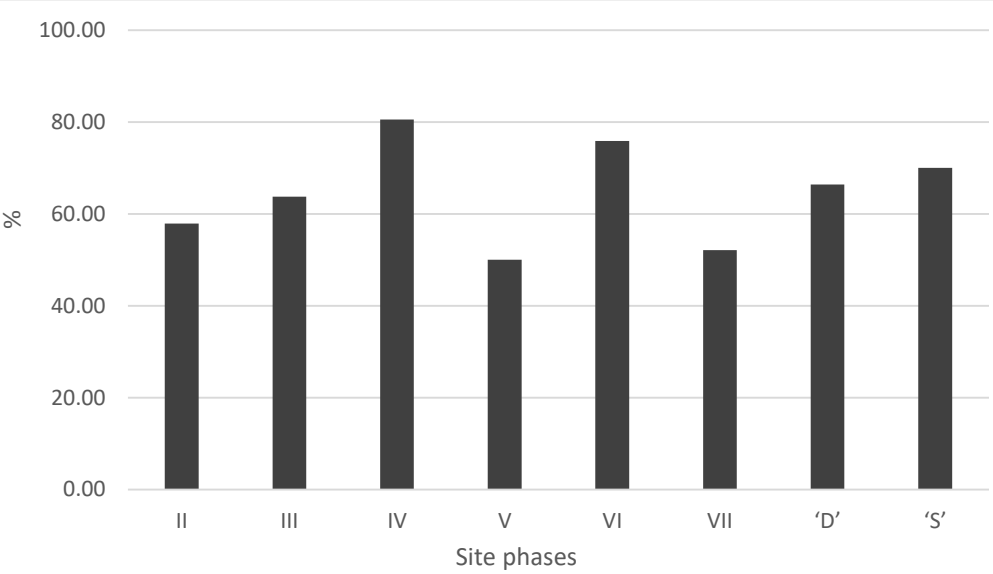


Figure 4.29: IPB across site sequence - % from SLBA phase total; based on Table 4.2

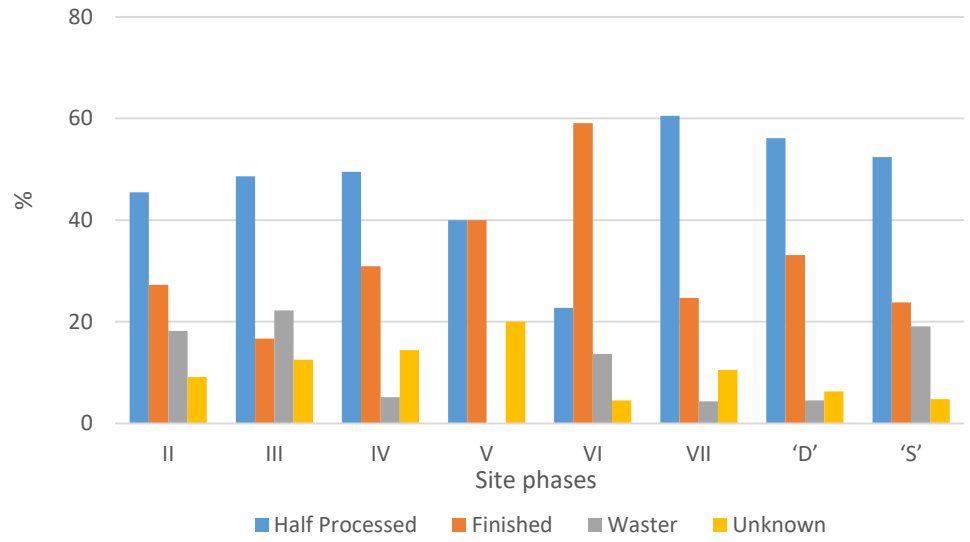


Figure 4.30: IPB evidence of on-site production across site sequence - % from IPB phase total; based on C4.3.16

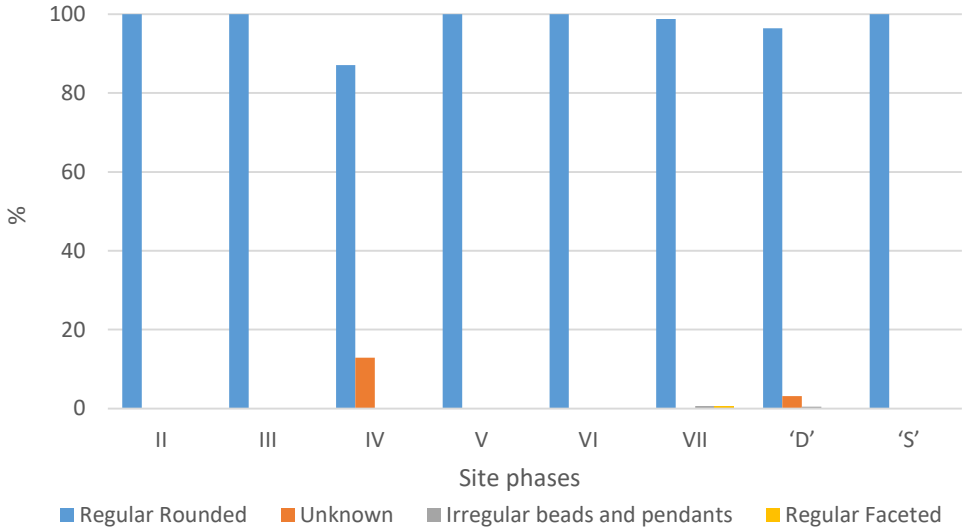


Figure 4.31: IPB Divisions across site sequence - % from IPB phase total; based on C4.3.17; Note the predominance of Regular Rounded bead forms across site sequence

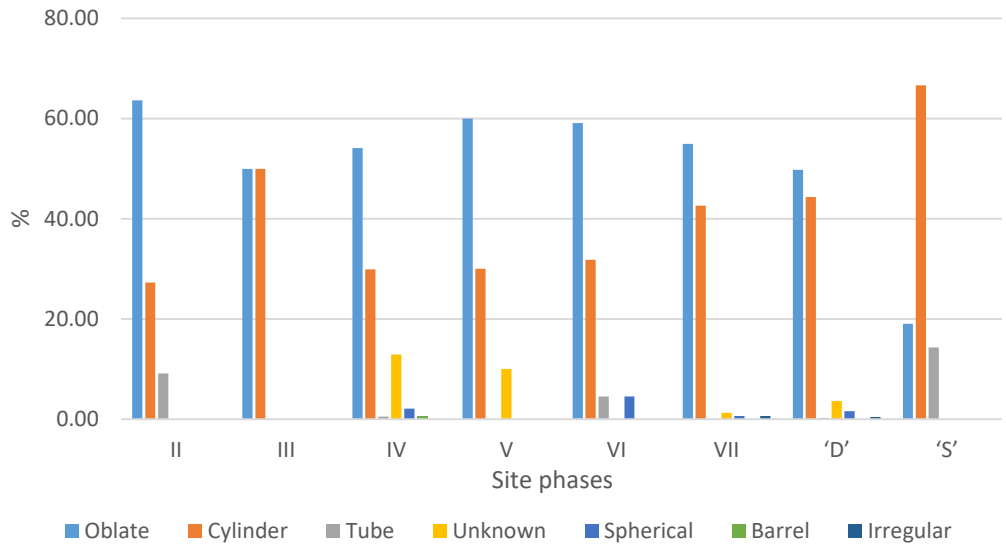


Figure 4.32: IPB class across site sequence - % from IPB phase total; based on C4.3.18

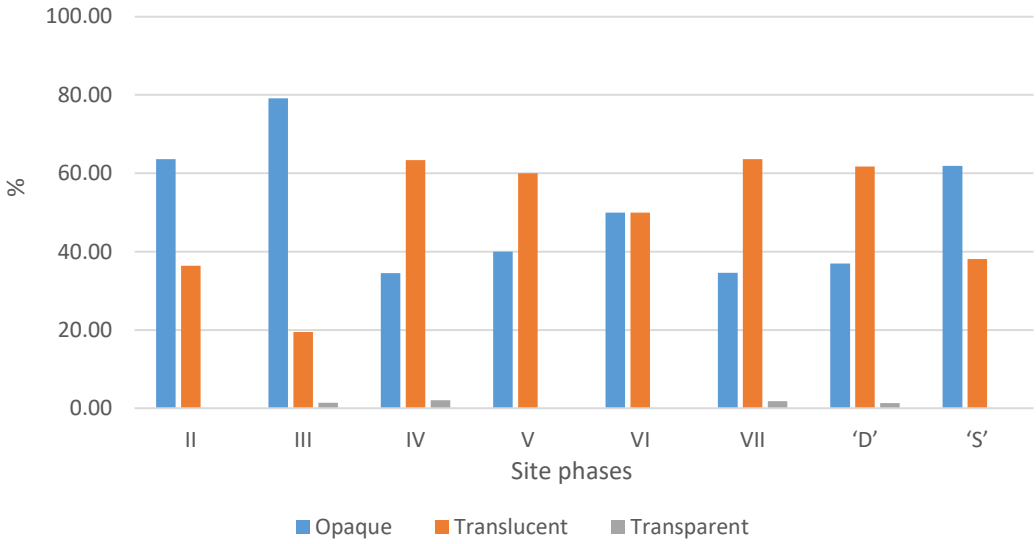


Figure 4.33: IPB diaphaneity across site sequence - % from IPB phase total; based on C4.3.19

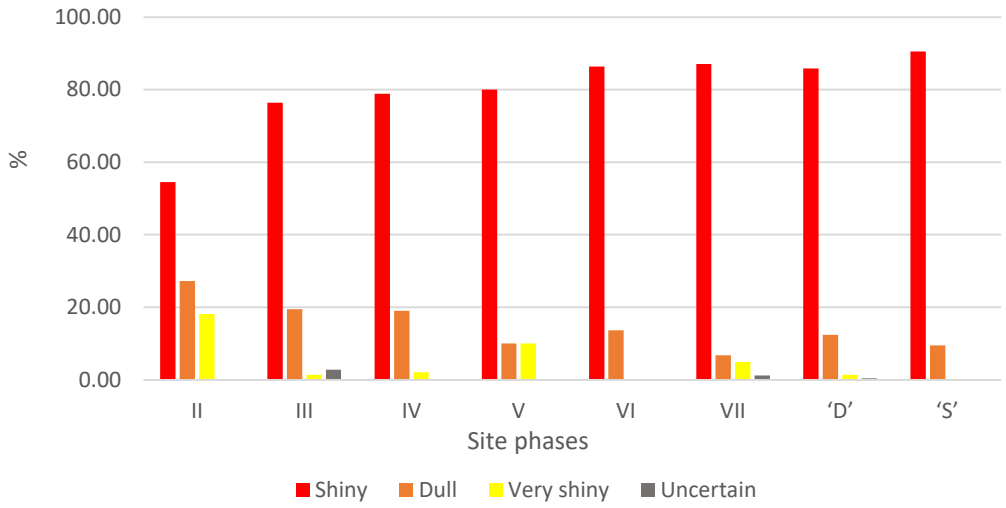


Figure 4.34: IPB surface lustre across site sequence - % from IPB phase total; based on C4.3.20

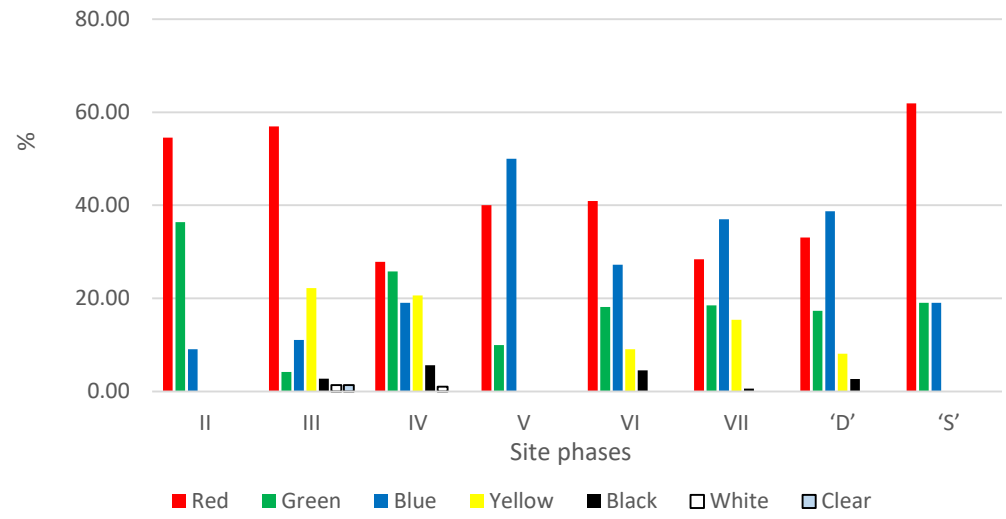
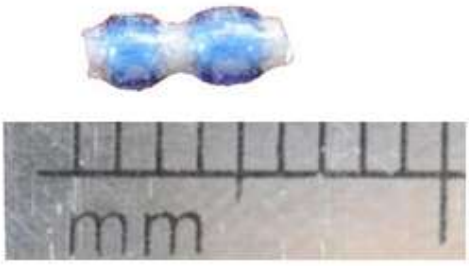
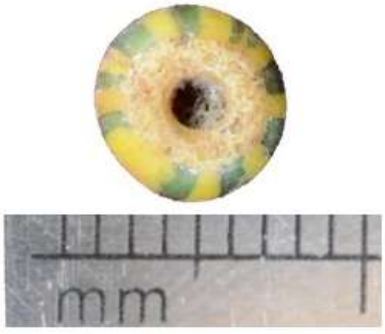


Figure 4.35: IPB colours across site sequence - % from IPB phase total; based on C4.3.21

Plate 4.3

Selected Special bead types	
Cornaline d'Aleppo	
	
Segmented bead-ME	Segmented bead-SL
	
Stupa bead	Collar bead
	
Striped bead	Melon bead
	

4.10.3 Imported beads and connections

The unique geographical position of Sri Lanka and particularly of Mantai in the Indian Ocean made it the terminus for traders travelling from both from east and west (e.g., Procopius I.20.9–1; Hourani 1963:43–44) making it the intermediary in east–west trade throughout the Early Medieval Period (Prickett-Fernando 1994). During the period of the Roman domination of the west, traders from Rome, Arabia, or Sassanian Persia traded at Mantai exchanging, amongst other goods, beads (Francis 2013a:351). During the peak of Islamic trade, however, other westerners were deprived of access to the market at Mantai (Ibid.) as Muslim traders maintained a monopoly with the island and the Chinese who came there (Procopius I.20.9–1; Cosmas II and IX).

This study considers that beads without accompanying wasters and manufacturing debris are likely to have been imported to Mantai from overseas or another part of Sri Lanka. Francis (2013a:349) considered beads that are made of exotic materials, have rare and unusual shapes, as well as those manufactured by employing techniques locally unknown, are imported. However, our analysis of those beads made of exotic raw material unavailable in Sri Lanka clearly indicates that most of these were made at Mantai. Similarly, some of the foreign made beads, such as the segmented type, were locally imitated. Francis (2013a:349) also considered industrial refuse, unfinished beads and the evidence for furnaces as indicating local production. Such evidence is ample at Mantai though, except for a single suspected locality, no evidence for kilns was found.

Thus, imported beads are defined as those for which there is no evidence for local production, and those of which the origin has been clearly established as foreign. Altogether only 43 beads (2.72% of TBA) comprise Mantai's imported bead assemblage (Figure 4.36&4.37), indicating that the port was largely self-sufficient in beads through those it produced locally. Though numerically few, imports are varied in their types and derive from the Roman Empire, Early Medieval Islamic states, India, and Southeast Asia and are a testimony to the extensive trade relations Mantai maintained.

The identification of a bead's origin, discussed below, is based on many authors such as Beck (1928), Francis (2002, 2013a) and Hannibal-Deraniyagala (2001, 2013).

4.10.3.1 Indian beads

Indian beads are the largest category of import, although this is limited to a mere 17 items (40% of the imported).[67] They are confined to Phases IV, VII, 'Disturbed' and 'Surface'and date from *ca.* the mid-3rd century to the 12th/13th century (Figure 4.38&4.39). All of the Indian beads are made of glass, with the exception of a suspected agate bead and a carnelian bead.

Collar beads (12 items) - those that have collars or any attachment at the end of perforation (Beck 1928:4, 10; and Figure 8)- are the largest category of Indian beads all of which – except a single suspected agate bead–are made of glass. They have been identified as being Indian since

[67] Inclusive of suspected Indian beads

examples were found at Arikamedu where they are dated to the Early Historic period (Wheeler et al. 1946; Francis 2002, 2013a:353).

The remaining four Indian beads are barrel, hexagonal bicones[68] and cylinders.[69] These are neither numerically nor historically important and therefore are not discussed any further.

Considering Sri Lanka's close cultural relationships with India and the comparatively large Indian ceramic assemblage, Mantai's Indian bead assemblage is extremely limited. The possibility of some of these so-called Indian beads being imitated at Mantai cannot be ruled out either, as four of the collard beads and the cylinder are half-processed. The small quantity and limited variety of the Indian bead assemblage illustrates the island's self-sufficiency in bead-making, rendering the importation of beads unnecessary.

4.10.3.2 Middle Eastern beads

Ceramics clearly illustrate Mantai's strong connection with the Middle East (Chapters 3.3.9.3 and 5.3.3.7). The Middle Eastern bead assemblage, however, is confined to a mere eight items (Table 4.3)

Table 4.3: Middle-Eastern beads

Bead Type		Quantity	Phase
Oblates		2	IV, 'Disturbed'
Special beads	Melon	1	VII
	Cornerless cube	1	'Disturbed'
	Segmented type beads	2	'Disturbed'
	? Mosaic cane beads	2	'Disturbed'

[68] Closer to Hexagonal Bicones reported in Arikamedu.

[69] Long cylinder is similar to drawn bead from Arikamedu illustrated on Plate 29 in Francis 2002.

The scarcity of Middle Eastern beads may indicate that despite strong connections, Mantai did not import many beads from the region, because it was itself primarily a bead production and export centre.

All of the Middle Eastern beads are made of glass, apart from a single oblate and a single cornerless cube bead[70], both of which are made of lapis lazuli. The oblate is a half-processed bead, indicating perhaps its local manufacture. Similarly, two suspected mosaic canes are wasters. Therefore, some of these beads could have been imitated locally.

Discounting a single bead in Phase IV, Middle Eastern beads are found in Phases VII (1) and 'Disturbed' (4) (Figure 4.40&4.41) and are thus likely to date from *ca.* the 7th century. Of these, only the historically significant are discussed below.

Segmented beads of Middle Eastern origin

Segmented beads are those made from drawn tubes, which are constricted along the length (Francis 2002:90; 1989e, Figure 9.2) to create bulges that were subsequently cut off as single/multiple beads. They were a key product of the Middle Eastern bead industry and are widespread in the region and documented from the 3rd century BC in the Middle East (Ibid). Francis (2013a:355–356) identified four varieties of segmented beads of Middle Eastern origin from Mantai. Three of these types are also found at Oc Eo in Vietnam (Malleret 1962:249–69), indicating inter-regional networks. Francis's (2013a:355–356) Mantai examples are found from

[70] Cubes or rectangles of which all corners are cut off so as to leave triangular surfaces. They are combination of cubes and octagonal (Beck 1928:17).

the Early Historic levels to upper disturbed layers, and hence dated to between the Early Medieval and later periods. In our assemblage, two Middle Eastern segmented beads are found from 'Disturbed' and hence also parallel those of Francis.

Melon beads

Melon beads are one of most common types of Beck's (1928:10) Gadrooned beads. They have convex decorations around the edge so that they resemble a melon. The origin of these beads has been assigned to Middle East (Francis 2002 and 2013a). Melon beads were not identified by Francis from Carswell's excavation. Hannibal-Deraniyagala (2013:373), however, identified a melon bead (Type XIII-1) of opaque black glass.

Our assemblage contains only a single glass melon bead from Phase VII, dating from early/mid-8th century to late 9th century. Black glass melon beads are found at Nevasa (Basa 1992:92) while blue types are very common in Early Historic contexts in India (Sankalia and Dikshit 1952:32), indicating circulations of melon beads in Southeast Asia, although they are scarce at Mantai.

Mosaic cane beads

Mosaic beads are those made by blending more than one colour of glass or faience to form definite patterns (Beck 1928:50). In mosaic cane beads, the size of these patterns is reduced subsequently by stretching cylinders/tubes. In the process, a cane with patterns of different colours running along the length is produced. Then canes are cut into beads. A small quantity of these beads is found in contemporary trading ports of Arikamedu, Mantai, Khlong Thom and Oc Eo from *ca.* the 1st century upwards (Francis 2002:94). Their origin is assigned to the Middle

Eastern region (Ibid.), while Dubin (1995:22) considered them to have been made using the techniques initially used for glass making during the Hellenistic and Roman period (300 BC–AD 400).

Two suspected mosaic cane beads were recorded from the 'Surface' during our investigation at Mantai. Francis (2002:94) also reports mosaic cane beads. Though limited, when taken as an assemblage, Middle Eastern beads appear to represent objects that arrived in Mantai incidentally alongside large cargoes including ceramics and items that left no archaeological trace.

4.10.3.3 Suspected Roman/Mediterranean beads

Two suspected Inlay beads from the 'Disturbed' are the only possible evidence for beads of Roman/Mediterranean (C4.3.22a&b). Inlay beads are those with decorations carved first and then filled with pieces of other material (Beck 1928:56). Our identification of inlay beads found at Mantai is tentative. Both of these are made of glass and their finishing is unknown.

4.10.3.4 Southeast Asian beads

Beads believed to have originated from the Southeast Asia are limited to 14 Cornaline d'Aleppo beads (32.6% of the imported beads). They are defined as beads of two layers, which are obtained by immersing the initially blown glass beads into a mass of glass of the same or another colour (See Kidd and Kidd 1983:221f; Dubin 1987:344 and Hannibal-Deraniyagala 2001:206).

Though limited, they are of special significance since evidence for Sri Lanka-Southeast Asia interaction is meagre. Our SEA beads are distributed from Phase VII (*ca.* early/mid-8th century)

to the 'Surface', (12th/13th century) (Figure 4.42&4.43). Chronologically, they tally with the presence of Southeast Asian ceramics as well.

Cornaline d'Aleppo beads[71] are considered to have derived from Southeast Asia, where they are plentiful (Francis 1991a:108; Hannibal-Deraniyagala 2001:221–122; Basa 1991). However, nearly 64.1% of our Mantai assemblage is half-processed and wasters. Only three (21.4%) beads are finished products. If this is taken as evidence for on-site production, then the majority of these beads were imitated/produced at Mantai. The trade/exchange of beads between the two regions is evident from the finding of Sri Lankan made *Stupa* beads and IPBs in Southeast Asia (Dussubieux and Gratuze 2010).[72] This relationship is likely to have been primarily based on Buddhism, which was introduced to Southeast Asia around the 1st century. The strongest presence of beads as items of adornments and the highest development of Buddhism (*ca.* 400–600) coincides in this region (Dubin 1995:57–58). Epigraphic and iconographic evidence illustrate the strong relations between Sri Lanka and SEA at least during the Middle Historic period (e.g., Casparis 1961:241–243; Chandra 1979:267–285; Paranavitana 1960; Chapter 6 and 7). Therefore, Buddhist religious networks could have been partly responsible for the distribution of beads, especially those of the *Stupa* variety as Buddhist symbols, in Southeast Asia.

4.10.3.5 'Imported.Unknown' beads

Three beads recovered from 'Disturbed' do not resemble any known local types (Figure 4.44). They are finished and there is no evidence of local production. Therefore, they are possibly imported though their provenance remains unknown. Two of these are special beads of which

[71] Francis (1991:108) termed them as 'tube with a dark centre and orange coat', and origin is assigned to Sungai Mas. He found one from Mantai.

[72] Dubin (1995:79) also mentions that beads of precious and semi-precious stone available in India and Sri Lanka are also found in early sites in South-East Asia.

the bead type is uncertain, while the other is an oblate. The former is made of glass while the latter is an onyx. Francis (2013a:367) also encountered some beads, which he termed imported, but remained unidentified.

4.10.4 Beads of 'Unknown' origin

The origin of 105 beads (6.7% of TBA) could not be determined, because 64% of these are fragments while others are highly weathered (Figure 4.44). The vast majority of these are glass and suspected glass beads, while a single item of shell and gold beads are also present. The likelihood of the majority of these beads being local is high though weathering makes their identification difficult. These beads are found from Phase III to the 'Surface'. Since 80% of these beads come from Phase VII onwards, they largely date from early/mid-8th century to the 12th/13th century. Their distribution tally in with the increase in bead production/consumption towards the later part of the site's occupation.

Typological studies of the beads discussed above are supplemented by scientific analysis of glass beads from Mantai and Kirinda[73], the results of which are summarized below.

[73] Beads from a number of sites, including those from Mantai and Kirinda, were scientifically analysed together. Kirinda, which was originally meant to be a chapter, is now moved to the Catalogue. Therefore, it was decided to discuss the Kirinda bead analysis results along with those of Mantai.

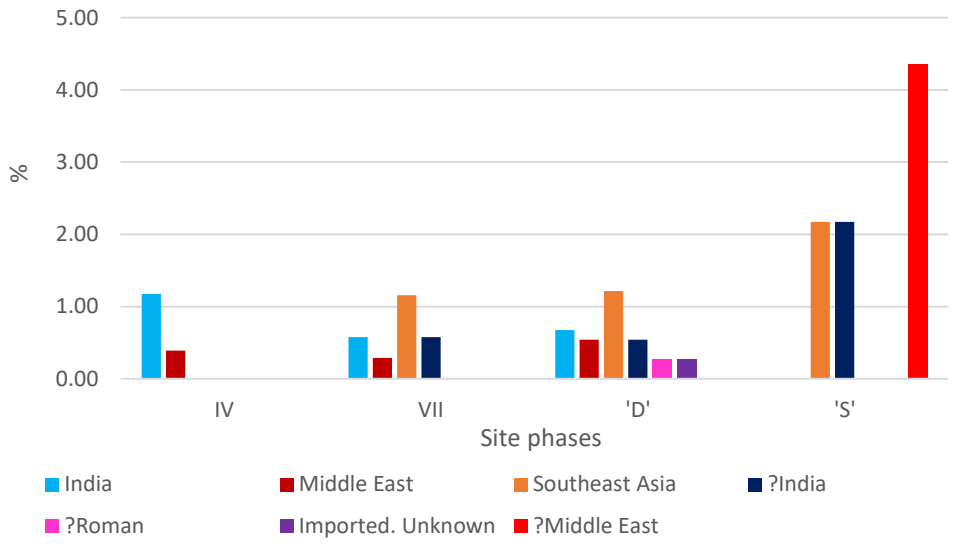


Figure 4.36: Imported beads across site sequence - % from TBA phase total; based on C4.3.22a

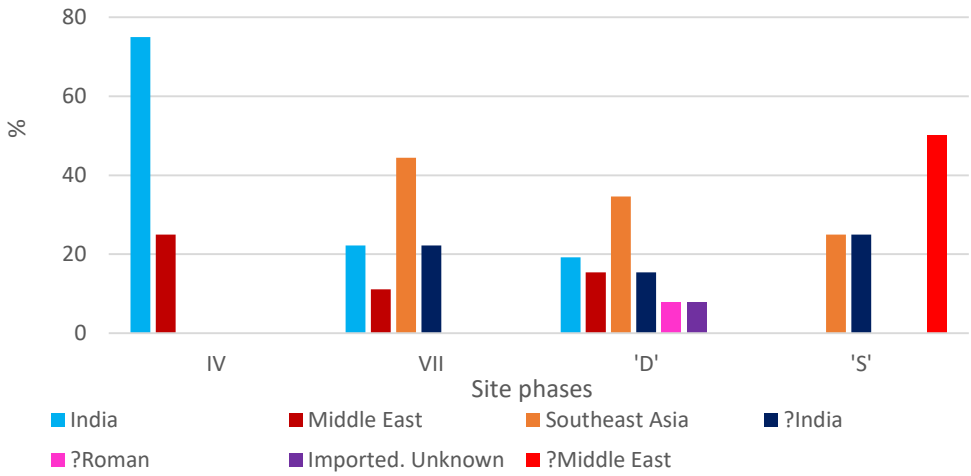


Figure 4.37: Imported beads across site sequence - % from IBA phase total; based on C4.3.22b

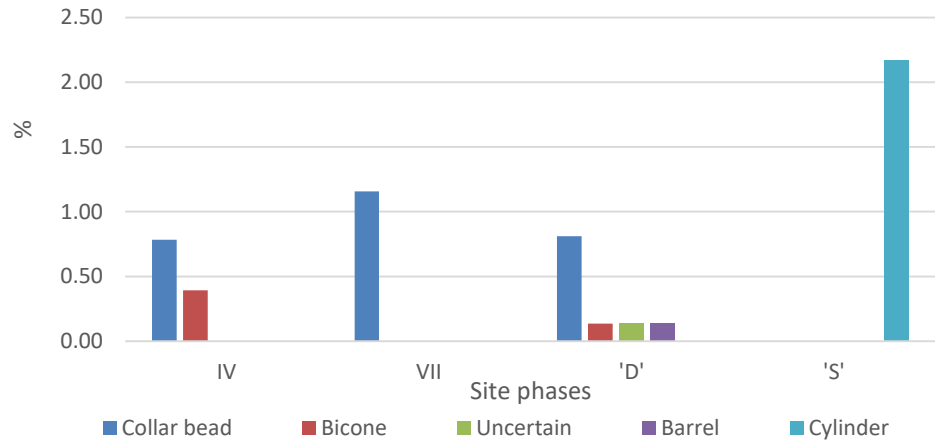


Figure 4.38: Indian beads across site sequence - % from TBA phase total; based on

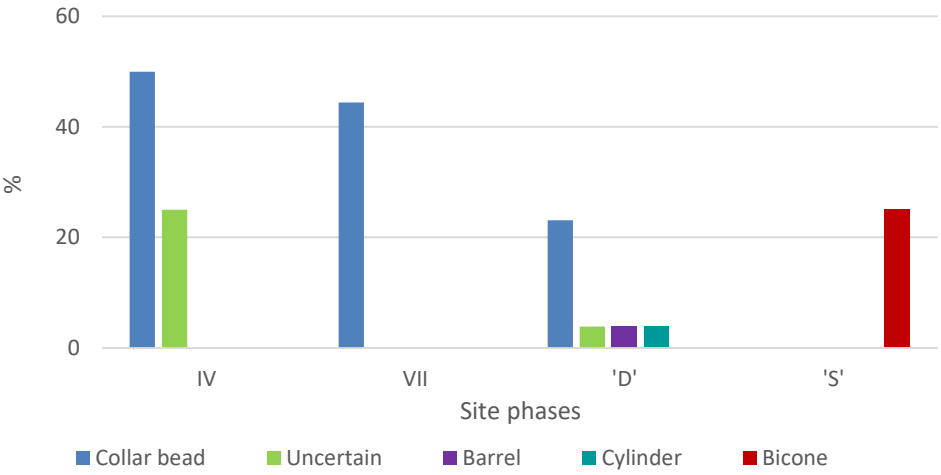


Figure 4.39: Indian beads across site sequence - % from IBA phase total; based on C4.3.23b

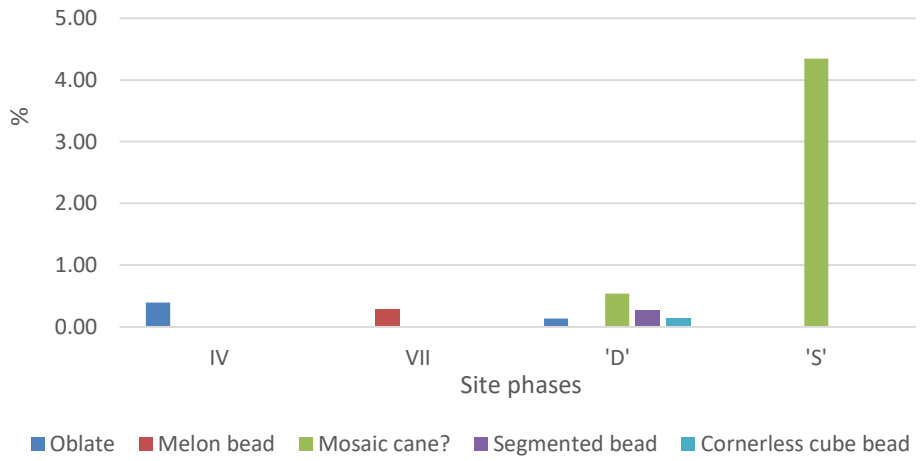


Figure 4.40: Middle-Eastern beads across site sequence - % from TBA phase total; based on C4.3.24a

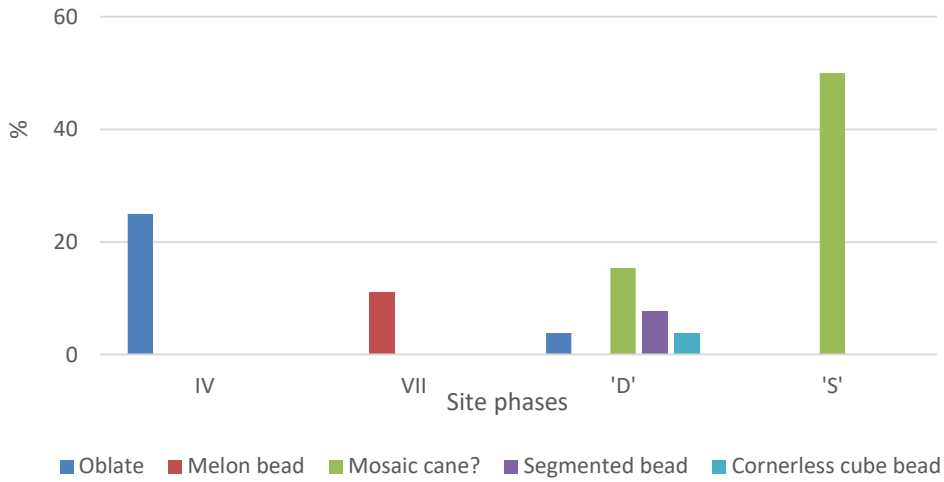


Figure 4.41: Middle-Eastern beads across site sequence - % from IBA phase total; based on C4.3.24b

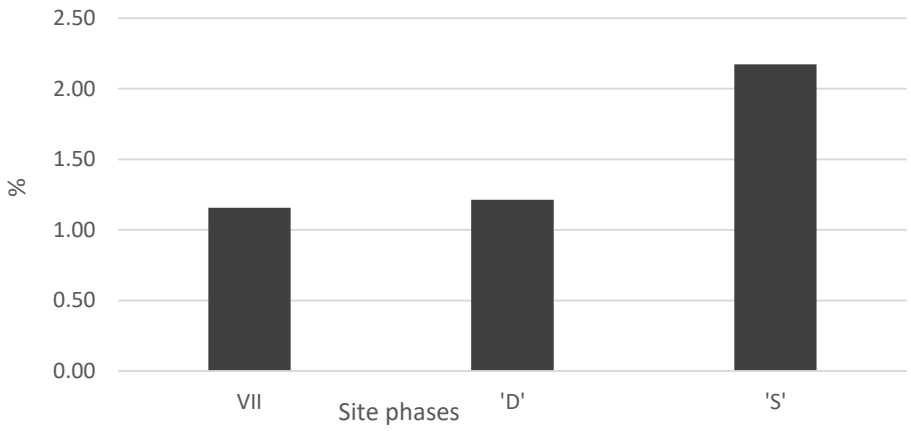


Figure 4.42: South-East Asian beads across site sequence - % from TBA phase total; based on C4.3.25

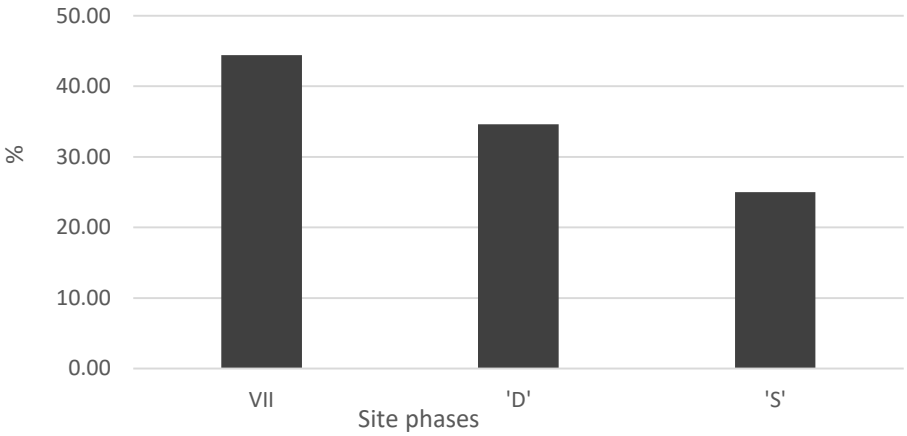


Figure 4.43: South-East Asian beads across site sequence - % from IBA phase total; based on C4.3.25

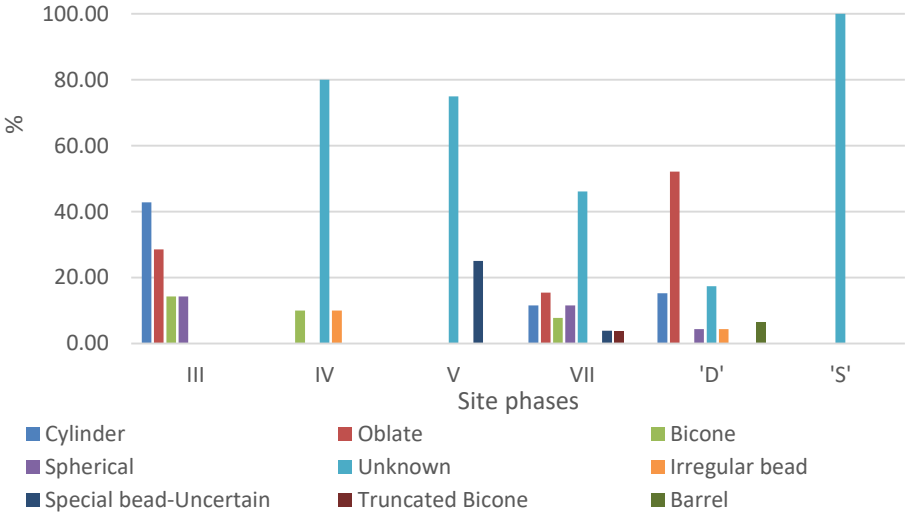


Figure 4.44: Origin unknown beads across site sequence - % from UBA phase total; based on C4.3.26

4.11 LA-ICP-MS analysis of glass beads

Twenty-four glass beads from our excavations at Mantai and Kirinda, along with some samples from Mafia and Zanzibar Islands in East Africa, were analysed by Laure Dussubieux (2014, pers.comm., Catalogue 4.2) using LA-ICP-MS for their composition. 83% of the Sri Lankan glass beads tested were categorised as made from mineral soda alumina (m-Na-Al 1) glass, which is suggested to have been produced in Sri Lanka and South India and subsequently used for making drawn beads (Dussubieux et al. 2008, 2010).

All of the beads from the m-Na-Al 1 glass group are from Mantai and Kirinda, with one exception. This bead, a yellow opaque drawn bead (UU249), is from Unguja Ukuu in Zanzibar. Such beads are rare at Arikamedu (Francis 2013a:364) while they are better represented at Mantai. It is possible that the Zanzibar bead is an import from Sri Lanka. Similarly, all of the beads that were shown to be soda plant ash beads are from Unguja Ukuu, with the exception of segmented (SMA 014) type beads from Mantai. These types of segmented beads from Mantai are imports from the Middle East, but they could also have arrived via direct trade from East Africa. I examined the Unguja Ukuu drawn and disc beads, and typologically they are very similar to those of Mantai.[74]

Two beads (SMA005 and SMA013) from Mantai belong to the Soda rich m-Na-Ca-Al glass. This glass group is reported from Arikamedu (2nd BC onwards) in South Asia to Phu Khao Thong in Thailand (2nd century BC–4th century AD) in Southeast Asia. Their origin/provenance, however, remains undetermined (Dussubieux pers.comm. 2014).

[74] I thank Dr Nicole Boivin and Alison Crowther for permitting me to look at those beads.

Typologically, 13 of the analysed beads from Mantai are classed as drawn glass beads while two beads (SMA014 and SMA008) are segmented and wound beads, respectively. Of these beads, only the segmented bead belongs to the composition group v-Na 1 while all others are of m-Na-Al 1 type beads. The segmented bead (SMA014) is the only Sri Lankan bead that is made of vegetable soda alumina (v-Na-Al) glass and hence is of special interest for this study. In Mesopotamia, Sassanian glassmakers are believed to have produced soda plant ash glass from the 3rd to the 7th century (Mirti et al. 2008, 2009 cited in Dussubieux 2014). With the rise of Islamic trade, Arab traders are credited with distributing soda plant ash glass after the 8th century (Gratuze and Barrandon 1990; Henderson et al. 2004 cited in Dussubieux 2014). Considering its strong Middle Eastern connections as seen in the ceramics, the arrival of Middle Eastern beads at Mantai is of no surprise.

These scientific analyses provide clues, otherwise impossible to gain, about Sri Lanka's possible connections with regions ranging from India and Southeast Asia to Eastern Africa.

Part II: Other non-ceramic artefacts from Mantai

In this section, less publicised but equally significant bangle and metal industries from Mantai are discussed.

4.12 The Mantai bangle assemblage

The forgoing discussion may have given the impression that Mantai was primarily a port of international trade with beads as its main product. This was not the case and consequently, this section illustrates that Mantai had a number of other industries. Bangle making is one

such industry, which in some ways is related to bead production as glass was the main raw material for both industries and the source of glass and production techniques are similar.

Carswell et al. (2013) report 921 glass bangles and nine rings, and 302 shell artefacts/objects from Mantai. The latter category includes beads, rings and bangles. While their sample is large and is clearly illustrated, facilitating identification and comparison, it lacks strict stratigraphic control and chronological certainty.

In contrast, our Mantai bangle assemblage is limited to 50 fragments. Despite being numerically smaller, it has a better stratigraphic control and a reliable chronology. Therefore, our assemblage can be compared with the larger sample of Carswell et al. to understand the nature of the Mantai bangle industry. Our assemblage is distributed from Phase III to the 'Surface', although only a single bangle fragment is found in Phase III, with production taking place from Phase IV (mid-3rd century) onwards. A higher density of artefacts has normally been recorded from Phase VII onwards at Mantai, but with regards to bangles the highest concentration is in the 'Disturbed' and the 'Surface' (post-dating the 8th/9th century). Thus, bangle production seems to have been a late introduction at Mantai compared to beads, though it too continued up to the 12th/13th century (Table 4.4 and Figure 4.47; See Catalogue 1.1 for methodology).

Table 4.4: Mantai Bangles across phases; % from TBA phase total

Phases	III	IV	VI	VII	'D'	'S'	Total
Bangles	**1**	**7**	**2**	**11**	**20**	**9**	**50**
%	2	14	4	22	40	18	100

4.12.1 Bangle materials

In our assemblage, bangles are made of synthetic and organic raw materials. Of the two, synthetic bangles included only glass, and account for 66% (33 pieces) of the bangles from the excavation. 34% of the bangles are made of organic raw materials (Figure 4.48). Mantai is located close to the chank banks of Mannar and Palk Bay, two of the major sources of chank in the Indian Ocean region (Waddington and Kenoyer 2013:391) and hence this raw material was easily available. Chank shell as a material has some ritualistic value for Hindus in particular (Gunasena pers. comm. 2015). Therefore, Chank bangles were probably more sought after as compared to the more common glass bangles.

Figure 4.48 illustrates the predominance of synthetic/glass bangles from Phase III to the 'Surface'. Bangles made of organic material are introduced only from Phase IV and found only in two more phases, VII and the 'Disturbed'.

4.12.1.1 Glass bangles

In the Carswell et al. (Francis 2013c:381–384) glass bangle/ring assemblage only three artefacts came from 'the Primary development mound' dated between the 1st and the 6th century. The rest were recovered from the 'developed mound' in association with imported ceramics and are dated from the 8th to the 11th century. The glass bangles recovered from our investigations are summarised in Figure 4.49.

4.12.1.2 Glass bangle colours

Glass bangle colour patterns differ from those of beads. Sixteen (48.5%) of the bangles are black, followed by blue (27.3%), green (18.2%) and yellow (6%) (Figure 4.50). The latter two

occur only from Phase VII upwards. Red, the most common colour of beads is completely absent, while black, which is represented by only 4% in the beads, dominates the bangles and bangles of this colour occur consistently from Phase VI to the 'Surface'. The vast majority of the bangles studied by Francis (2013c:381) were also opaque black. He noted that the black cullet recovered are far more numerous than the black beads and therefore concluded that these culets were used for bangle making. They therefore appear to constitute evidence for the on-site manufacturing of black glass bangles. At ASW2, Coningham (2006:349) also recorded that the majority of the monochrome bangles were made of dark blue/black glass. Other colours such as light green, dark green, and light blue are quantitatively insignificant.

4.12.1.3 Glass bangle decorations

Twenty (60.6%) of the glass bangles are undecorated and these occur from Phase III to the 'surface'. Of the 39.4% decorated bangles, the majority (27.3%) are decorated with 'grooved lines'. Of the remainder, one is a 'foiled' bangle recovered from Phase VII (Figure 4.51).

The remaining three bangles from the 'Disturbed' are considered imports. Of these, a black bangle with daffodil yellow[75] transverse lines (Figure 4.45) is identical with a bangle depicted in Francis (2013c:382, Pl 13, 4.1 (7). He identified this bangle as having been made of glass rods with circular sections. In this technique, glass rods are reheated and bent into circles by joining the ends to make bangles. This was a technique developed in the Roman Empire and in medieval Islamic areas (Gardi 1969:90 cited in Francis 2013c:383). This bangle is thus considered to be an import from the west. Interestingly, a Roman cane mosaic bead was found from the same layer (Francis 2013c:384).

[75] Munsell colour 4.0Y 8/10

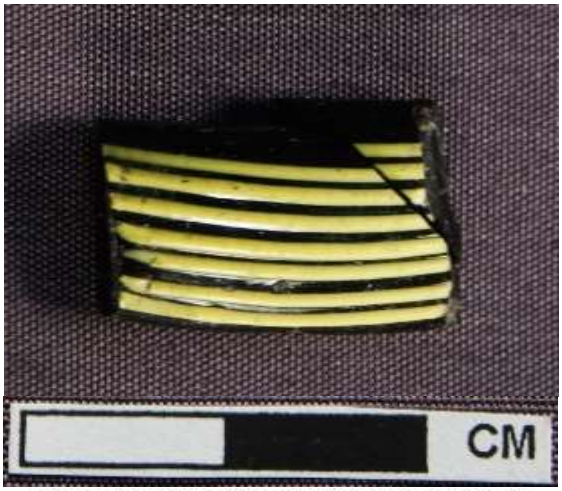


Figure 4.45: Black bangle with yellow stripes

The other two decorated bangles consist of 1) daffodil yellow[76] layer decorated and 2) yellow layer applied on exterior surface (Figure 4.46). They are similar to bangles described in Francis (2013c:382, Pl 13.4.3—first two, respectively).[77] These are also considered as imports, though the precise region of origin is unknown. All imported bangles are found only in the 'Disturbed'.



Figure 4.46: Bangle fragments with painted yellow colour decorations

In summary, both imported and decorated glass bangles are limited in numbers from our excavation and they post-date *ca.* 8th/9th century.

[76] Munsell colour 4.0Y 8/10

[77] Bangles of compound glass, yellow over amber (Francis 2013c:383)

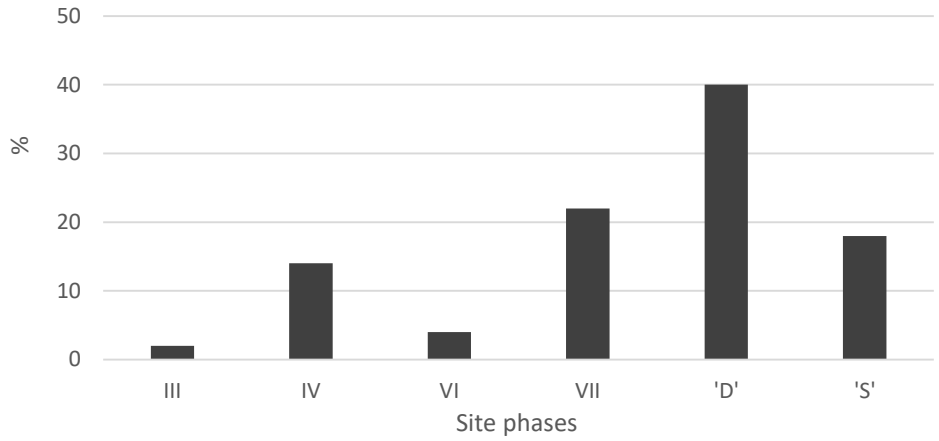


Figure 4.47: Bangle distribution across site sequence - % from TBA; based on Table 4.4

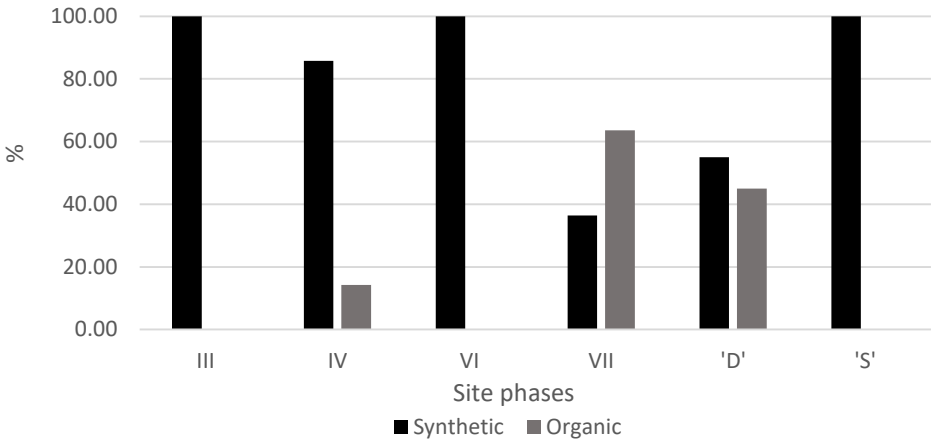


Figure 4.48: Medium of Bangles across site sequence - % from TBA; based on C4.3.27

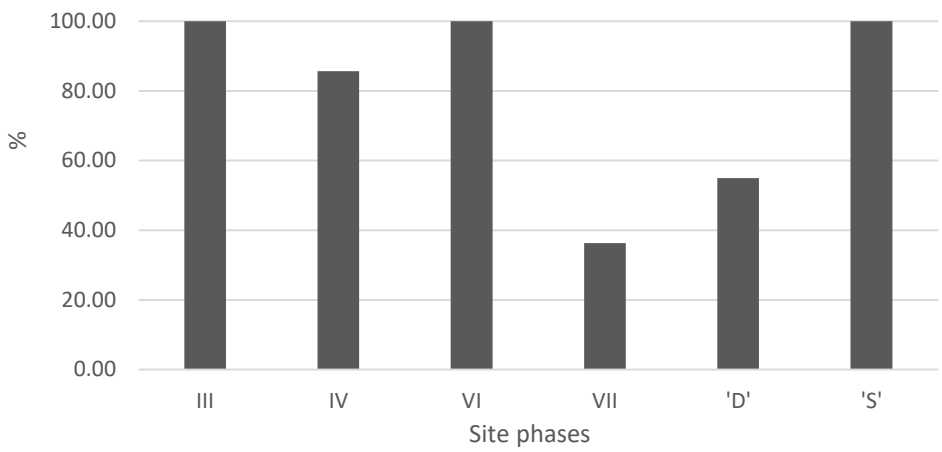


Figure 4.49: Glass bangles across site sequence - % from TBA; based on C4.3.28

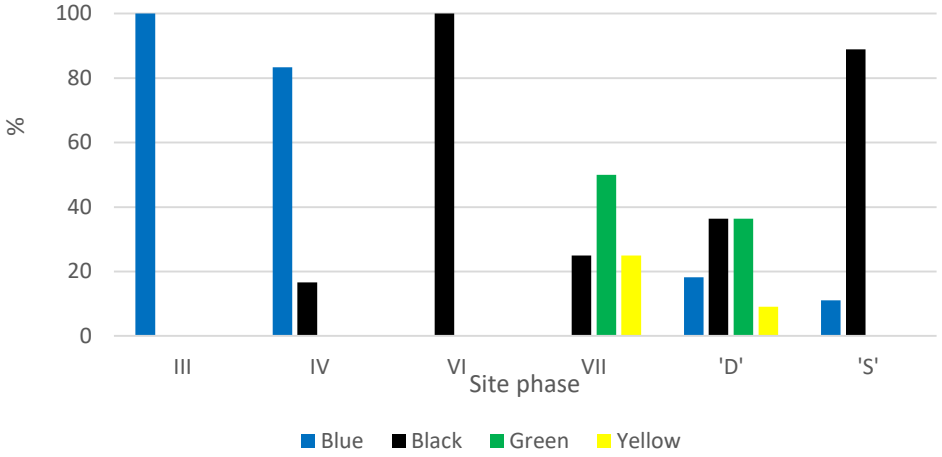


Figure 4.50: Glass bangle colours across site sequence - % from TBA; based on C4.3.29

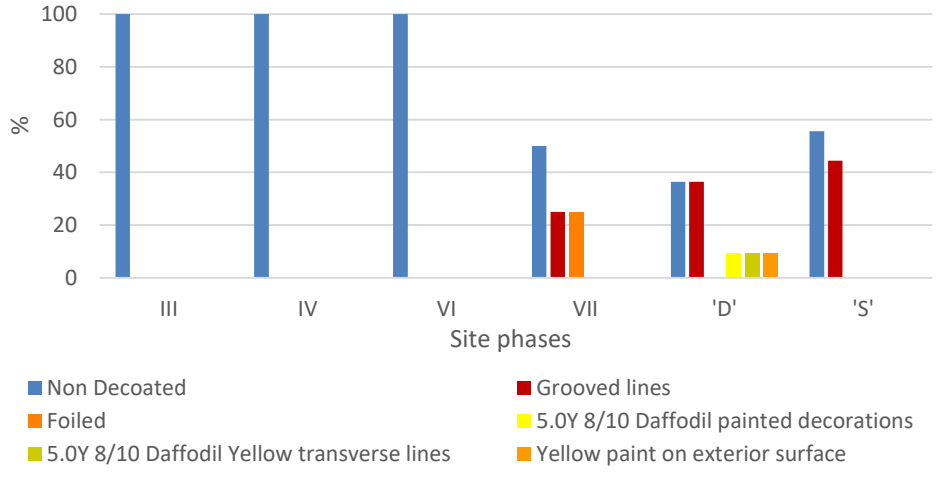


Figure 4.51: Bangle decorations across site sequence - % from TBA; based on C4.3.31

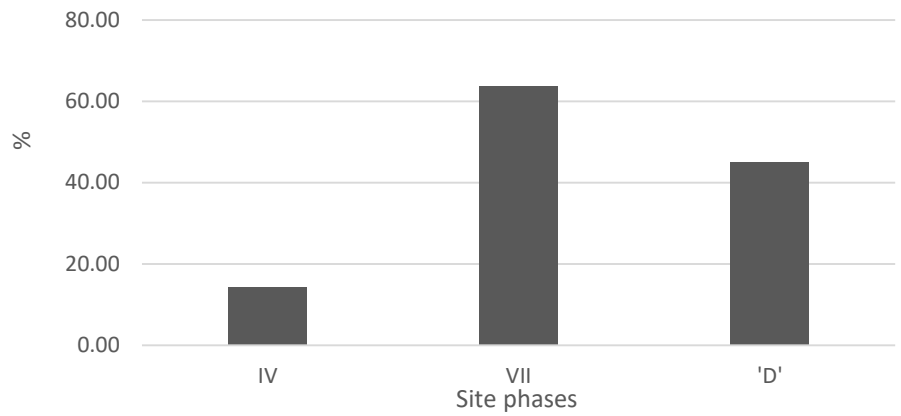


Figure 4.52: Organic bangle distribution across site sequence - % from TBA; based on C4.3.32

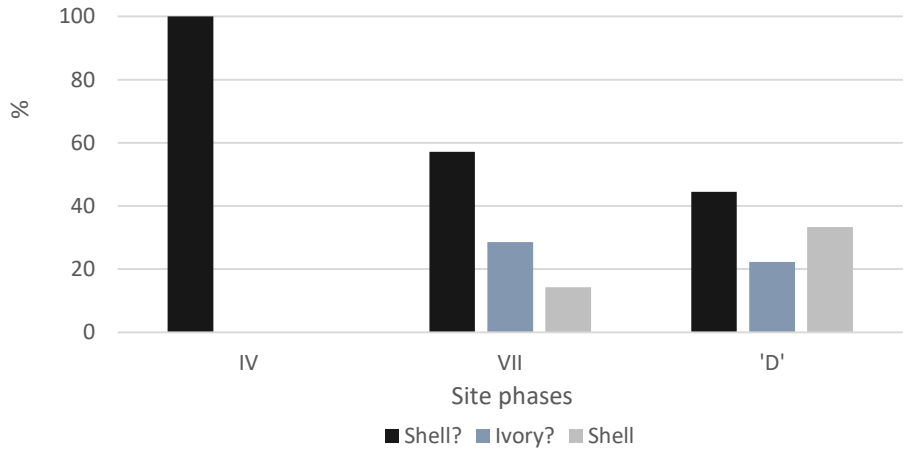


Figure 4.53: Organic bangle material across site sequence - % from TBA; based on C4.3.33

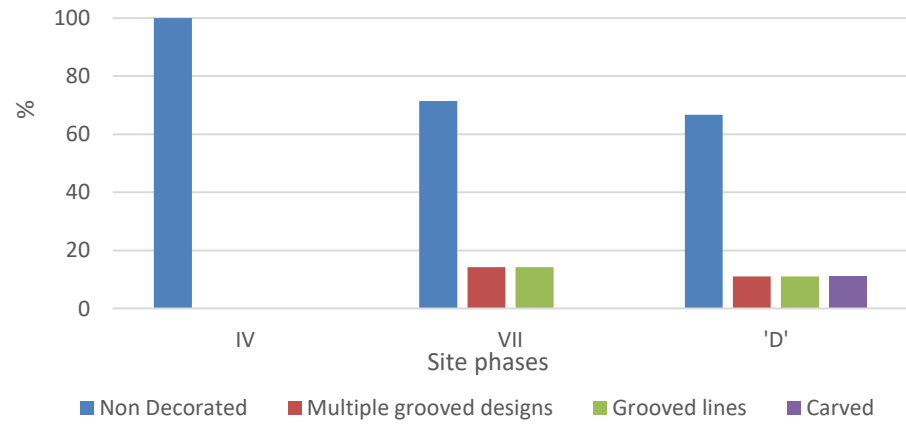


Figure 4.54: Organic bangle decoration across site sequence - % from TBA; based on C4.3.34

4.12.1.4 Organic bangles

Bangles made of shell (large gastropods, *Turbinella Pyrum L.*; Figure 4.55), suspected shell and suspected ivory are discussed in this section. Waddington and Kenoyer (2013:385–395) studied 267 shell artefacts from the Carswell et al. (2013) excavation. They considered 37.36% of them as manufacturing waste, including two sawn spirals and 100 bangle fragments, broken in production. They assigned the vast majority of these to the 'Developed mound' (8th to 11th century) while admitting difficulty in identifying any chronological development due to stratigraphic limitations.



Figure 4.55: Organic bangle fragment from Mantai

In our assemblage there are only 17 bangles made of organic material (34% of the total bangle assemblage), which appear only in Phases IV, VII and 'Disturbed' (C4.3.32). They occur consistently from Phase VII onwards and may thus post-date 8th/9th century (Figure 4.52).

Figure 4.53 illustrates the distribution of raw materials (Figure 4.53&4.54) in this category. However, due to weathering, the identification of some material without scientific analysis is difficult. Of the organic bangles, 23.5% and 53% are made of 'shell' and 'suspected shell', respectively. There are also four bangles which are thought to be ivory. Graham (2013f:399–

405) reports various ivory objects including dice, an ornamented rectangular bar, a ring, and triangular off cuts of ivory, which provides clear evidence for on-site ivory working, although the source of ivory is not clear.

Disregarding the single suspected shell bangle in Phase IV, all the other organic bangles in our assemblage appear in Phases VII and the 'Disturbed'.

4.12.2 Origin of bangles

The identification of the origin of bangles is more difficult than that of beads. Except for a few bangles, such as those made by joining glass rods and twisted canes, Francis (2013c:384) considered that the vast majority of Mantai bangles were made at the site. Black glass culets and misshapen bangle pieces have been cited as evidence for on-site production. Francis further suggests that imported glass bangles are from the west and unknown regions (Ibid.). In our assemblage, only three bangle fragments belong to these imported types. As the entire glass bangle assemblage comprises of fragments, the percentage of actual production debris is unclear. Undoubtedly, the vast majority of glass bangles are made at the site. There is clear evidence for the on-site production of organic bangles, shell bangles in particular, as sawn-off spirals of chank shell are commonly found at the site, and our assemblage includes two. Waddington and Kenoyer (2013:391) estimated that 37.4% of their Mantai shell bangle assemblage was composed of manufacturing waste, indicating the on-site production of shell.

No clear evidence for Sri Lankan-made bangles has been reported outside the island, consequently, while production for export is possible, it is also likely that some would also have been consumed locally.

4.12.3 Discussion

The use of bangles as personal adornments in Southeast Asia dates from *ca.* 1000 BC in India (Francis 1984, 2013c:381) although they did not become common until at least *ca.* the 14th century (Sankalia 1947; Dikshit 1969:47; Francis 2013c:384). Our Mantai bangle assemblage, however, occurs from Phase III (late 1st century–late 2nd/early 3rd century) to the 'Surface' (12th/13th century). Considering their consistent occurrence from Phase IV onwards, bangle production may date from *ca.* mid-3rd century. Francis (2013c:384) also noted that the Mantai glass bangle industry is much older than that of India and the presence of Persian traders here is cited as a possible reason for such early bangle production.

Waddington and Kenoyer (2013:390) report that the vast majority of their shell bangle production debris came from Trench P, situated in the northern edge of the mound at Mantai. This may suggest that a specific quarter of the port was used for the production of shell bangles. Historical references clearly indicate that different quarters were allocated for various artisans and craftsmen in the city (Chapter 2.3.1.6).

Besides glass bangles/rings of glass and organic material, there seem to have been various productions at Mantai, such as ivory working. A number of objects made of ivory are reported by Waddington and Kenoyer (2013:385–395). Thus, Mantai was undoubtedly an urban centre with various crafts and productions and not just a trading/transhipment port.

4.13 Metal working

A considerable amount of iron ore and slag are found on the surface of Mantai and from Phase III upwards in our excavation. They are clearly production debris related to metal

working at the site. Since the analysis of our iron ore/slag assemblage is pending, I draw from Carswell et al. (2013) and incorporate their findings with historical evidence to discuss the significance of metal working at Mantai. Graham (2013g:273–276) found 465 iron and 79 copper alloy objects, majority of which came from contexts datable from the 2nd to the 5th/6th century. Graham (2013g:273) mentions that "both iron and copper alloy occurred across the whole site and at every stratigraphic level".

Slag and other metal-working debris from the Carswell et al. excavation were analysed by Juleff (2013:277–310). She reports convincing evidence for copper/iron working, including a 'small scale iron smelting hearth', which pre-dates AD 200. Based on the occurrence of quantities of debris, the main metal smithing and copper working is believed to have been undertaken on the southern-end of the site during later periods.

Several Tamil inscriptions from Mantai postdating the 8th century, provide invaluable insights into the city planning during the *Chola* control (See Indrapala 2013). For example, a pillar inscription, dated to the 11th century, indicates that Mantai had different quarters and estates designated for different social groups including various artisans. Thus the "*Kammana-ceri*", the blacksmiths, lived in an area north of the land granted to the Rajarajesvaram temple (Indrapala 2013:65).

During our survey, scatters of ore and slag were noted across the entire fortified settlement and on the adjacent areas. While Juleff (2013:278) identified the southern end of the site as the main metal working area during later periods, Graham (2013g:275) reports the highest number of iron objects from Trench H during the primary development of the site (Figure

2.12). Further archaeological and historical investigations may reveal the spatial organization of metal working at Mantai.

There are also references to weavers, oil millers and traders in the inscriptions relating to Mantai (Indrapala 2013:65) and perhaps they too had quarters designated to them. Such quarters were present as early as 500 BC at Anuradhapura, to which the port was directly linked (*Mv.*10:76–106). Thus, it is clear that Mantai was not a mere trading port, but a production centre in the true sense.

4.14 Chapter summary and conclusions

The primary objective of this thesis is to understand Sri Lanka's external connections based on imported and exported artefacts. In contrast to ceramics, the Mantai bead assemblage provides an extraordinary dataset that demonstrates large-scale on-site production and export. While beads can be understood from various perspectives, this study mainly treats them as objects of local production and export to reconstruct local networks, local agency and to understand inter-cultural connections.

78% of the local beads are made of glass, and while no glass furnaces were found, there was considerable indirect evidence in terms of production waste. Glass bead workers, however, need not necessarily be glass producers as well. The two industries could have operated independently. Local sources such as Giribawa, and yet unknown sites, could have been sources of glass for the Mantai bead industry. Glass ingots found on the Godavaya shipwreck (Gaur et al. 2011:9–17; Muthucumarana et al. 2014) may also indicate import from sources such as those in India (Chapter 6.4.1).

Of the glass beads, IPBs account for 74.8%. Quantitatively, they are the largest bead category. Of the IPBs, oblates and cylinders together account for 92.7% of the total IPB assemblage. They are made consistently of red, blue and green colours with a very high percentage (85%) of very shiny and shiny surface lustre. All these suggest that Mantai specialized in a selection of a few IPB glass bead classes. They are produced throughout the site's occupation and likely well in excess of the requirements for local consumption. Similar beads are found elsewhere in Southeast Asia, Red Sea and possibly in the Persian Gulf supporting this view (Chapter 6.4.3.4).

Our stone bead assemblage is quantitatively larger, chronologically early and more wide-ranging than that of Francis (2013a). Stone beads are the second most numerous bead type in our assemblage and occur consistently from *ca.* the late 1st century to the 12th/13th century. They were made on-site from local and imported raw materials. According to Dubin (1995:10, 11), it was raw materials that were traded more frequently. Trading of lapis lazuli is suggested to have been one of the stimuli of early inter-regional and maritime trade (Oppenheim 1970:10; Francis 2002:7).

Imported raw stone materials seem to have come from various sources in India, Afghanistan and Thailand (Chapter 6.5). Rocks and minerals that are available in Sri Lanka could have come from various places (Figure 4.56). Garnet, a mineral widely available in Sri Lanka and an export to various regions, including the Mediterranean, Oman and Southeast Asia (section 4.8.4), is claimed to have been the least used for bead making in Sri Lanka (Hannibal-Deraniyagala 2013:372). 33% of our stone bead assemblage, however, comprised of garnet beads. More importantly, there is clear evidence for the on-site manufacture of garnet beads.

The scientific analysis of local beads reveals their circulation in the contemporary international market. IPBs, the main exported local bead type, appear to have circulated possibly as far as East Africa in the West to China in the East. The *Stupa* bead, a Buddhist symbol, mainly circulated in the Buddhist regions of Southeast Asia.

Local beads also provide clues to possible workshops, including glass sources such as Giribawa[78] and internal trade-exchange networks. While Mantai seems to have specialized in a few glass bead forms, the production of *Stupa* beads appears to be largely confined to Southeastern Sri Lanka. Similarly, disc beads are largely found in Anuradhapura and northern Sri Lanka (see Coningham 2006; Deraniyagala 1972); it is not known if they were made there.

The Mantai imported bead assemblage is limited to 43 beads, which come from India, the Middle East, Southeast Asia, and the Mediterranean, and from undetermined overseas regions. The largest proportion of these are from India (17) and the Middle East (11)[79], but they are limited. Imports from other regions are even fewer. The raw materials used in bead production are derived from various local and overseas sources. While Afghanistan seems the likely source of lapis lazuli (e.g., Roberts et al. 1974:349) carnelian might have come from Gujarat or the Deccan trap in India and Thailand (e.g., Francis 2002:244). Taken along with other material remains, primarily ceramics and textual evidence, these finds are very

[78] Giribabwa is located in Giribawa secretariat division in the North-western province of Sri Lanka. Its location in the Kala Oya valley where the protohistoric site of Pomparippu is situated is significant. Giribawa is claimed to have revealed furnaces used for glass making (Dussubieux et al. 2008:798; Bopearachchi 1999, 2002; Gratuze et al. 2000; Dussubieux 2001). The furnace itself is reported to have been 'lined with vitrified alumina-rich materials and blocks of raw glass with similar compositions'. Alumina sand sources also occur close to the site (Ibid.). It is claimed that Giribawa is the only site that has evidence of both glass and glass bead productions in Sri Lanka (Dussubieux et al 2008:801). The site is dated from fourth century BC to fifth century AD (Dussubieux et al 2008: 797–821).

[79] including both suspected Indian and Middle Eastern Beads as well.

significant in establishing links with these regions. Imported beads and bangles were perhaps intended for elites in interior urban centres. This could have been partly responsible for the low density of them from Mantai. The main reason for the limited number of imported beads, however, is probably the self-sufficiency of beads in Sri Lanka, which reduced the need to import them from elsewhere.

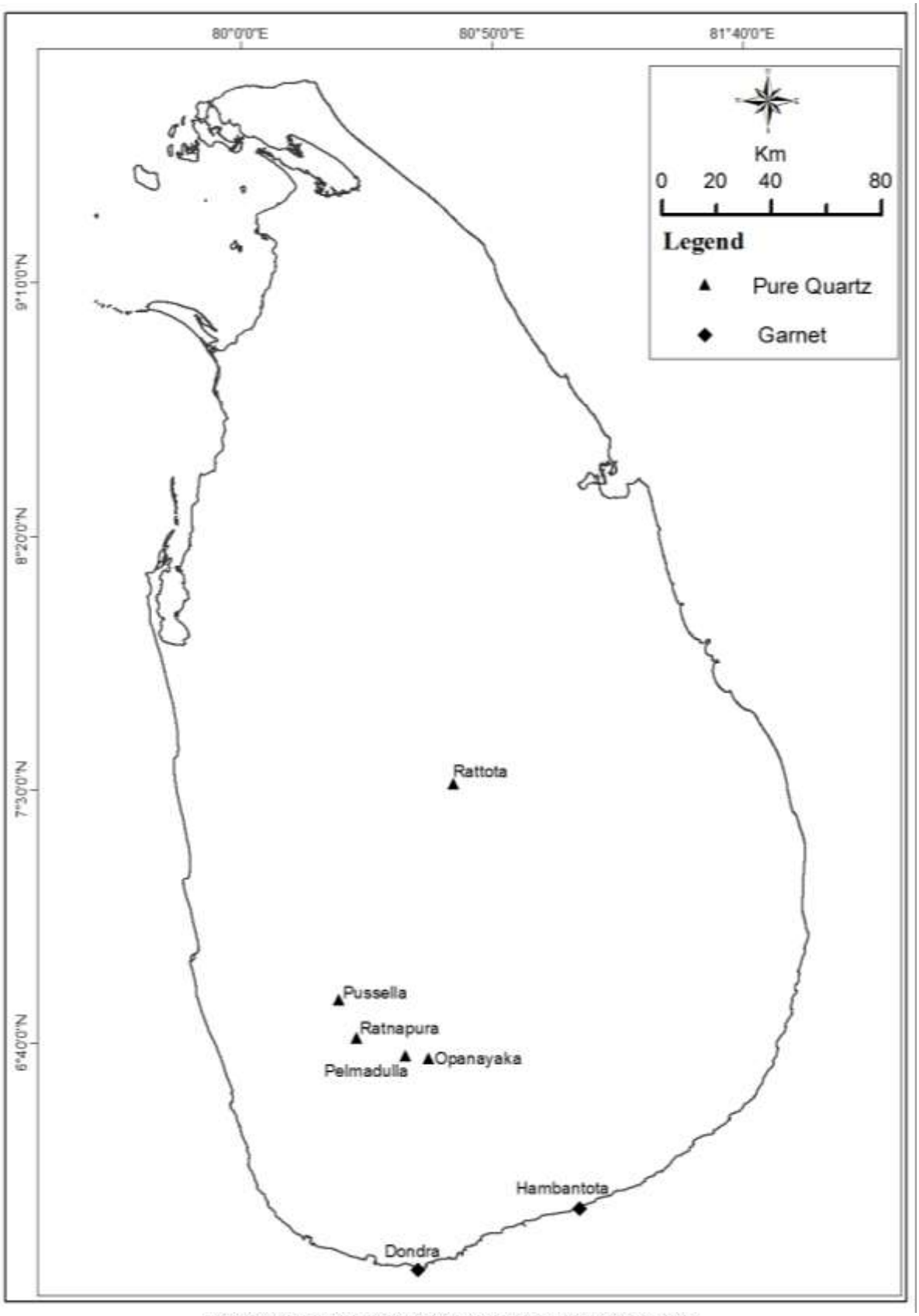


Figure 4.56: Occurrence of Garnet and Quartz in Sri Lanka

Part II of this chapter illustrates that Mantai was a centre for multiple productions. Of the artefacts selected for examination, bangles are a quantitatively small proportion of our finds. Nevertheless, they illustrate differing patterns to that of the bead production. As compared to beads, a higher proportion of bangles (34%) are made of organic material such as shells. Chank shells, as a raw material, was abundantly available with Mantai being located close to the main chank banks in Mannar and Palk Bay. Similarly, there seems to have been a greater demand for shell bangles, which undoubtedly encouraged their production and hence, it is likely that they were made primarily for export.

Although glass bangles and beads are made in a similar way, different colours are used for both. While red dominates the bead assemblage, it is absent from the bangle assemblage. Black is only 4% of the GBA, while nearly 49% of bangles are black. In South Asia, colours have deep cultural meaning. For example, black is generally considered unholy and a symbol of sorrow. On the other hand, red is always associated with religious and pleasurable occasions in India (Gunasena pers.comm. 2015). While such symbolic meaning cannot be ruled out, technological limitations might also have played a role in the choice of colour used. If they were reheating culets for making glass as implied by Carboni (2013:313–348), then they could have been restricted by the supply or deliberately chose to buy coloured glass for specific purposes.

Our bangle assemblage occurs from *ca*. the mid-1st century upwards, though regular production may date from *ca.* early 5th century. It appears to have been established much earlier than in India, perhaps due to the influence of Persian traders who were present at the site (cf. Francis 2013c:384). The high proportion of production debris indicates that the vast

majority of glass bangles were likely made at the site, while some proportion might have been imported. Almost the entire shell bangle assemblage appears to have been produced on-site, and shell bangles were most likely made for export.

Metal-working was another manufacturing this thesis considered. Inscriptions clearly indicate the presence of various artisans at Mantai, amongst whom were blacksmiths. Iron/copper ore and slag occurs extensivelyconsiderably on the surface and across the excavated sequence in our investigations, and those of Carswell et al. (2013). The scientific analysis of metal objects by Juleff and the finding of a metal-working hearth clearly indicate considerable metal working at Mantai. The gold bead in our assemblage may illustrate the jewellery making as well.

Thus, a number of other industries were at Mantai. While most of these products were perhaps intended for the international market, archaeobotanical remains reflect the importation of several crops from India, the Middle East and Southeast Asia (Chapter 6.6.3). The limited number of archaeobotanical finds may represent the large volume of agricultural products that were transhipped via Mantai, though some were no doubt intended for local consumption. Large quantities of archeobotanical remains for rice and the presence of irrigation reservoirs around Mantai attest to the high volume of local agricultural yields such as rice, some of which seem to have been exported.

CHAPTER 5

CONTEXTUALIZING CONNECTIONS THROUGH CERAMICS

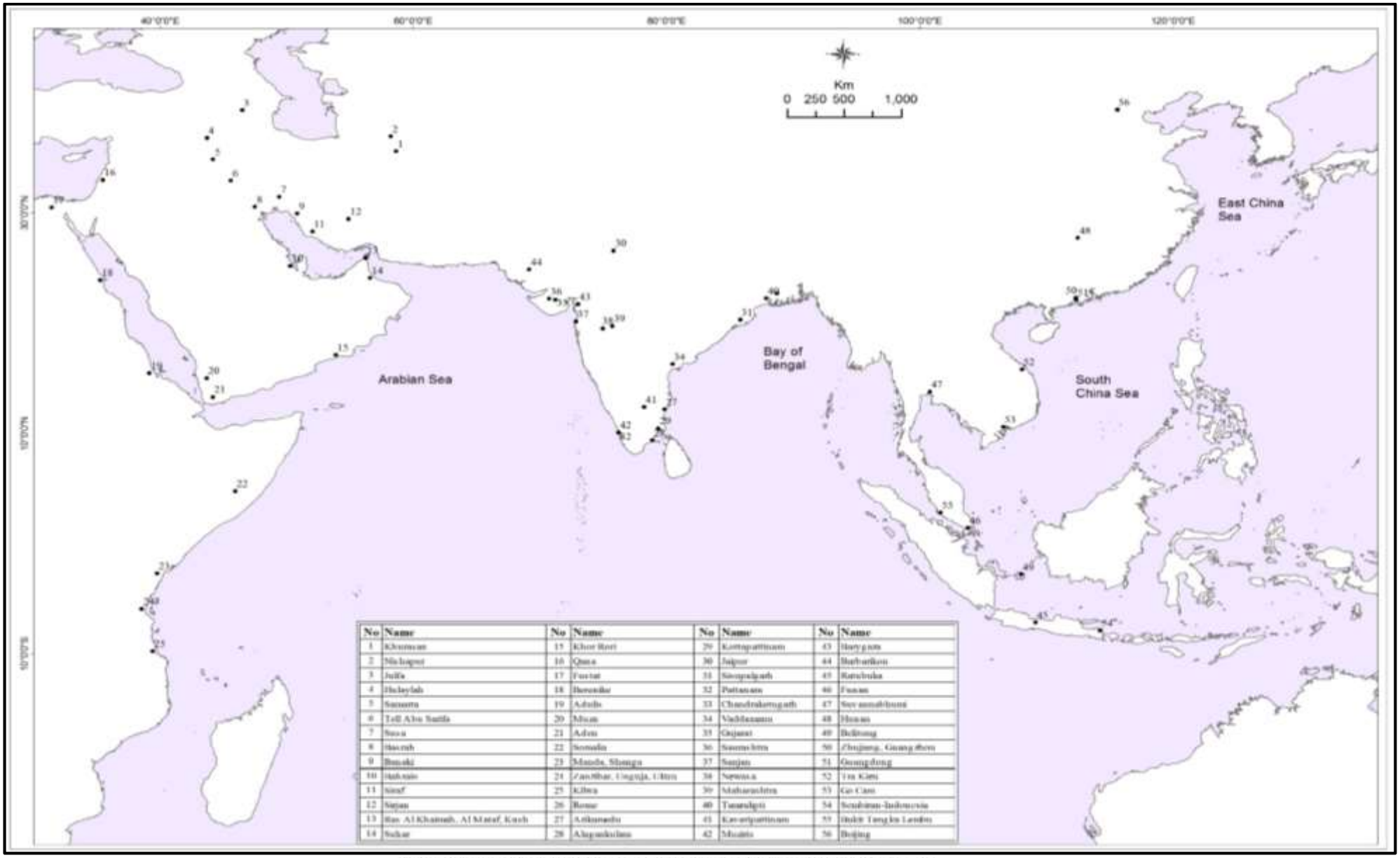
5.1 Introduction

In all pre-modern societies pottery was an essential commodity. Advances in societies increased the urge for the diversification of the potter's craft. A pot in its historical context was not a mere utilitarian object, but was also an expression of the increasing demand of evolving societies. This longing for material accumulation led not only to the expansion of local industries but also increased the desire for foreign utilitarian and decorative wares, which are an important source of information for understanding interactions within and between cultures.

In Chapter 3, the Mantai ceramic assemblage was discussed in detail. In this chapter, it is compared with those from Kantharodai and Kirinda as well as those from the main sites in Sri Lanka and elsewhere in the Indian Ocean (Figure 5.1). An attempt is made to establish the provenance of ceramics and the corresponding relative chronologies in order to conceptualize trade-exchange patterns during the Early–Medieval period.

5.2 Pottery making in ancient Sri Lanka

Longstanding cultural relations between India and Sri Lanka had a direct influence on the use and production of ceramics in Sri Lanka. It is recorded that potters were among the various craftsmen sent to Sri Lanka by the Emperor Asoka (269–232 BC) along with his daughter *Bhikkhuni* Sanghamitta (*Mv.*19:1–3).



No	Name	No	Name	No	Name	No	Name
1	Khormaxan	15	Khor Rori	29	Kottapattinam	43	Hatyapm
2	Nishapur	16	Qana	30	Jaipur	44	Barbarikon
3	Jidh	17	Fuvtat	31	Sivagalgarh	45	Ratnbnka
4	Hulaylah	18	Berenike	32	Pattanam	46	Funan
5	Samarra	19	Adulis	33	Chandrakemgarh	47	Sri ansabhoni
6	Tell Abu Sarifa	20	Mocn	34	Vadhnagara	48	Hoanh
7	Siraf	21	Aden	35	Gujarat	49	Beihong
8	Hasrah	22	Somalia	36	Saurashtra	50	Zhujiang, Guangzhou
9	Basaki	23	Manda, Shanga	37	Sanjan	51	Guangdong
10	Sahrain	24	Zanzibar, Unguja, Ukuu	38	Nagara	52	Tra Kieu
11	Siraf	25	Kilwa	39	Maharashtra	53	Go Cam
12	Sirjan	26	Rome	40	Tamralipti	54	Southern Indonesia
13	Ras Al Khaimah, Al Manaf, Kush	27	Anuradhapura	41	Kaveripattinam	55	Bukit Tengkorak Landing
14	Sohar	28	Alagankulam	42	Muziris	56	Beijing

Figure 5.1 Major sites referred to in this chapter, excluding Sri Lanka

While the earliest evidence for pottery production/use may date from *ca.* 5300 BCE (Wijeyapala 1992:34), a clear ceramic chronology in the island has been established from *ca.* 1000/900 BC (De Silva and Dissanayake 2008:34).

Pottery production was a specialized craft in which the entire family was involved. Ethnographic, epigraphic and literary evidence indicates that extended families of potters settled together and formed villages at regular geographical intervals depending on the availability of suitable clay sources (Karunathilaka et al. 2010; Bandara 2005) and socio-economic factors such as a consideration of the caste system (Seevalee 1998; Bohingamuwa in prep.). Potters were known as *Kumbhakara*, their villages as *Kumbhakaragama* and streets where they were settled as *Kumbhakaravidi* (De Zilva Wickremasinghe 1912:96,28). In the town planning of ancient urban centres such as Anuradhapura (*Mv*.10:75–105) and Panduwasnuwara (Seevalee 1998) a special area was designated for potters. Present day Ambagahawewa potters in Panduvasnuwara claim their ancestry to the "*Seva gam*" (service villages) since King Pandukabhaya's rule (*ca.* 500 BC) (Seevalee 1998).

Pottery making in Sri Lanka continues to be an inheritance of families whose ancestry may date back to pre-Christian times. Karunathilake et al. (2010) report a continuing tradition of Black Ware production by descendants of South Indian origin from the North-western Province of Sri Lanka. The author's own work (1997 and 2012) with families of South Indian origin potters at villages of Ambagahawewa, Panduvasnuwara and Gallegoda in the North-western province supports the Karunathilaka et al.'s study (Figure 5.2). These communities are inter-related and their relationships are reinforced by intermarriages facilitating the transfer of ceramic traditions. The close relationship that existed in the potting traditions

between Sri Lanka and South India in particular makes the differentiation of coarse wares from these countries difficult. This led to our creation of the origin group termed 'Ind/SL'.

5.3 Total ceramic assemblage

The total ceramic assemblage from Mantai, Kantharodai and Kirinda (GTCA) is 48,384 sherds (Table 5.1).[80] Mantai is the key site with ceramics imported from a wider geographical range and the longest chronological sequence, dating from the 2nd century BC to the 12th/13th centuries (Table 5.2): its ceramic assemblage is extremely significant for reconstructing Sri Lanka's external interactions. Quantitatively, Kirinda has the largest ceramic assemblage but it is the most recent assemblage in terms of chronology (late 3rd/4th century- 9th century) (Catalogue 7.2-Kirinda3; Table 5.4). It is overwhelmingly local with a limited number of imported sherds, indicating its regional character. Kantharodai contains the smallest ceramic assemblage, and the sequence dates from *ca.* the 5th century BC to the beginning of the CE (Catalogue 7.1-Kantharodai; Table 5.3). Its assemblage is primarily comprised of Indian and Sri Lankan wares. Collectively, the three sites contain a ceramic assemblage dating from *ca.* the 5th century BC to the 12th/13th century AD.

Table 5.1: Total ceramic assemblage from Mantai, Kantharodai and Kirinda (GTCA)

Site	Mantai	Kantharodai	Kirinda	GTCA
Sherd Count	12171	11011	25202	48384
% of GTCA	25.16	22.76	52.09	100
Ware Count	142	27	50	192

[80] Excluding 65797 sherds of Red Ware General (sieved small pieces from KR3. See Catalogue 7.2-Kirinda3).

Table 5.2: Mantai sherd count across phases (% from TCA)									
Period	II (2nd C. BC-mid-1st C. AD)	III (Late 1st C.- late 2nd C./Early 3rd C. AD)	IV (Mid-3rd C.- early 7th C. AD. AD)	V (Early 7th C.- early/ Mid-8th C. AD)	VI (Early/ mid-8th C. AD)	VII (Early/mid-8th- late 9th C. AD)	'D' (Post 8th/9th C. - 12th/13th C. AD	'S'	Total
Sherd count	65	1363	2350	681	103	2590	4266	753	12171
% from Phase total	0.53	11.20	19.31	5.60	0.85	21.28	35.05	6.19	100

Table 5.3: Kantharodai sherd count across phases (% from TCA)						
Period	III (ca. 5th C. BC)	IV (Mid-4th C. to Late 3rd C. BC)	V (Late 3rd C.- Mid-2nd C. BC)	VI	VII (Early 1st C. BC-Mid-1st C. BC)	Total
Sherd count	99	2183	1632	1201	5896	11011
% from the Phase total	0.90	19.83	14.82	10.91	53.55	100

Table 5.4: Kirinda sherd count across phases (% from TCA)						
Period	IA (Late 3rd - Mid 7th C. AD)	IB (Late 4th- Mid 7th C. AD)	IC (Early 6th- Mid 7th C. AD)	II (Mid/Late 6th- Mid 7th C. AD)	III (Early 8th C. AD)	Total
Sherd count	284	679	1117	10771	12351	25202
% from the Phase total	1.13	2.69	4.43	42.74	49.01	100

The Mantai ceramic assemblage was discussed in Chapter 3. All details about the Kantharodai and Kirinda ceramic assemblages are given in Catalogues 7.1.2 and 7.2.2.[81] Tables 5.2, 5.3 and 5.4 below summarize the distribution of ceramics across phases in all of these three sites.

In the following sections, internal networks and external connections traceable from ceramics are explored through ceramic origin groups identified from these sites. Dates assigned to ceramics are based on the dates obtained for the respective site sequences. Since the Mantai ceramic assemblage was discussed in Chapter 3, only the distribution of selected wares from Kantharodai and Kirinda are illustrated in graphs in this chapter.

5.3.1 Local ceramic assemblage

The local ceramic assemblage from Kirinda, Mantai and Kantharodai, comprises of 28 wares and 42082 sherds, representing 87% of the Grand Total Ceramic Assemblage (GTCA; Table 5.5).

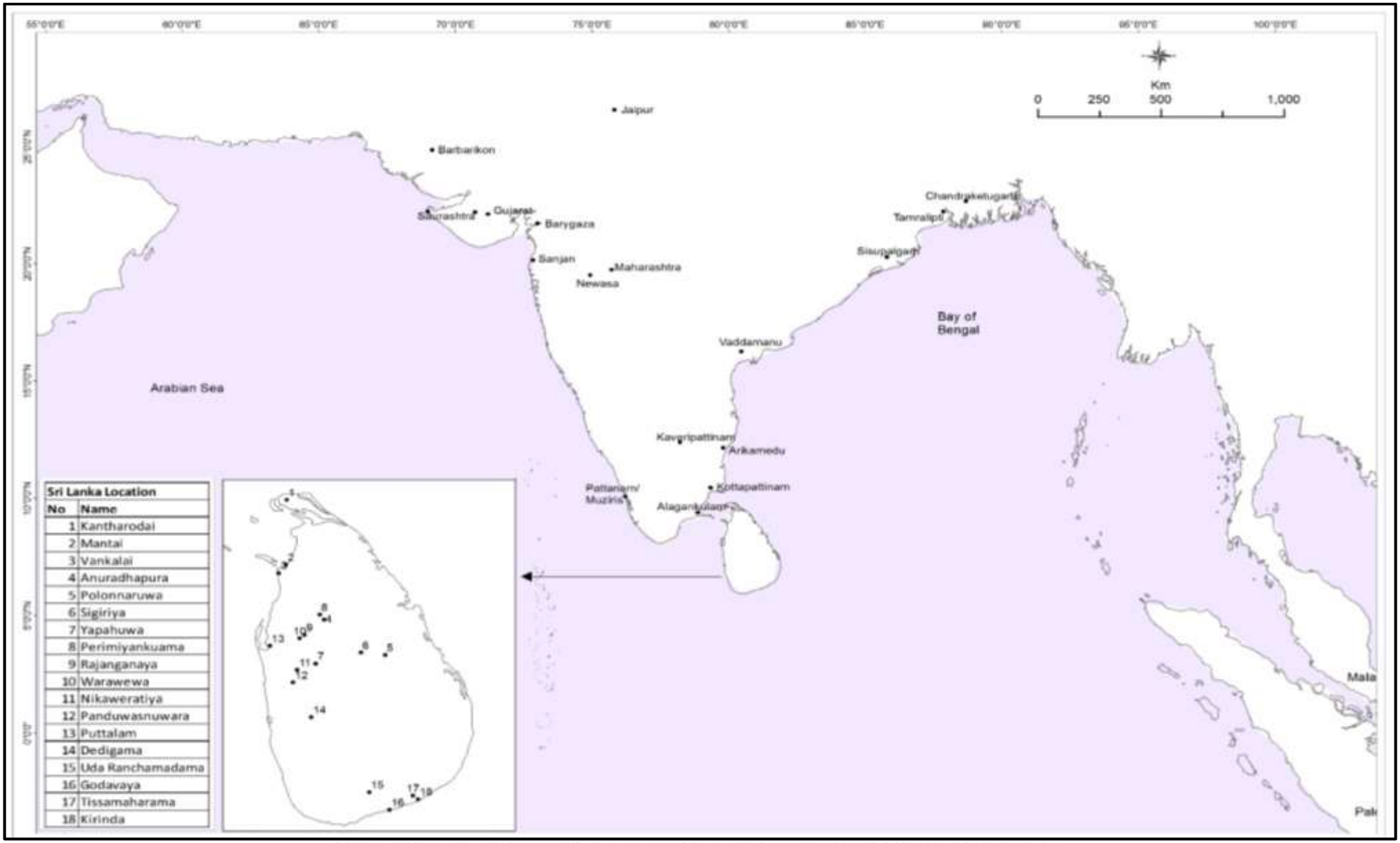
Table 5.5: Local ceramic assemblage; % from TCA of each site and GTCA

Origin	Kantharodai		Mantai		Kirinda		All sites
	Sherds	TCA%	Sherds	TCA%	Sherds	TCA%	GTCA%
Sri Lanka	9649	87.63	8871	72.89	23562	93.49%	86.97

Across the three sites, the Kirinda local assemblage is the most varied with regards to the number of wares (17) represented (C5.1.2), probably due to the lack of a standardized technology for pottery making at multiple production sites. This is clear from wares (BRW,

[81] Originally, it was planned to present field studies undertaken at Mantai, Kantharodai and Kirinda for my thesis as three independent case studies and to observe their individual characters. However, the reconstruction of long sequence at Mantai was considered the primary task. The analysis of diverse material from Mantai proved that the space available for this thesis does not permit to present the other two sites as case studies. Hence, it was later decided to use Mantai as the key site and to include the information on the other two sites in the Catalogues 7.1 and 8.2 and to draw from them for discussions in Chapters 5 (ceramic) and 6 (Non-ceramic material).

TBRW) produced using an inverted firing technique. It also has some regional specific wares. Mantai also has a fairly diverse local assemblage with 13 wares, however, compared to Kirinda, this is more standardized with regards potting attributes. While the Kantharodai local assemblage contains a larger local sherd count than that of Mantai, it has only five wares, exhibiting less variation in ceramic composition probably because of its early date (C5.1.1).



Sri Lanka Location	
No	Name
1	Kantharodai
2	Mantai
3	Vankalai
4	Anuradhapura
5	Polonnaruwa
6	Sigiriya
7	Yapahuwa
8	Perimiyankuama
9	Rajanganaya
10	Warawewa
11	Nikaweratiya
12	Panduwasnuwara
13	Puttalam
14	Dedigama
15	Uda Ranchamadama
16	Godavaya
17	Tissamaharama
18	Kirinda

Figure 5.2: Sites studied and discussed in the present research in South Asia, including Sri Lanka

The distribution of selected local wares across phases from Kantharodai and Kirinda are illustrated in Figures 5.3 and 5.4. Mantai local wares were illustrated in Figure 3.5. Of the local wares, RESL, PLRE and BRW are the most abundant/significant wares across sites. Though numerically insignificant, Graphite and Mica Slipped/Tempered/Coated Wares (Figures 5.5 and 5.6) are important for understanding regional networks. The distribution of these ware across other sites is discussed below.

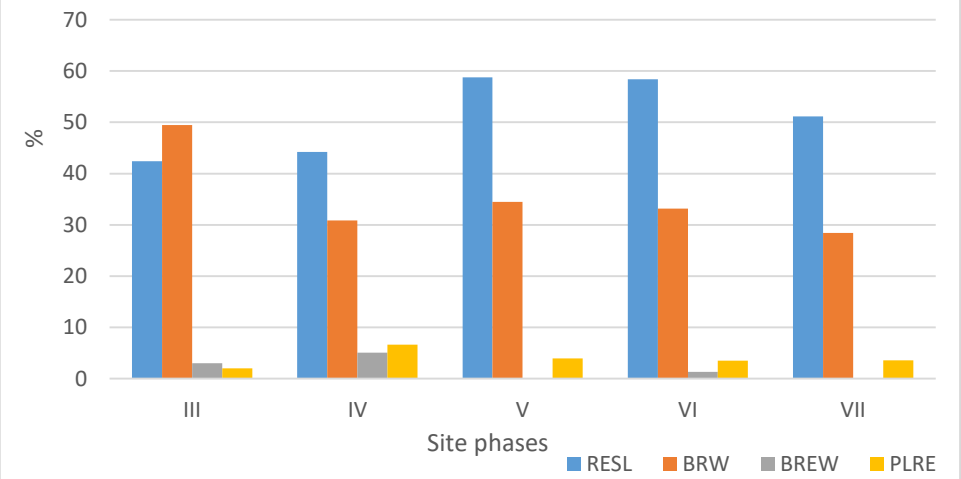


Figure 5.3: Distribution of Kantharodai selected local wares across phases (% from TCA phase total); based on C5.1.1

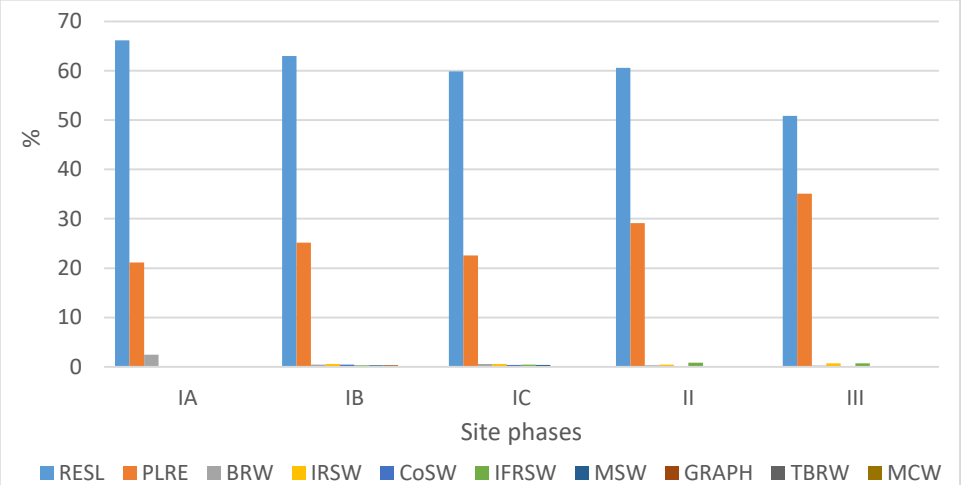


Figure 5.4: Distribution of Kirinda main local wares across phases (% from TCA phase total); based on C5.1.2

5.3.1.1 Black and Red Ware (BRW)

Produced using an inverted firing technique, BRW is considered as part of the South Indian Megalithic tradition, which is said to have been introduced to the island around 1000/900 BC (Seneviratne 1984). Subsequently, the technique was mastered and BRW was produced locally.

At Anuradhapura citadel BRW occurs from *ca*. 900 BC to *ca*. AD 300, which is considered as the upper age boundary for the ware (Deraniyagala 2004:709, 713). BRW is also one of the most abundant wares in ASW2 (Coningham et al. 2006:175–176). At Tissamaharama it is present from *ca*. the 4th/3rd century BC to *ca*. the beginning of the 3rd century AD. BRW is a tableware whereas the associated Coarse Red Ware served mainly as a kitchenware. These two wares are the most common wares in Sri Lanka (cf. Schenk 2001:60–61, 68–69, 124).

Mohanty (2013:121, 220) mentions that BRW is 'found in a small quantity' in Mantai and considered them as being locally made, adopting the South Indian Megalithic tradition. BRW in our Mantai assemblage occurs from Phase II to IV and then continues as residual to the 'Disturbed'. Disregarding the residual, they date from the 2nd century BC to mid-3rd and possibly up to the early 7th century AD (C3.9.5a). Nevertheless, BRWO and TBRW, which appear to be part of the same ceramic tradition and produced using a similar but less advanced firing technique than BRW, occur from Phase III to the 'Disturbed', continuing well after the decline of BRW. Thus, the upper date boundary of BRW and the use of the inverted firing technique require reassessment. A considerable variation within these wares is visible, indicating multiple centres of production and a close relationship between them.

At Kirinda, BRW, (76 sherds) occurs from Phase IA to Phase III (C5.1.2). The first three phases contain only a few sherds, while larger quantities are recorded from Phases II and III. All of these are later variations of BRW and are different (in thickness, fabric, firing etc.) to BRWO and TBRW from Mantai. They are fired using an inverted firing technique and dates from the late 3rd to the mid-7th/8th century (Catalogue 7.2.1.3).

At Kantharodai, the BRW assemblage accounts for 35% (3,359 sherds) of the local assemblage, illustrating the dominance of the ware (C7.1.2.3a). BRW occurs from Phase III to VII and dates from *ca.* 500 to the early/mid-1st century BC (C7.1.1.2). Discounting the slight decrease in sherd count in Phases IV and V, there is a gradual increase of BRW, indicating an increase in the production/consumption of the local ceramic industry during the latter part of the occupation. Kantharodai operated when BRW was one of the main local wares produced and its BRW are the best quality BRWs recovered from all three sites studied. Some of these could even be imports from India.

BRW is one of the earliest wares, probably introduced from India to Sri Lanka and was then mass-produced locally. They are widely found across the island. In our assemblage, excluding Kantharodai, where BRW is the main local ware, BRWs show greater variations, indicating multiple local level productions.

5.3.1.2 Plain Red Ware (PLRE)

Our PLRE is equivalent to the Course Red Wares of Schenk (2001:68, 70), the Red Ware of Deraniyagala (2004:709) and the Plain Red Wares of De Silva and Dissanayake (2008:14) and Somadeva (2010a:39–88). They are found from the Early Iron Age in Sri Lanka continuing until

the 10th/12th century at Tissamaharama and ASW2 (Coningham et al. 2006:128; Schenk 2001:125). Course Red Ware (i.e., PLRE) are considered to have been one of the most common household wares in Sri Lanka (De Silva and Dissanayake 2008:14; Schenk 2001:68). This is true for our assemblages as well.

Carswell et al. (2013) discussed only a small sample of local wares. In our Mantai assemblage, PLRE accounts for 34% of the TCA (C3.9.5a&b) and 46% of the local assemblage, indicating its dominance along with RESL. The ware occurs from the 2nd century BC to the 12th/13th century AD (Chapter 3.3.5).

At Kantharodai PLRE accounts only for 4.2% (461 sherds) of the TCA (C5.1.1). Although it occurs throughout the site sequence, 45% comes from Phase VII. The general trend is for production/consumption to increase from Phase IV, although with a sharp drop in sherds in Phases V and VI, which was also noted for BRW.

At Kirinda, 33.75% (7,951 sherds) of the local assemblage comprises of PLRE (C5.1.2). This occurs throughout the site sequence with the highest concentration in Phases II (39%) and III (55%) which are dated to between the mid/late 6th and the early 8th centuries.

The distribution of PLRE across sites indicates that it was one of the most common kitchenwares used from the earliest occurrence of ceramics in Sri Lanka. While greater variations in fabric, inclusions and firing within and across sites are observed in PLRE, striking similarities in forms and decorations are also noted (below).

5.3.1.3 Red Slipped Ware (RESL)

The distribution of RESL wares at Mantai was discussed in Chapter 3 and their occurrence at Kirinda and Kantharodai is illustrated in Figures 5.4 and 5.3. Our RESL seems to tally with the Red Slipped Ware of De Silva and Dissanayake (2008:14) and the Fine Red Ware of Tissamaharama, where four variations are noted and dates from the 3rd/4th century BC to around the 2nd/3rd century AD (Schenk 2001:69, 125). Our Mantai assemblage dates from *ca.* the 2nd century BC to the 12th/13th century AD.

RESL is similar in vessel forms and distribution to PLRE, but differs mainly for having a slip on the exterior surface. Like PLRE, the ware varies greatly with regard to its fabric, firing techniques, and inclusions, while sharing common forms and decorations. Nearly 61% of Mantai RESL vessel forms are multi-purpose vessels, while 30% are tablewares (Chapter 3.3.5.2).

At Kirinda RESL accounts for 56% of the TCA (C7.2.2.1) and occurs throughout the site sequence, the largest concentration being in Phases II and III. At Kantharodai RESL accounts for 51.61% of TCA (C7.1.2.1) and are found throughout the site sequence. Nevertheless, more than half are found from Phase VII. The assemblage as a whole seems to date from *ca.* 500 to the early/mid-1st century BC.

RESL and PLRE are found from all historical sites across in Sri Lanka from the earliest occurrence of ceramics. As the most common wares found on Sri Lanka across time and space, they are used for establishing regional networks (below, Figure 5.2).

5.3.1.4 Graphite, Copper and Mica Coated/Slipped/Tempered Wares

There is a group of wares that are either slipped, coated or tempered with mica and graphite. They are mainly reported from sites in Southeastern Sri Lanka, but occasionally in other areas (Schenk 2001). They are found in small quantities in both black and red fabrics in our local assemblages (Figures 5.5 and 5.6).

At Tissamaharama, Graphite Ware (GRAPH) occurs in two varieties and date from the 1st/2nd to the 9th centuries (Schenk 2001:68, 71). In our Mantai assemblage GRAPH is confined to three sherds from Phase VII and is thus contemporary with those from the upper levels at Tissamaharama. Kirinda contains 12 sherds of GRAPH, from layers that may date from *ca.* late 4th–8th century. At both places GRAPH is used as table/ritual ware. Considering the rarity of sherds, GRAPH may be considered as an import at Mantai.

The other group of wares may be termed Mica Coated, Slipped or Tempered Wares, depending on the nature of mica occurrence in the fabric or on the surfaces and the method of application. These three wares may be collectively equated with the Mica Slipped Ware of Schenk (2001:71) and De Silva and Dissanayake (2008:14). The latter is considered a rare table/decorative ware. Their fabric is close to PLRE and the exterior surface has a shiny golden colour. In Mica-Tempered Ware mica is present in the paste whereas in MCW and MSW the application and thickness of the mica on the surfaces differ. Mica Tempered Ware occurs both in Black ware (MTBW) and PLRE (MTPLRE).

At Tissamaharama, Mica Slipped Ware forms occur from *c.* the 1st century BC/AD to the 2nd century AD and then again from *ca.* the 5th to the 9th centuries AD (Schenk 2001:124). At

Mantai MTBW is present from Phase IV to the 'Disturbed' (*ca.* mid-3rd - 2th/13th century. At Kirinda, MSW and CoSW are found in contexts dated between the late 4th and early 8th centuries (C5.1.4).

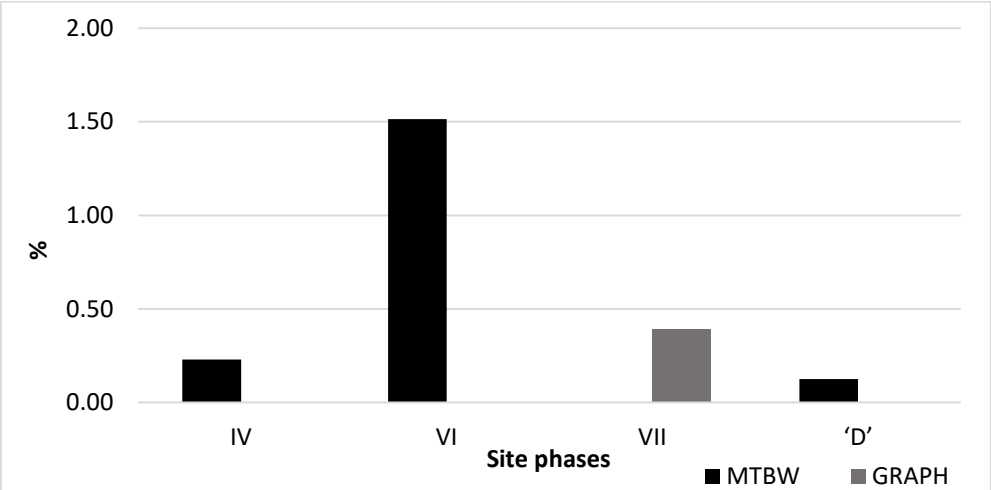


Figure 5.5: Distribution of Graphite Wares across phases at Mantai (% from SLCA phase total); based on C5.1.3

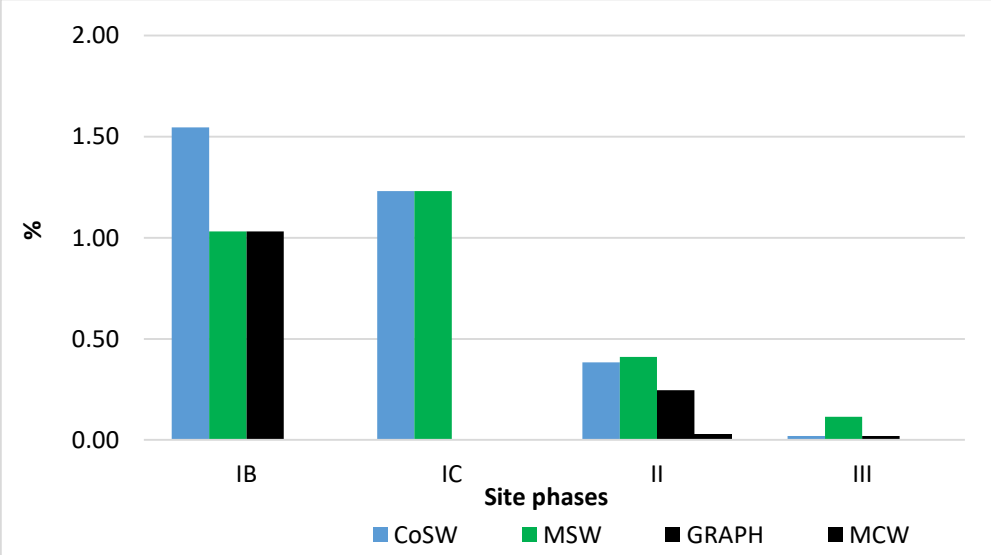


Figure 5.6: Distribution of Graphite Wares across phases at Kirinda (% from TCA phase total); based C5.1.4

Despite the variations noted above, this group along with GRAPH seems to belong to the same techno-cultural tradition, which appears to have been largely confined to Southeastern Sri

Lanka. Their occasional presence at sites such as Mantai and Kantharodai may be evidence for internal trade-exchange networks.

5.3.2 'Ind/SL' assemblage

This group accounts for a mere 1.7% of the GTCA. Kantharodai has the largest 'Ind/SL' assemblage supporting its close contacts with India (C5.1.6) as evident from historical sources. Kirinda, the furthest of the three sites from India contains the second largest 'Ind/SL' assemblage, though the majority of these could be local (C5.1.5). Although Mantai is the closest to India, it has the smallest the 'Ind/SL' assemblage. This is primarily because it has the largest imported assemblage (Table 5.6).

Table 5.6: 'Ind/SL' ceramic assemblage; % from TCA of each site and GCTA

Origin	Kantharodai		Mantai		Kirinda		All sites	
	Sherds	TCA%	Sherds	TCA%	Sherds	TCA%	Sherds	GTCA%
'Ind/SL'	371	3.37	66	0.54	368	1.46	805	1.66

The distribution of 'Ind/SL' wares at Mantai was discussed in Chapter 3 and their occurrence at Kantharodai and Kirinda is illustrated in Figures 5.8 and 5.7. At both sites, BPW seems to be the most likely Indian ware. While RWG is the dominant 'Ind/SL' ware at KantharodaiTRW top the 'Ind/SL' list at Kirinda. Both wares, however, are likely to be local or imitated Indian wares. Thus while a small percentage of the 'Ind/SL' may have an Indian origin, particularly those found at Kantharodai, their separation is difficult for sharing a common tradition between the two countries (Chapter 5.3.2.1).

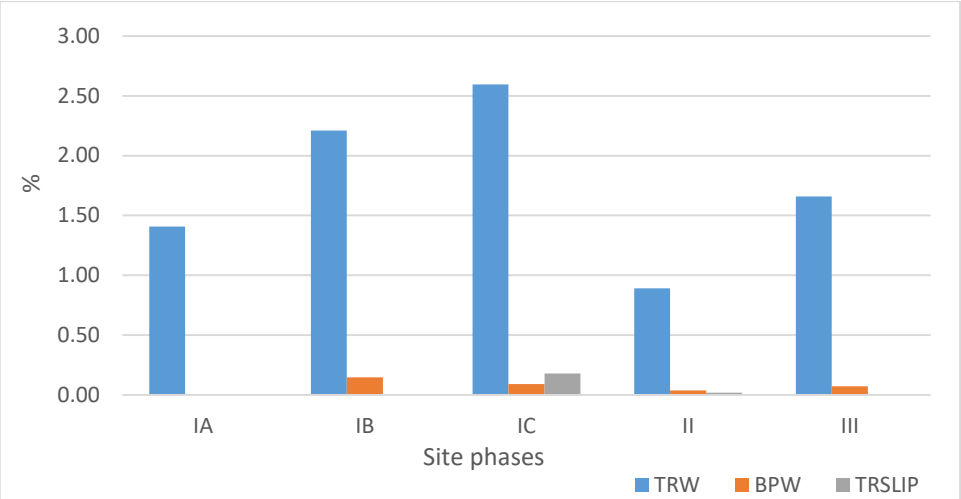


Figure 5.7: Distribution of 'Ind/SL' wares at Kirinda (% from TCA phase total); based on the C5.1.5

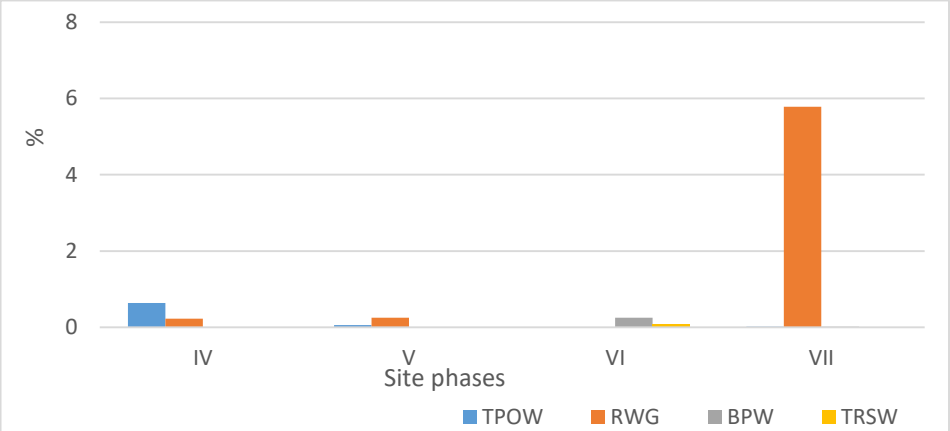


Figure 5.8: Distribution of 'Ind/SL' wares at Kantharodai (% from TCA phase total); based on the C5.1.6

5.3.2.1 Local and 'Ind/SL' assemblages and regional networks

Considerable variation in the potting attributes such as fabric, firing techniques, inclusions were noted in the local and 'Ind/SL' wares across sites. This was interpreted as an indication of multiple sources of production and slightly different methods used (Chapter 3.3.5.3). These variations could also be attributed to chronological change, given the long time period that each of these phases represent.

While their occurrence across sites may be attributed to the existence of trade/exchange networks, it is unlikely that coarsewares were transported from production sites that were far away in such quantities. Therefore, this variability in ceramics may be attributed to technological and social factors (Miller 1985:1–5) and to the disparity in skills and technologies of potters in different workshops (Sinopoli 1991:593) or ideosynchracy of practice. Variations are also observed in the products of the same potter (Miller 1985:41–42). This makes the knowledge of potters and pottery a prerequisite for ceramic studies (Coningham et al. 2006:175). Our limited ethnographic work and those conducted by others is used to re-assess the variability observed in our local assemblage.

Cross-cutting the variations in potting attributes, there is some uniformity in the decorations on the local ceramics. Decorations recorded for local wares at Mantai (Chapter 3.3.13.3) are summarized in Table 5.7. The vast majority of these decorations are found on the exterior surface of PLRE and RESL, which are the most common local wares. Almost all decorations on the exterior surfaces are 'paddle impressions' (PI), which are nearly identical in both wares. They occur in contexts dated from *ca.* the 2nd century BC to the 12th/13th centuries AD. While there are some variations in the width and depth of the PI decorations, there is a clear similarity in the techniques applied and the overall pattern of the decoration. This close similarity perhaps may link them to a common techno-cultural tradition.

Table 5.7: Mantai ceramic decorations

	% of decorated sherds	% of exterior decorated from decorated sherds	Ware	% of decorated sherds	% of exterior decorated	Decoration type
Local assemblage	33.73	95.86	PLRE	25.62	91.69	PI- 85.31
			RESL	40.6	98.03	PI- 85.85

Identical/near identical rim types and vessel forms occur in the assemblages of Gedige and ASW2 in Anuradhapura, Tissamaharama and Mantai (Deraniyagala in press; Schenk 2001; Coningham 2006; Catalogue 3.10), which indicates connections across these geographically distant sites. While it is tempting to interpret this as evidence for trade and exchange, the sheer quantity and the coarse nature of wares underscore the unlikelihood of their being traded. While some of these might in fact have been traded—at least as container wares for other items traded/exchanged—ethnographic evidence indicates that long-distance trade of coarsewares is not undertaken due to practical reasons such as breakage and because it is not cost-effective. Therefore, similarities noted in decorations, some rim types and vessel forms across regions may not necessarily reflect trade and commerce, but in fact may be attributed to the sharing of a common ceramic tradition across regions since most of these potting communities could have been inter-related as is clear from ethnographic studies and historical evidence.

The distribution of some regionally specific wares such as GRAPH, and Mica-coated/slipped wares, presumably produced in Southeastern Sri Lanka, may in fact indicate internal trade/exchange networks. While the rarity of occurrence at Mantai and Kantharodai would indicate that these wares were not used regularly in a domestic capacity, the special efforts taken to decorate these wares with graphite and the vessel forms (jugs and sprinklers) may indicate a luxury/ritual use.

5.3.3 Imported ceramic assemblage

By the middle of the first millennium BC, east–west commercial networks across the Indian Ocean had been established in which ceramics, among other traded items, were in circulation.

Sri Lanka, being situated in the centre of this maritime web, derived ceramics from India and regions to the west and the east as far as Rome and China.

Our imported assemblage comprises 11% of the GTCA. While each assemblage is discussed separately below, their proportionate size is given in Tables 5.8. The distribution of the imported assemblage from Mantai was discussed in Chapter 3 (Figure 3.11) and Kantharodai and Kirinda are given in Figures 5.9 and 5.10. The imported ceramic assemblage varies significantly with regards to their possible provenance across sites.

Table 5.8: Imported ceramic assemblage; % from TCA and ICA of each site

Origin	Kantharodai			Mantai			Kirinda			All sites
	Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	TCA	ICA	GTCA
India	946	8.59	95.46	859	7.06	27.37	233	0.92	18.32	4.21
Imp.Unk	45	0.41	4.54	725	5.96	23.1	1002	3.98	78.77	3.67
China				450	3.7	14.34	2	0.008	0.16	0.93
ME				1026	8.43	32.69	27	0.11	2.12	2.18
SEA				79	0.65	2.52	8	0.03	0.63	0.18
Total	991			3139			1272			11.16

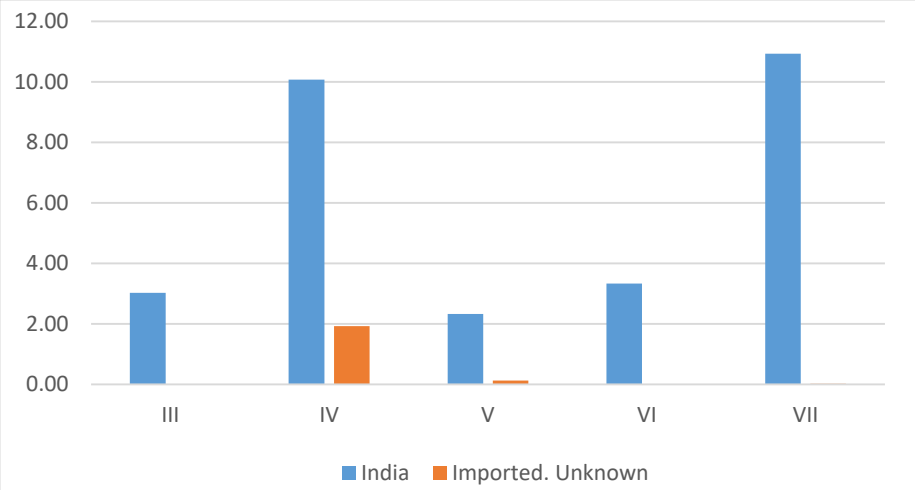


Figure 5.9: KTD Imported assemblage; % from TCA phase total; based on C5.1.7

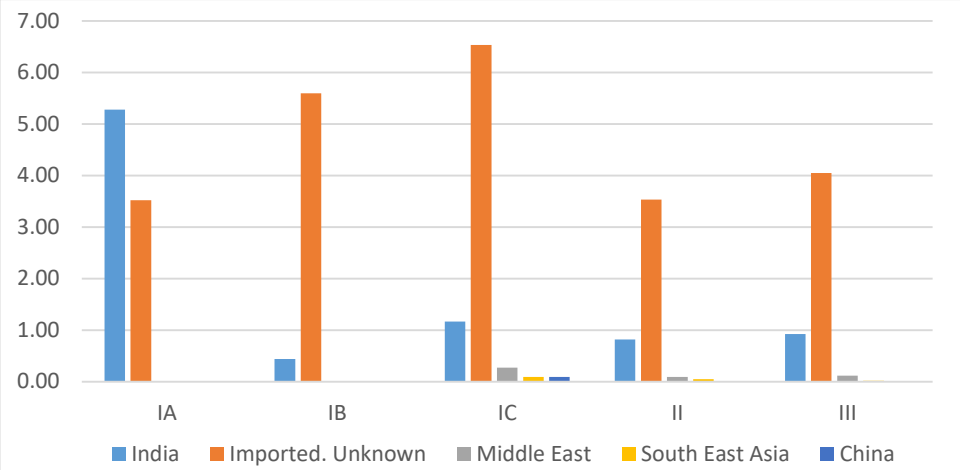


Figure 5.10: KR3 Imported assemblage; % from TCA phase total; based on C5.1.8

Mantai, being the main seaport that connected Sri Lanka to the external world, has an imported assemblage that is derived from across the Indian Ocean. The earliest imported ceramics in our assemblage, however, come from Kantharodai, which was linked to the Bay of Bengal networks, particularly India via *Jambukolapatthana* (Catalogue 7.1-Kantharodai). It has an overwhelmingly Indian assemblage. Mantai contains a larger Middle Eastern assemblage than Indian, which is the second largest. Mantai also has an 'Imported.Unknown' assemblage larger than that of Chinese wares and the largest SEA assemblage of the three sites studied. Kirinda, a regional port with occasional external interactions, has a limited range of imported wares, the majority of which are 'Imported.Unknown' (Catalogue 7.2-Kirinda3).

5.3.3.1 Indian assemblage

Due to its geographical proximity and close cultural relations, the Indian ceramic tradition had a strong influence on that of Sri Lanka. Although ceramics represent only a small segment of the wider set of cultural traits that represent Indian influence, they help us to understand the broader cultural package of which they were a part. Ceramics represent the largest material remains of such interactions to survive in the archaeological record. Consequently, in order to

appreciate the Sri Lankan ceramic tradition, and the wider cultural forces that introduced that tradition to the island, the Indian assemblage are assessed in detail.

The Indian assemblage makes up a mere 4.2% of the GTCA. More than 95% of the Kantharodai imported assemblage comprises Indian wares, indicating that its external interactions were largely confined to India. In contrast, Mantai's Indian assemblage is only 27% of its imported assemblage, demonstrating its extensive interaction with other regions. Kirinda, the furthest from India and the latest to become occupied, has the smallest Indian assemblage. The selected Indian ceramic assemblages from Kantharodai and Kirinda are illustrated in Figures 5.11 and 5.12[82] (Table 5.8; see Chapter 3.3.8 for Mantai).

The Mantai Indian assemblage was discussed (Chapter 3.3.8) based on two ceramic groups: Grey Ware Family (GWF) inclusive of Rouletted Ware (ROUL) and Red Polished Ware (REPO). GWF sherds from all three sites studied account for 73% of the total Indian assemblage. They are also the most significant wares for reconstructing Indo-Lanka relations and Indian Ocean trade/exchange networks during the period under discussion (Figure 5.2). Consequently, these two ceramic groups recovered from Mantai, Kantharodai and Kirinda are discussed below.

[82] For full assemblages, see C8.1.2.5a&b and C8.2.2.5a&b

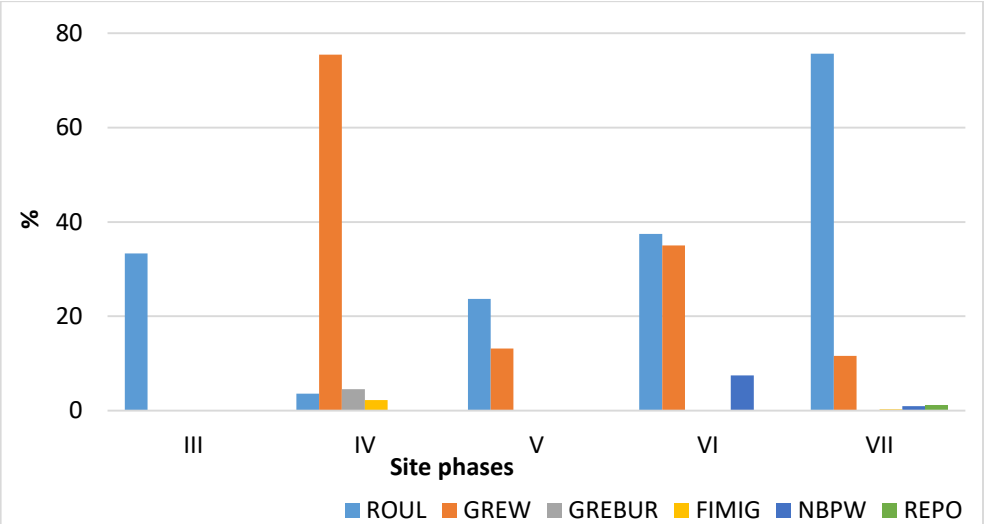


Figure 5.11: Distribution of GWF and REPO wares across phases at KTD (% from Indian phase total); based on C5.1.9

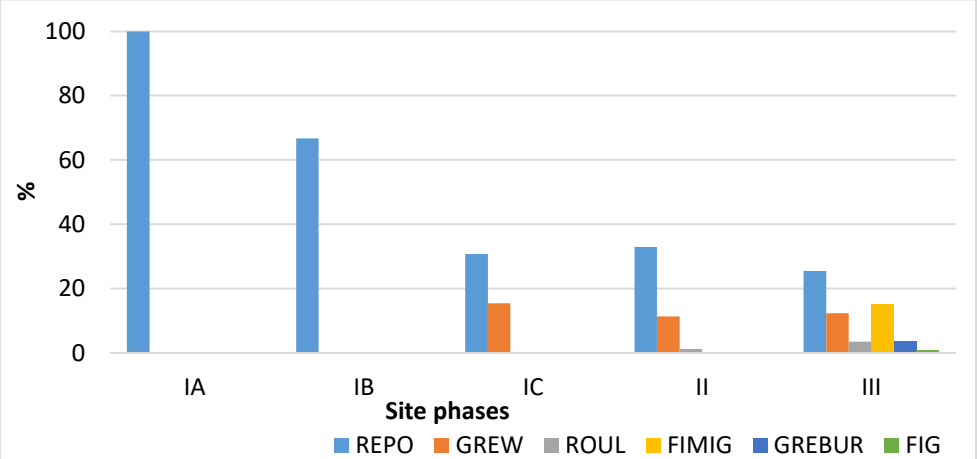


Figure 5.12: Distribution of GWF and REPO wares across phases at KR3 (% from the Indian assemblage at the site); based on C5.1.10

5.3.3.2 Grey Ware Family (GWF)

Six Indian wares of grey body are differentiated by varying fabric, texture, mica inclusions and burnishing effects (Chapter 3.3.8.1). NBPW in the Kantharodai assemblage belongs to the same ware family and hence is discussed together as GWF.

The majority of them belong to GREW and ROUL (Figure 5.13). NBPW, the other early variant of GWF and FIG and TTGW, the later developments of the GWF are represented by small

quantities. Consequently, GREW and ROUL are the best-suited wares to discuss ceramics networks.

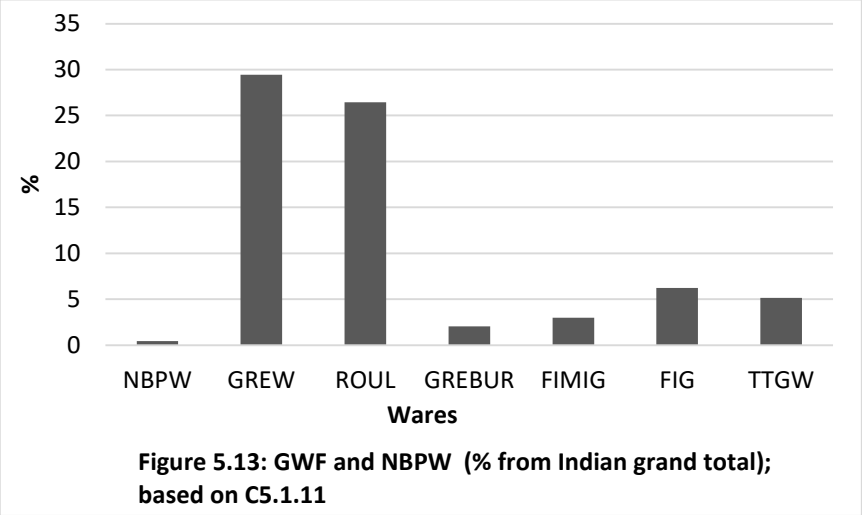


Figure 5.13: GWF and NBPW (% from Indian grand total); based on C5.1.11

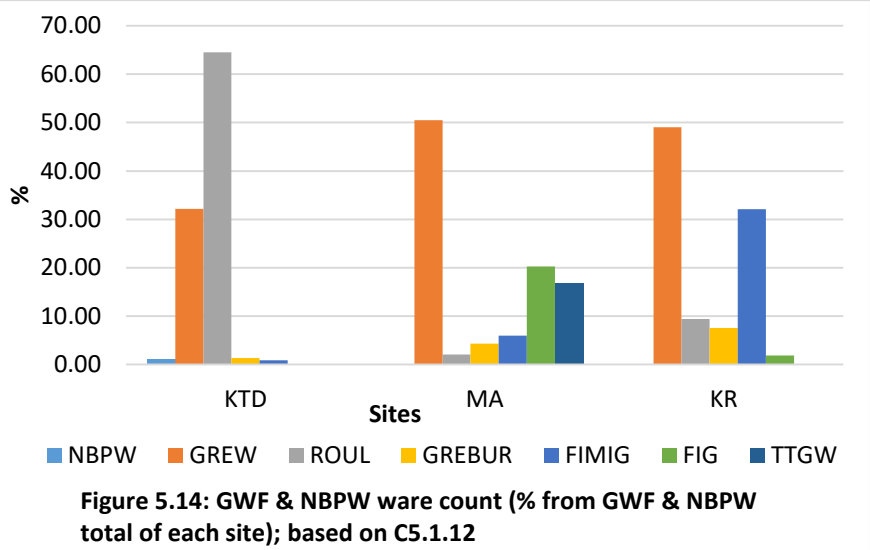


Figure 5.14: GWF & NBPW ware count (% from GWF & NBPW total of each site); based on C5.1.12

The GWF and NBPW assemblages from Kantharodai, Mantai and Kirinda are given in Table 5.9. Kantharodai, being chronologically the earliest of the three sites, contains largely earlier variants of GWF wares: ROUL (64.5%) and GREW (32%) (Figure 5.14). NBPW is found only at

Kantharodai.[83] The number of later variants such as GREBUR and FIMIG are negligible, whereas TTGW, supposedly a local imitation, is absent. This pattern contrasts with the other two sites studied.

Mantai contains all variants of GWF wares, with the exception of NBPW. More than half of the Mantai GWF comprise GREW, followed by FIG. A large quantity of the later variants of GWF (i.e. FIG, FIMIG) are found at Mantai (Figure 5.14). ROUL accounts only for 2% of the GWF at the site, where as TTGW is found only at Mantai. This pattern is largely due to the late chronology of Mantai—in comparison to Kantharodai—and its Rouletted tradition largely comprises later variants and local imitations.

A similar situation is observed at Kirinda, which dates from the late 3rd–early/mid-8th-9th century. It only contains 53 sherds of GWF of which over 50% belongs to GREW and over 30% are FIMIG. ROUL are limited and clearly residual (Table 5.9 and Figure 5.14).

The predominance of earlier forms of GWF and the lack of later variants at Kantharodai reflects its early chronological position among the three sites and its connection with both north and south India. ROUL is the primary archaeological evidence considered for Kantharodai's connections with South India (Begley 1967:20–24). ROUL, however, is likely to have been made in the Gangetic Plain (Gogte 2001), at other places in the south India (Schenk 2014) and possibly in Sri Lanka (cf. Deraniyagala and Abeyratne 2000). The NBPW links Kantharodai with north India. *Jambukolapatthana*, the seaport linked to Kantharodai, was the

[83] In our Kantharodai assemblage, NBPW accounts only for 9 sherds (0.1% of the TCA). While, our sample from Mantai did not contain any NBPW, Carswell et al. (2013), report a single sherd.

landing port of Sanghamittha, who came from north India in the 3rd century BC (*Mv.*11:19–21). Sanghamittha and the *Bodhi* sapling were taken to Anuradhapura in a procession, indicating internal road networks connecting urban centres and ports. *Jambukolapatthana* might have been the port through which some of the north Indian artefacts reached Anuradhapura. Anuradhapura and the Mauryan kings maintained cordial relations that may be highlighted by the sending of coronation ornaments by Emperor Asoka to King Devanampiyatissa (*Mv.*11:27–30).

Mantai came to prominence when genuine ROUL was diminishing and its imitations and local productions such as TTGW were coming into prominence. Lack of NBPW and ROUL and the high percentage of later forms, including TTGW indicates this phenomenon. The Mantai and Anuradhapura assemblages have striking similarities, demonstrating their close connections. Over two millennia, Mantai was the main seaport of Anuradhapura, which is reflected in the ceramic assemblage.

The distribution of main GWF wares in Sri Lanka and elsewhere is discussed below in order to establish ceramic/trade networks. Understanding the origin, timing and the pattern of their distribution across regions provides insights into the relationship between regions and the mechanisms responsible for their distribution.

Table 5.9: GWF & NBPW assemblage; % from TCA and ICA of each site										
Origin	**Kantharodai**			**Mantai**			**Kirinda**			**All sites**
Ware	Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	TCA	ICA	GTCA
NBPW	9	0.08	0.91							0.02
GREW	260	2.36	26.24	314	2.58	10	26	0.1	0.48	1.24
ROUL	521	4.73	52.57	13	0.11	0.41	5	0.02	0.09	1.11
GREBUR	11	0.1	1.11	27	0.22	0.86	4	0.02	0.07	0.09
FIMIG	7	0.06	0.71	37	0.3	1.18	17	0.07	0.31	0.13
FIG				126	1.04	4.01	1	0.004	0.02	0.26
TTGW				105	0.86	3.35				0.22
Total	808			622			53			3.07

Grey Ware (GREW) and Northern Black Polished Ware (NBPW)

Plain Grey Ware (GREW) and NBPW are the earliest Indian wares relevant to my discussion).[84] GREW is associated with Painted Grey Ware (PGW) in the Gangetic Doab (Prickett-Fernando 2003a:55) where they coexisted with the early phase of NBPW and NBPW succeeded the PGW (Mohanty 2013:216). Similarly, at Anuradhapura, Grey Ware is followed by NBPW (Prickett-Fernando 2003a:55), and both wares co-occur with potsherds containing early *Brahmi* inscriptions (below). Grey Ware is a medium fine ware, with vessel forms such as dishes and bowls.Grey Ware is generally un-decorated at ASW2 (Coningham et al. 2006:126,128).

The Basal Early Historic (*ca*. 600–500 BC) levels at the Anuradhapura citadel provided the earliest occurrence of a 'low-lustre medium-fine paste, medium light Grey Ware', representing an 'archaic variant of bowl type' with a *Brahmi* inscription (Deraniyagala 2004:711–712). The coeval occurrence of Grey Ware and *Brahmi* letters have been interpreted as an extraneous cultural impulse, linked to the arrival of Vijaya, as mentioned in

[84] South Indian derived BRW and Red Wares are found in Protohistoric Early Iron Age Contexts (1000/900 BC) in Sri Lanka. Neither such material is found in my investigations nor do they fall within the time period of the present work.

the Chronicles (Ibid).[85] Deraniyagala (2004:711) also refers to a possible *Prakrit* inscription, indicating connections with both northern and southern India.

207 Grey Ware sherds representing the fine and medium grained categories are reported from the ASW2 (Coningham et al. 2006:128). Coningham et al. consider that their evidence supports Deraniyagala's (2004:712) claim that Rouletted grew out of Grey Ware (below). Based on thin section analysis, Ford et al. (2005) suggested that Grey Wares were possibly not imported, as the associated minerals matched the local geology (cf. Coningham et al. 2006:128). My evidence clearly indicates that some of the wares included in Fine Grey Wares (GWF) were locally made (Chapter 3.3.8.2 and 5.3.3.3 below). Considering the continuation of GREW in our sites, it is possible that they were also imitated/produced locally.

Begley (1967) reports Grey Ware in the layers dated to between *ca*. 480 and 130 cal. BC from Kantharodai. Grey Wares are the earliest of the 'Fine Ware Pottery' to appear at Tissamaharama, where they occur from the 4th/3rd century BC onwards and continued up to *ca*. the 1st/2nd century AD. They occur in two variants, Plain Grey Ware and Coarser Plain Grey Wares with paddle marks (Schenk 2001:,61,72, 125, 128). Mohanty (2013:213–227) considered Sri Lankan Grey Wares as non-local, occurring in levels predating the 4th century BC. All this evidence suggests that the Grey Ware predates Rouletted.

In our Kantharodai assemblage, GREW (260 sherds) is the largest of the GWF categories. They first appeared in Phase IV (mid-4th to the late 3rd century BC). Consequently, our assemblage

[85] See Coningham 1996:93-94 and for Deraniyagala's response to Coningham in Deraniyagala and Abeyratne (2000:787).

is chronologically comparable to that of Begley cited above. In our Mantai assemblage, GREW, occurs from Phase III to the 'Surface'. A large number of these come from Phase VII and in the upper levels. These later incidences of Grey Ware are believed to be residual, as the ware is considered to have been discontinued after *ca*. 500 BC (Prickett-Fernando 2003a:73).. The Mantai sequence below Phase VI; however, is sealed and securely dated by four C14 dates to between the early 7th and the early/mid-8th centuries. Therefore, the occurrence of GREW from Phase II to Phase V cannot be easily dismissed as residual. At ASW2 also, Grey Ware occurs in contexts dated to between AD 600 -1100 (Coningham et al. 2006:128). In our Mantai assemblage, GREW is likely to date from *ca*. the late 1st century to early 7th–early/mid-8th century).[86] The Kirinda assemblage contains only 26 GREW sherds and they occur in layers dated from the early 6th/mid-7th century to the early 8th century. The results from our three excavations suggest that although some of the examples found in later contexts could be residual the traditional views that Grey Ware decline by 500 BC requires reconsideration.

Sri Lankan Grey Wares, ROUL and Wheeler Type 1 and 10 are said to be mineralogically identical (Krishnan and Coningham 1997), further supporting the suggestion that ROUL grew out of Grey Ware (Deraniyagala 2004:712; Coningham and Allchin 1995:163). As a result, they all form a part of the same Indian Ocean fineware network.

Northern Black Polished Wares

NBPW is a well-polished ware with a fine fabric (Roy 1986; Ghosh and Panigrahi 1946:55), which appeared in the early part of the 1st millennium BC in northern India and continued up to the first quarter of the CE, being most prolific during the Mauryan period (Mohanty

[86] Disregarding the material above coral wall

2013:216). NBPW is widely distributed in India and was traded to Sri Lanka and SEA around the 3rd/4th centuries BC. It was also imitated at a number of places in India by the beginning of the CE (Mohanty Ibid.; Hegde 1978:141–155).

NBPW is found in limited numbers in Sri Lanka. It occurs in the Basal Early Historic period (600–500 BC) in Anuradhapura (Deraniyagala 2004:711). Coningham et al. (2006:127, 165) found a single NBPW sherd from levels dating from 360 to 190 cal. BC at ASW2. At Tissamaharama 28 NBPW sherds are found from layers dated to the 2nd century BC to *ca*. the 2nd century AD (Schenk 2001:125, 128). These three sites suggest 600/500 BC to the 2nd century AD as a date range for the occurrence of NBPW in Sri Lanka.

Mohanty (2003:216) reported a single NBPW sherd from Mantai. According to him the arrival of NBPW in Sri Lanka predates Emperor Asoka as maritime trade contacts had already been established. In our assemblage, only Kantharodai contained NBPW (nine sherds) from Phases VI (*ca.* the mid/late 2nd) and VI (early/mid-1st century BC). Since NBPW were imitated at many places, their provenance on the island is not necessarily from north India and consideration of their chronology and fabric is necessary.

Rouletted Ware (ROUL)

ROUL[87] is a thin, brittle and well-fired ware, of which the exterior surface is smoothened, while the interior is generally decorated with concentric bands of Rouletted patterns. It is a very distinctive Early Historic Ware, widely reported in India and which has been classified into various types based on forms and fabrics (Gogte 1997; Begley 1992a; Wheeler et al. 1946).

[87] Wheeler/ Arikamedu Type 1

The distinctive characteristics of ROUL, its wide distribution and tight chronology, makes it a key Indian ceramic that reveals Early Historic maritime networks. ROUL is recorded at all the main contemporary urban centres in Sri Lanka. Their geographical and chronological occurrence in Sri Lanka and elsewhere is discussed for understanding Sri Lanka's role within this network.

Distribution

ROUL is widely distributed from East Africa (Suresh 2004:92), and Berenike and Myos Hormos in the Egypt (Tomber 2002), Qana in Yeman (Sedov 1996:19), Khor Rori in Oman in the Gulf Oman (Sedov and Benvenuti 2002:186), Tra Kieu and Go Cam in Vietnam (Glover 2005:17; Glover and Yamagata 1995:157), Sembiran and Buni in Indonesia (Ardika and Bellwood 1991:223) and Bukit Tengku Lembu in Malaysia (Sieveking 1962:25–26). Its largest concentration, however, is in South Asia and particularly the Eastern and Southeastern coasts of India and Sri Lanka (Figure 5.15 and 5.16; Prickett-Fernando 2003a). In India, ROUL is widely recorded from Arikamedu (Wheeler et al. I946), Alagankulam (Sridhar 2005; Begley and De Puma 1992), Sisupalgarh (Ghosh 1989:413) Chandraketugarh (Walker and Santoso 1977:42) and Pattanam (Shajan et al. 2008; Selvakumar et al. 2005).

ROUL is found in Early Historic sites in Sri Lanka. Deraniyagala (2004:712) recorded undecorated ROUL from Anuradhapura in the Lower Early Historic Period (*ca*. 500–250 BC). (*ca.* 500–250 BC). Decorated ROUL occurred in the subsequent Mid-Early Historic Period (*ca*. 250 BC–AD 100), where it was considered as the index fossil. Consequently, Deraniyagala postulated that ROUL had its origins in the medium-fine Grey Ware of Period IV (*ca*. 250 BC–AD 100). ROUL (1191 sherds) is also reported from ASW2 and dated from 200 cal. BC to AD

130 cal. AD, though some associated wares (Arikamedu Type 10) continued up to AD 1100 (Coningham et al. 2006:133,159; Coningham and Batt 1999a:128–129).

ROUL appeared in the 3rd century BC at Tissamharama, where over 2000 sherds have been recorded. They are part of the same "Fine Grey Pottery", which included NBPW and Grey Ware and the entire ROUL assemblage is identical in terms of paste and fabric (Schenk 2001:128, 2006:129, 135, 2014:101).[88] By the 1st century BC, ROUL forms are imitated in BRW in Tissamaharama. Schenk (Ibid:125) assigns a time-period of the 3rd/2nd century to the 1st century BC for the production/circulation of ROUL and later findings are considered to be residual. Nevertheless, Deraniyagala and Abeyratne (2000:779), based on finds from ASW1, Anuradhapura, date ROUL to the 5th–4th centuries BC and suspect an Indian/Sri Lankan origin.

Nienty seven per cent (521) of our total ROUL comes from Kantharaodai (Figure 5.13 and 5.14). They are distributed from Phase III to Phase VII, although only a single rim sherd was found in Phase III, and hence it is not possible to verify whether it belongs to ROUL with or without decoration, the latter being the older of the two. Going by Deraniyagala's (2004:712) material/dates from Anuradhapura citadel, I assign it to the undecorated type. The genuine ROUL at Kantharodai begins from Phase IV. Although Phase VII at Kantharodai is disturbed, its possible date range falls within that accepted for ROUL (Table 5.3). The Kantharodai ROUL assemblage, therefore, may date from *ca*. the 5th to the early/mid-1st century BC. Our Mantai ROUL assemblage is composed of 13 sherds from phases III, IV and VII. Of these, only the

[88] Nevertheless, Schenk (2001:73) had mentioned earlier about the variability of Rouletted and noted three variants of RW, which had further sub-variants.

sherds in phase III are *in situ*, while the rest are residual. Therefore, Mantai ROUL is likely to date from late 1st century BC to late 2nd/early 3rd century AD.

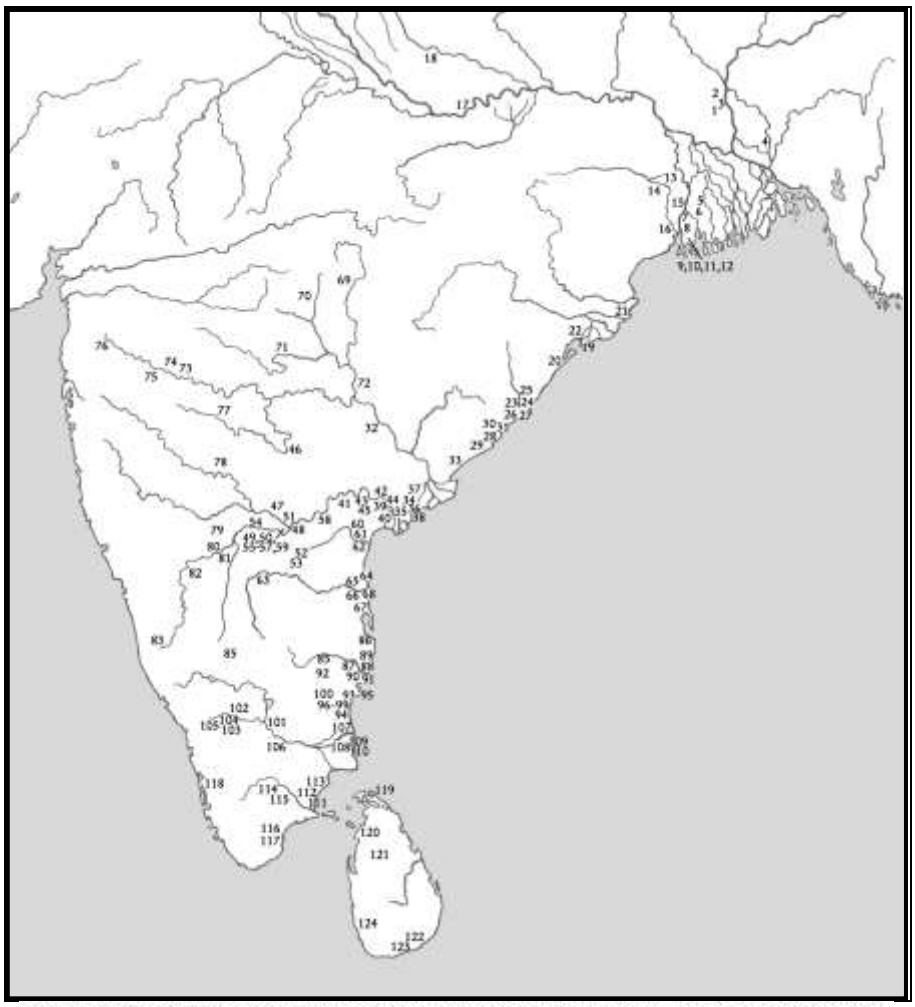


Figure 5.15: Distribution of Rouletted ware in Bangladesh, India and Sri Lanka (Schenk 2006:123-152; Fig. 4)

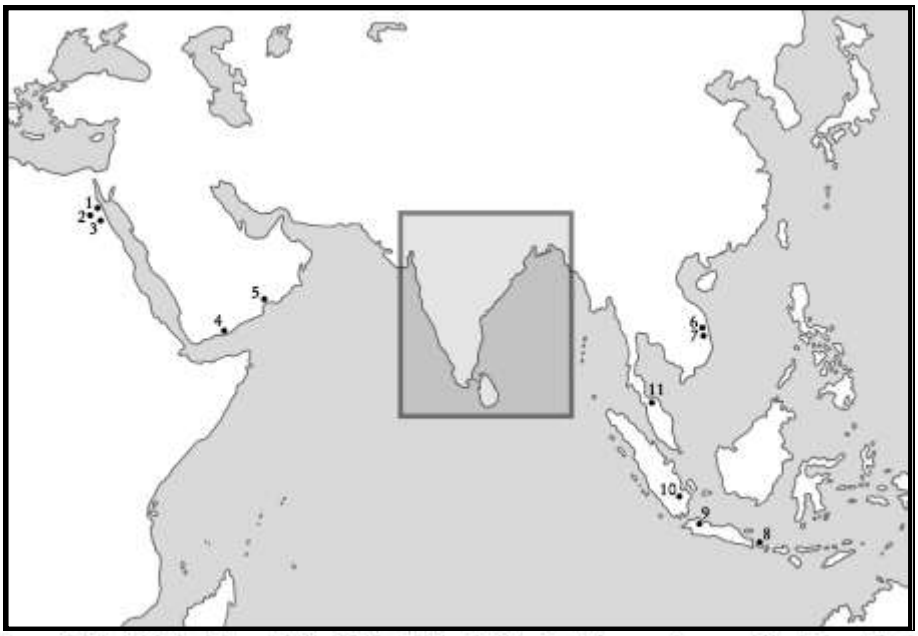


Figure 5.16: Distribution of Rouletted Ware in the Red Sea region and Southeast Asia (Schenk 2006:123-152; Fig.4)

ROUL origin, dating and the significance of GWF classification

The ROUL origin/dating debate illustrates a paradigm shift in the discussion of Indian Ocean maritime connections. It also provides a basis to discuss the outcome of our GWF ware analysis. ROUL, because of its association with Mediterranean Amphorae, Arretine Sigillata, and the so-called non-Indian character of its decoration, is considered as either an imported ware, or at least strongly influenced by Mediterranean culture. On this basis ROUL was dated to between the first century BC and AD 200 (Wheeler et al. 1946:45, 24). Since Arikamedu is believed to have been a 'Roman trading settlement', ROUL and other Mediterranean ceramics were once taken as archaeological evidence for Roman trade with the east, as depicted in the Periplus (for a critique see Begley 1983; 1988; 1991; Schenk 2006; Coningham 2002). Some concerns, however, were expressed about the assigned origin and dates, and a possible indigenous origin was suggested as early as the 1960s (Deo and Joshi 1972:76; Subrahmanyam 1964:8, 43).

Begley (1983:461–481, 1988:427–440, 1991a, 1996:8, 30) dated the inception of ROUL to the 3rd/2nd century BC, pre-dating Arratine Ware and the Periplus dates for Indo-Roman trade. Based on strong similarities, including in fabric and form between ROUL and NBPW, in addition to distribution patterns, Begley (1998, 2004b) has assigned a South Indian origin to ROUL. Scholars such as Nagaswamy (1995:78) argue for the continuity of ROUL to as late as the 4th century, a date after the cessation of Roman trade in the Indian Ocean.

In Sri Lanka, Deraniyagla (1972:104f, 2004:712) used radiocarbon dating to show the occurrence of undecorated ROUL from between *ca*. 500 and 250 BC, prior to the appearance of ROUL from *ca*. 250 BC to *ca*. AD 200. He claims that ROUL originated from the Fine Grey Ware at Anuradhapura around 250 BC, and assigns them a north Indian origin. Coningham (2006) and Schenk (2001, 2006) agree with Deraniyagala's association of ROUL with the Fine Grey Ware, and assign a Southern and Northern Indian origin, respectively. Subsequent scientific analysis (e.g., Ardika et al. 1993 and below) have supported an Indian origin, and perhaps even a single source. Gogte (1997, 2001) conducted X-ray diffraction studies on ROUL and other finewares from sites in India, Sri Lanka and Southeast Asia, in addition to clay samples from Chandraketugarh. His results suggest the Gangetic delta as a possible source, centring on the Chandraketugarh–Tamluk area (Ibid.). Tomber (2008:44) reported large quantities of ROUL and other Indian finewares in the Chandraketugarh region, which are similar to those of Arikamedu and Egypt. Ford et al. (2005:909–920) conducted a geochemical analysis on ROUL, Wheeler Types 10 and 18, Grey Ware and "Omphalos ware" samples from Anuradhapura, Kantharodai, and Mantai in Sri Lanka, and Arikamedu, Alagankulam, Vaddamanu and Kopbal in India. They conclude that there existed a "single geological source" for all these wares. ROUL from Anuradhapura and Arikamedu, as well as Arikamedu Type 10,

and the Anuradhapura Grey Ware, was found to be identical and produced from similar materials. Grey Ware, which predates and is considered an ancestral form to ROUL, has only been identified at Arikamedu (Wheeler et al. 1946:51), Anuradhapura and Kantharodai (Coningham and Allchin 1995:167, 171), thus supporting a Southeast Indian origin of ROUL (Ford et al. 2005:916–17). Krishnan and Coningham (1997:925–937) analysed ROUL, Wheeler type 10, "Hellenistic" sherds, and local BRW and Grey Ware samples from Anuradhapura and assigned a South Indian origin to the fineware class.

These studies highlight striking similarities and close connections between Grey Fine Wares—inclusive of ROUL—across regions. While our assemblage of GWF clearly exhibits the characteristics discussed above, they also illustrate variations in the fabric, firing and inclusions, reflecting possible regional centres of production and Sri Lankan manufacture of wares such as TTGW (5.3.3.3). Moreover, ROUL is clearly one of a larger group of grey body wares. Therefore, striking similarities in finewares observed by the authors cited above may not necessarily point to a common source or a particular region of production but perhaps to the transfer of technology and the sharing of the same ceramic tradition by potters scattered across regions.

5.3.3.3 GWF wares, local imitation and connections

Our analysis of GWF is significant in a number of ways. Although they are closely related in terms of their form and grey body colour, the wares vary in terms their fabric, surface treatment and firing techiques. My analysis of GWF wares- supported by clear stratigraphic evidence and radiocarbon dates at Mantai- clearly shows the continuation of Grey Ware

beyond the traditional date of their demise. Similar evidence is found at ASW2 and Tissamaharama (section 5.3.3.2 above).

The two-tone fabric of TTGW, a ware in GWF, is a result of adopting a different firing method to that of the reducing firing method associated with other GWF wares. At Mantai, TTGW first appeared in Phase V and continues up to the 'Surface'. Their thickness (5–13 mm) is greater than any other GWF wares. These factors are perhaps an indication of local production of some of the GWF wares such as TTGW. At ASW2, Coningham et al. (2006:128) noted two categories of Grey Wares, one of which was made for 'a different people or purpose'. They (Ibid:128), based on minerological analysis, mention that the Grey Ware was pehaps not an imported ware. Our results seem to support the latter argument. The occurrence of GREBUR and FIMIG in the Mantai sequence is also similar to the TTGW, although they represent different fabrics. Schenk's (2001:73) identification of variability in ROUL itself, and the imitation of ROUL forms in BRW at Tissamaharama, may also support our suggestion that some GWF wares such as TTGW were local imitations. Our GWF assemblage is part of the same group of 'Fine Grey Wares' that have been recorded across the Indian Ocean. They provide evidence for maritime trade well before the Periplus and Indo-Roman trade. Such trade networks linking SEA with India's east coast, Sri Lanka and the larger Indian Ocean existed at least since the 3rd/2nd century BC.

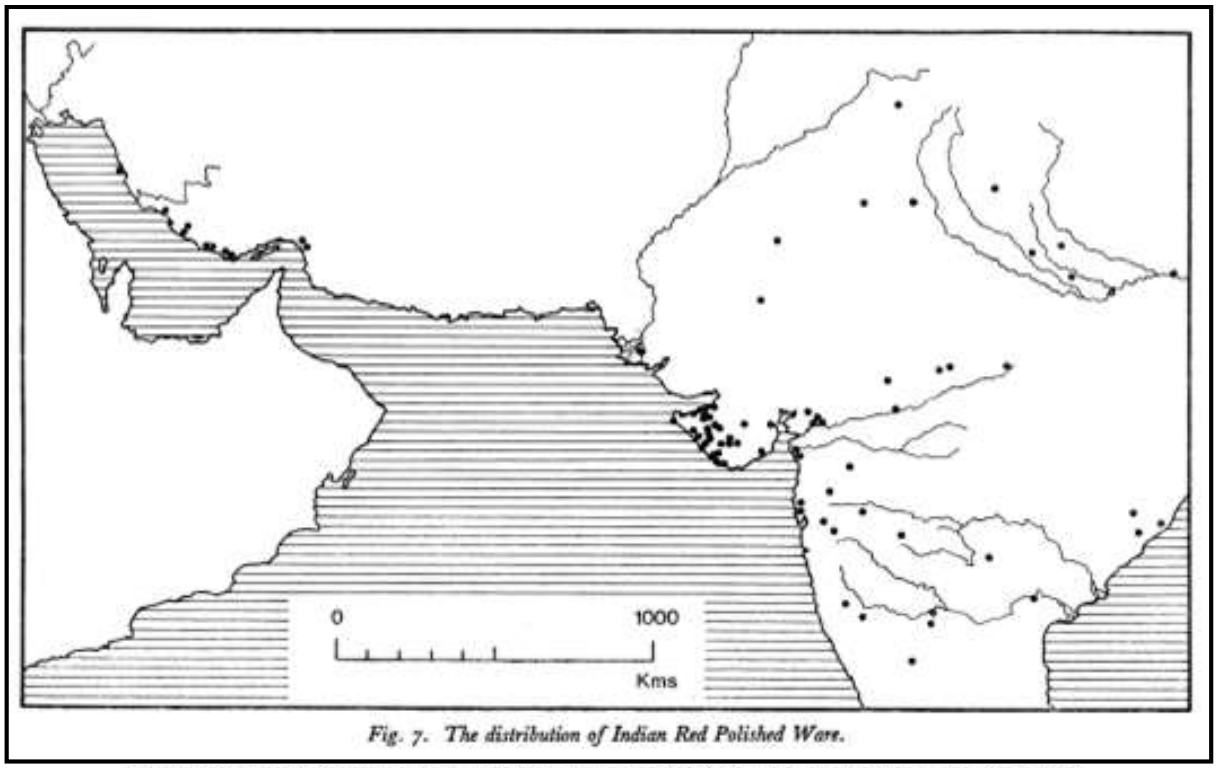


Fig. 7. The distribution of Indian Red Polished Ware.

Figure 5.17: Distribution of Red Polished Wares (Whitehouse and Williamson 1973:39)

5.3.3.4 Red Polished Ware (REPO)

REPO is one of the most discussed Indian wares that dates from the 1st century BC in Gujarat, where it apparently originated (Orton 1991:46–81). Their presence in Sri Lanka links it with the Malabar Coast of India in particular and the western and eastern littorals of the Indian Ocean since the beginning of the CE. The Mantai REPO assemblage was discussed in Chapter 3, their distribution at Kantharodia and Kirinda is illustrated in Figures 5.11 and 5.12.

The REPO assemblage consists of 111 sherds from all three sites (Table 5.10), of which 74% (79 sherds) come from Kirinda. There it occurs throughout the sequence (*ca.* late 3rd to Early/mid-8th or 9th century; Figure 5.18). The Mantai assemblage contains 22 REPO sherds and occurs from Phase IV to 'Surface'. Since the sherds after Phase VII appear to be residual, REPO dates from the mid-3rd to *ca*. early/mid-8th or 9th century. This date range supports Kennet's (2004:89) 8th century (or even later) date for REPO in India. Kantharodai contains

seven REPO sherds from the 'Disturbed' (early/mid-1st BC) and they are likely to be residual and difficult to date

Table 5.10: REPO assemblage; % from TCA and ICA of each site											
Origin	**Kantharodai**			**Mantai**			**Kirinda**			**All sites**	
Ware	Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	GTCA
REPO	7	0.06	0.71	22	0.18	0.7	82	0.33	1.52	111	0.23

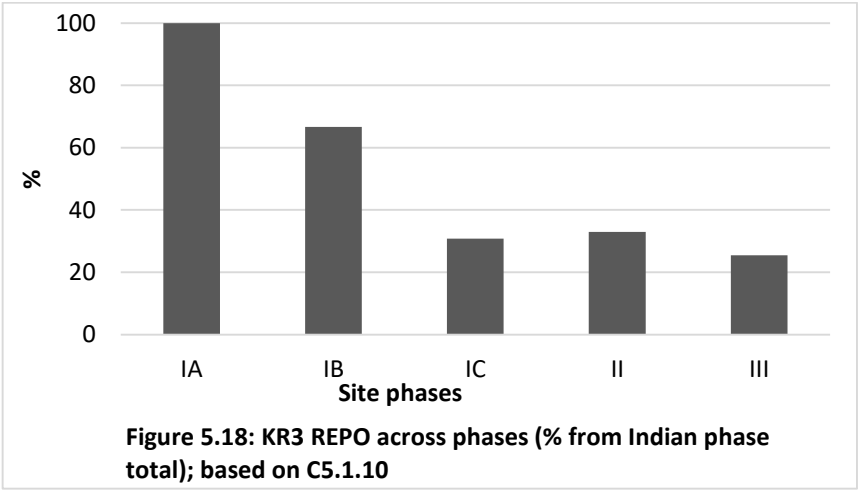


Figure 5.18: KR3 REPO across phases (% from Indian phase total); based on C5.1.10

REPO origin and distribution

Indian REPO is a ceramic made of finely levigated clay, with a red fabric and highly burnished red or orange slip. It is close in appearance and manufacturing technique to Roman Red Gloss Ware from the Mediterranean, although the two vessel forms are different (Whitehouse and Williamson 1973:38–39; Subbarao 1953). Because of its appearance, REPO has been associated with Roman trade (Wheeler et al. 1946:17–124). Based on studies of REPO in Gujarat, Orton (1991:46–81) traced the similarity between the shapes and forms shared by both REPO and Indian Coarse Wares, and concluded that REPO is an Indian ware. REPO is considered to be one of the 'most misinterpreted' (Begely 1992b:4) and 'often misjudged' wares (Schenk 2007:66). The authenticity of some ceramics considered as Indian REPO are also questionable (Tomber and Begley 2000:155). It is generally agreed that Indian REPO

originated in Gujarat (Kennet 2004:88–89; Orton 1991:46–47; Whitehouse and Williamson 1973:29–49).

Although mainly concentrated in Gujarat and Saurashtra, REPO is distributed across much of central and northern India (Kennet 2004:88; Orton 1991:46–81; Rao 1966:51–59), as well as outside India (See Schenk 2001: Figure 5.7; Whitehouse and Williamson 1973:39, Figure 7). It has been reported from a number of Persian Gulf locations (Priestman and Kennet 2002; Whitehouse and Williamson 1973), including Suhar (Kennet 2004; Kervran 1996:38-43; Kervran and Hiebert 1991:341), Khor Rori (Sedov and Benvenuti 2002:188) and Qana (Sedov 2007:83–84)**.** At Ras al-Khaimah (Kush), REPO is most commonly found in layers dated to the 7th and 8th centuries (Kennet 2004:88–89). Dating of Indian REPO ranges from the 1st century at Nevasa (Sankalia et al. 1960:69, 280–281, 307) to the 8th century at Sanjan (Gupta et al. 2003:29–30). The evidence from Kush illustrates the continuation of the REPO production into a much later period (Kennet 2004:88–89).

REPO in Sri Lanka

In Sri Lanka, REPO is reported from sites such as Anuradhapura, Mantai, Kantharodai, and Tissamaharama and generally dated from between the 1st to the 3rd/4th centuries and its later variants to the 7th century (Prickett-Fernando 2003a:73, 1990:81; Schenk 2000:671). REPO and its variants are recorded from Period VII, and the Upper Early Historic Period (*ca.* 100–300) from the Anuradhapura citadel, where it is considered as the index fossil (Deraniyagala 2004:713). In ASW2, 92 REPO sherds occur in the contexts dated to between *ca.* 200 cal. BC–AD 1100 (Coningham et al. 2006:168). At Tissamaharama, 47 sherds representing four variants

of REPO are reported. Vessel forms comprise spouted jugs and sprinklers for ritual use. The earliest occurrence of REPO is dated to the 1st century (Schenk 2001:73, 132–133).

REPO in our Mantai and Kirinda assemblages dates from the mid-3rd to the early/mid-8th/9th centuries. REPO links Sri Lanka with the Western Coast of India and the REPO circulation network in the Indian Ocean. Epigraphic evidence links Sri Lanka with the western coast from around the early centuries of the CE (Paranavitana 1970:CXXVIII; Gunawardana 2003:18; Weerakkody 1997:155).

5.3.3.5 Indian assemblage summary

The Indian ceramics are the earliest imported wares in our assemblage. GREW and NBPW, which are part of GWF, reached Sri Lanka *ca.* 600/500 BC. They are associated with early *Brahmi* script at Anuradhapura and are considered to represent the North Indian contacts symbolized by the arrival of Prince Vijaya. Our Kantharodai GWF wares date from *ca.* mid-4th to late 3rd century BC and seem to tally with the arrival of Sanghamitta to the island in the 3rd century BC. Thus, Sri Lanka's earliest interactions as determined from ceramics in our assemblage seem to be with North India. The Rouletted assemblage (with decoration) in Sri Lanka dates from *ca.* 3rd century/200 BC to AD 200 (Somadeva 2006:289; Deraniyagala 2004:712; Schenk 2001:128). While our Kantharodai (undecorated?) Rouletted assemblage dates from *ca.* 5th to late 3rd century BC. Mantai Rouletted dates from late 1st century late 2nd/early 3rd century. Although the provenance of Rouletted wares is being traced to north India (Gogte 2001), regional production including in Southern India has been suggested (Schenk 2014). Rouletted ware found in Sri Lanka probably came from both sources. Some wares in GWF also seem to have been locally imitated. Rouletted and other GWF fine wares

link Sri Lanka with the maritime networks encompassing the eastern coast of India, the Bay of Bengal and SEA in the east since at least the 2nd/1st century BC.

REPO, which is apparently made in Gujarat, Saurashtra and Maharashtra (e.g., Orton 1991:46–81), connects Sri Lanka to the western part of the Indian Ocean. While REPO in Sri Lanka dates from the 1st century to the 7th century (Deraniyagala 2004:713; Prickett-Fernando 2003a:73), our Mantai and Kirinda assemblage dates from *ca.* the mid-3rd century to the early/mid-8th or 9th century. Although historical sources are largely silent about Sri Lanka's interaction with the western parts of India, references are found in inscriptions from around the 1st century. *Bhagava lena* inscription, for example, mentions a Sri Lankan mariner who sailed to Barukacca (ASCAR 1933:17) or *Bhojakataka* (Broach; Chapter 7).

5.3.3.6 Middle Eastern assemblage

The Middle Eastern assemblage comprises of 37 wares and 1053 sherds, of which 97% are from Mantai (Chapter 3.3.9). The remaining 3% are from Kirinda (Table 5.11). Although not found in our excavations at Kantharodai, Middle Eastern ceramics have been found in the area of the site and are displayed at the Jaffna museum. Kantharodai was declining by the beginning of the CE, which perhaps explains the absence of the Middle Eastern wares in the excavated assemblage.

Table 5.11: Middle-Eastern assemblage; % from TCA and ICA of each site

Mantai			Kirinda			All sites	
Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	GTCA
1026	8.43	32.69	27	0.11	0.5	1053	2.82

The distribution of Middle Eastern wares across phases at Kirinda is illustrated in Figure 5.19. Although Kirinda seems to have operated during the peak of Middle Eastern trade in the Indian

Ocean, its Middle Eastern assemblage contains only 27 sherds representing four wares and belongs to the non-glazed transport ware category. 95% of the Kirinda assemblage is comprised of local and 'Ind/SL' wares, indicating its limited external contacts.

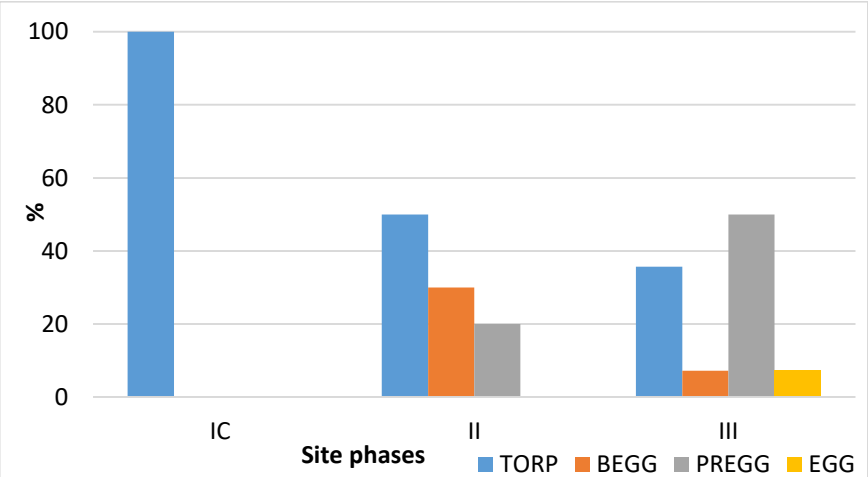


Figure 5.19: KR3 ME wares across phases (% from ME phase total); based on C5.1.13 (The entire KR3 ME assemblage is non-glazed)

With 97% of our Middle Eastern assemblage, Mantai represents the strongest interactions with the western Indian Ocean. The assemblage contains 1026 sherds representing 36 wares and accounts for 33% of the imported ceramics. It is clearly divisable into storage/transport and table wares. The former includes only seven wares, but nonetheless accounts for 63% of the total Middle Eastern assemblage. Of these, more than half are TORP and PATO jars. Although tablewares account for only 37% of the assemblage, they represent 28 wares, indicating a diversity assemblage.

Sri Lankan–Middle Eastern interactions can best be observed by analysing the Middle Eastern assemblage based on the main glazed and non-glazed wares (Figure 5.20).

The Glazed assemblage

In our assemblage Middle Eastern glazed wares are recorded only from Mantai and discussed in Chapter 3 (Figures 3.21 and 3.23), under Alkaline Glazed Ware (AGW) and Opaque Glazed Ware (OGW) categories (C3.9.21). The AGW comprises four varieties of Turquoise Glazed Wares (208 sherds, 2% of Mantai TCA; C3.9.22a). Of these, only 1% of the AGW sherds are found in Phase V and VI with the remaining 99% from Phase VII onwards.

The OGW assemblage is made up of 63 sherds that can be classified into six wares of TIN, MONOLUS, SPL, POLYLUS, RULUS and TIN.T (C3.9.24a). As with AGW, only 8% of the OGW are found in Phases V and VI, while 92% are from Phase VII upwards. Thus, although both categories appeared in Phase V (early 7th - early/mid-8th century), their regular occurrence is from Phase VII (early/mid-8th century).

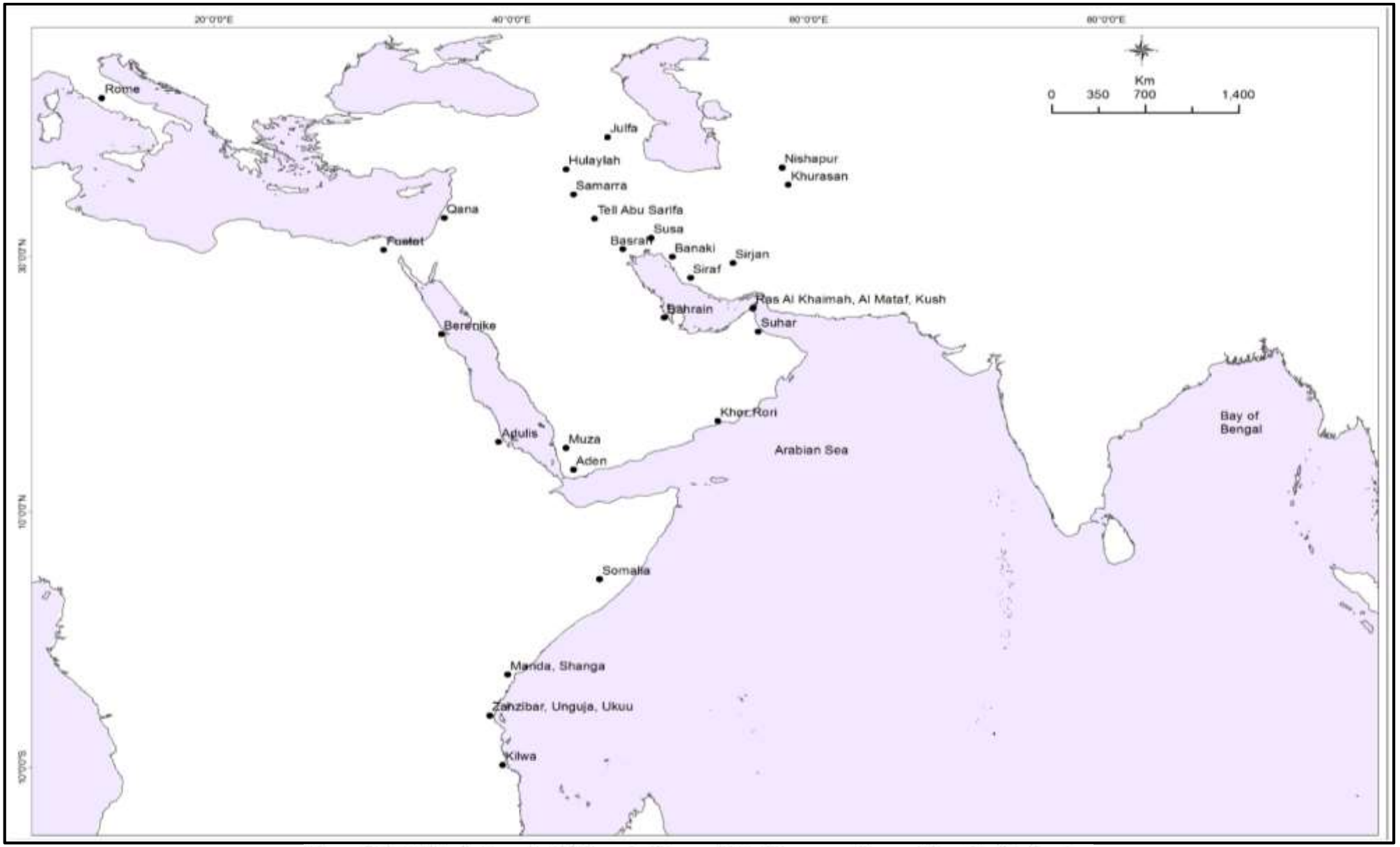


Figure 5.20: Middle-Eastern, East African, Red Sea and Mediterranean sites mentioned in the chapter

Sourcing ceramics is key for the reconstruction of trade through ceramics (Tomber 2008:56). While the identification of parallel finds does not necessarily indicate the routes of their travel, they provide insights for trade/exchange networks and sometimes their provenance. Therefore, the temporal and spatial distribution of the AGW and OGW on the island and elsewhere in the Indian Ocean is discussed in order to reconstruct possible trade-exchange networks.

Alkaline Glazed Wares (AGW)

AGW has an alkaline glaze that varies from pale yellow through green to turquoise in colour. The glaze can be confined to the interior surface and the rim, though they are found normally on both surfaces. The glaze is noted to degrade easily while its fabric varies mostly being grainy, quartz-rich, and light-coloured. Incised horizontal waves are recorded in some sherds as is appliqué and stamped decoration. Vessel forms are largely small bowls and large/storage jars. Rare examples exist of large bowls and saucer lamps (Kennet 2004:35; Schenk 2007:57; Nanji 2011:27). It was probably made in central or southern Iraq, while Basra was one of the centres of production (Tampoe 1989:32, Kennet 2004:36).

AGW is reported from Kilwa (Chittick 1974), Manda (Chittick 1984), Shanga (Horton 1996), Unguja Uuku (Juma 2004) in East Africa; Ras al-Khaimah and Kush (Kennet 2004) in the Arabian Gulf; Siraf (Tampoe 1989; Whitehouse 1968), Suhar (Kervran 2004), Samarra (Northedge 1996) in the Persian Gulf; Mantai and Anuradhapura (Prickett-Fernando 2003a&b; Carswell and Prickett 1984); Sanjan (Nanji 2011) in South Asia and SEA and up to Japan in the Far-East (Glover 2002). They are present in almost all historical ports and were one of the commonest traded ceramics in the Indian Ocean (Nanji 2011:27; Horton 1996:275). AGW was produced at

least since the 3rd century BC in the Gulf (Mouton 1992:148; Salles 1984:248–250) and even earlier in Mesopotamia (Moorey 1994:159–162). It continued to occur up to the 10th century at Susa (Kervran 1977), from the 8th to the 10th centuries at Unguja Ukuu (Horton 2013:59) and they are reported in small quantities up to the 15th century at Kush (Kennet 2004:37).[89] The TURQ appliqué decoration in AGW is dated to the 8th/9th century (Whitehouse 1979; Mason and Keall 1991:52). While the wide geographical distribution of AGW may indicate trade routes, their long chronological distribution makes precise dating difficult.

The AGW is known by various names[90], Turquoise-glazed (Kennet 2004:35–37; Nanji 2011:27) being the most common term. It is the same Parthian blue-green glaze that continued to be used into the Islamic period (Lane 1947). More characteristic vessel forms are, however, found in the late Sassanian and early Islamic periods (Nanji 2011:27; Lane 1947:9). A high proportion of Alkaline-glazed Wares are recorded from the contemporary port sites such as Siraf (Tampoe 1989), Sanjan (Nanji 2011) and Mantai (Prickett-Fernando 2003a, 1990). 76% of our Mantai Middle Eastern glazed wares is AGW.

AGW is highly variable in terms of its glaze and the fabric. Both Kennet (2004:35–37) and Nanji (2011:27–33) classified this ware into five and six different sub-groups, respectively. Kennet (2004:35–37) describes the difficulty of classifying this ware due to the instability of the glaze and its tendency to exfoliate and discolour, a fact also clear from Mantai. Our classification of alkaline wares in to four categories was based on this.

[89] Probably as residual

[90] e.g., Blue-Green Glazed ware

In Sri Lanka, AGW is reported from a number of coastal and inland sites. Deraniyagala (2004:713) reported, Sassanian Pale Blue-Green Glazed Wares from contexts dated to the 3rd century at Anuradhapura citadel. Similarly, Prickett-Fernando (2003a:56, 74, 1990:164, 170;) discussed Partho-Sassanian Blue Green Glazed Wares, dated from the 2nd century BC to the 3rd century AD, from Jetavana and Mantai. Wijayapala and Prickett (1986:17) mentioned Early Sassanian-Islamic (Turquoise Blue, Alkaline glazed) Ware, which was dated from the 4th to the 10th century from Anuradhapura citadel, Jetavana, Sigiriya and Mantai. More than 53% of the Middle Eastern Assemblage from the first field season of Carswell and Prickett (1984:64–65) at Mantai was Sassanian/Islamic Turquoise Glaze Ware. At ASW2, the second largest Middle Eastern ware (116 sherds) was Sassanian-Islamic blue glazed ware, which is considered to date possibly from pre-Islamic or Parthian times (Stern et al. 2008:411; Seely et al. 2006:94). At Tissamaharama (Schenk 2007:57, 60), Turquoise-blue glazed ware is found in contexts dated to the 8th and the 9th centuries. In our Mantai assemblage, 77% of the total Middle Eastern glazed ware is Alkaline. Based on the stratigraphy (Phase V to VII), our assemblage dates from the late 7th to the late 9th/early 10th century. Our AGW assemblage is similar to those of TURQ 5 and TURQ general of (Kennet 2004) and ALK1 and 2, and TURQ general of Priestman (2005). Since Kennet's (2004:36; Table 17) AGW upper boundary is the 15th century, some sherds in the 'Disturb' and 'Surface' assemblage may postdate late 9th/early 10th century.

Thus, as elsewhere in the Indian Ocean, the vast majority of the Middle Eastern glazed assemblage at Mantai belongs to Turquoise/Alkaline Glazed variety. In contrast to earlier claims that Middle Eastern ALK (AGW) glazed ware are found almost entirely from coastal sites and the intended users of AGW were resident Persian and Arab merchants in foreign ports

(see Nanji 2011:31; Glover 2002:174), they are distributed equally in coastal sites and inland urban/religious complexes in Sri Lanka, indicating both secular and religious consumption.

Opaque Glazed Wares (OGW)

Produced in Southern Iraq, probably at the vicinity of Basra during the 9th–10th centuries, OGW was a very distinctive glazed ware, which influenced the development of many later Islamic glazed wares (Priestman 2011:89–113; Kennet 2004:38). It is widely distributed in the Middle East and was traded across the Indian Ocean from South Africa and Egypt in the west to Thailand in the east (Whitcomb 1975:125–126; Sinclair 1982; Prickett-Fernando 1990, 2003a&b; Wade Haddon 1992, 2002; Whitelaw 1994:35; Horton 1996; Glover 2002; Kennet 2004; Nanji 2011). Therefore, OGW is a key ware for understanding Indian Ocean trade during the 9th–10th centuries.

OGW is defined as a Middle Eastern glazed class with "a finely-levigated cream-coloured calcareous body with limited coarse inclusions, and a thick, opacified glaze that covers the entire interior and exterior surfaces, except for the foot where the vessels ....". The glaze colour is "mostly either plain white or white with other colours added in pigment form or as pigment mixed in a glaze suspension" (Priestman 2011:89–113, esp. 89).

Wares that can be classified as 'opaque glazed' have been variously termed and categorized, based on characteristics such as decorations and fabric other than the glaze. This study confines itself mostly to those assemblages that are comparable to our Opaque Glazed assemblage (TIN, TIN-T, RULUS, POLYLUS, MONOLUS, and SPL) at Mantai.

Priestman (2011:89–113, table 1) classified OGW into 16 different wares that included Gold, Rubi and Polychrome Lustres wares, three variants of Cobalt wares, Colour Painted Wares, White on Black or Black on White Wares. In Horton's (1996:277–279) classification at Shanga, Group 2 (White Glaze and colour-splashed), Group 3 (Samara lustre) and some of the Group 4 (Lead-glazed Polychromes) seem to encompass the OGW class (Horton 1996:Tables 13–14). At Sanjan, the OGW assemblage seems to have included White Glazed, Splashed White Glazed and Lustre Painted Wares (Nanji 2011:34–40, 65–88). The Mantai first field season ceramic assemblage alone contained 87 OGW sherds, indicating their strong presence at the site (Carswell and Prickett 1984:64, Table 1).

Despite undeniable variations, there are some unifying characteristics of OGW such as having a fine cream coloured calcareous fabric, an opacified glaze and a range of standardised vessel forms (Priestman 2011:90; Mason 2004), all of which can be used to correlate these assemblages across sites with some accuracy. Of the forms of OGW, open bowls are the most common category (Mason 1997:29), which is true for our Mantai assemblage as well (.

The introduction of opacified lead and perhaps tin glazes and polychrome decorations, coupled with a range of innovative ceramic forms was the hallmark of the so-called Samara horizon (Northedge and Kennet 1994, Kennet 1994:38). Kennet (2004) discussed Opaque classes such as YBTIN (Plain Opaque White Glaze) and LUSTRE (Lustre) wares in his treatment on the Samara Horizon classes. Hence, the chronology of OGW is tightly tied with that of the Samara Horizon. Start dates ranging from the beginning of the 7th century to the later 9th century have been proposed to it based on evidence from the sites such as Tell Abu Sarifa (Adams 1970:91), Susa (Kervran 1979, 1977) and Siraf (Tampoe 1989:88–89; Whitehouse

1979). Today the introduction of the Samarra horizon ceramics, however, is dated to between AD 803–804 and 836 when Samarra was founded. From about this date OGW is said to have lasted for *ca.* 150 years. Therefore, OGW can be safely placed in the 9th and 10th centuries (see Priestman 2011:105, 107,110).

OGW is recorded from a few sites in Sri Lanka. At ASW2, 11 sherds of White Tin Glazed ware are dated to the 9th to 11th centuries (Stern et al. 2008:411; Seely et al. 2006). Opaque Glazed ware from Kirinda is dated to between AD 700 and 900 (Somadeva 2006:190). Except for five sherds of MONOLUS and TIN, which are considered as intrusive and derived from later contexts in Phases V and VI, 92% of our Mantai OGW occurs from Phase VII onwards. Thus, the assemblage is likely to date from the 9th and 10th centuries, with some wares such as TIN.T and POLYLUS dating up to the 13th century AD (cf.Priestman 2005:67; Prickett-Fernando 2003a:74).

OGW was one of the largest commercial glazed wares (Priestman 2011:102) produced for internal consumption and maritime trade that linked ports across the Indian Ocean with that of Basra (Hallett 2000:5–7). The occurrence of these wares at Mantai and interior sites indicates Sri Lanka's connectivity to the larger network of Indian Ocean maritime of trade and exchange.

Non-glazed wares (NGW)

The GTCA Middle Eastern non-glazed assemblage comprises of 748 sherds from Mantai and 27 from Kirinda (Table 5.12).

Table 5.12: Middle-Eastern non glazed ware assemblage; % from TCA and ICA of each site							
Mantai			Kirinda			All sites	
Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	GTCA
748	6.15	23.83	27	0.11	0.5	775	2.07

The Kirinda assemblage comprises entirely of non-glazed sherds (27)[91] and represents four wares (i.e. TORP, BEGG, PREGG, EGG) occurring from Phase IC to Phase III. Phase IC has only three sherds of TORP, with the remainder in Phases II and III (Figure 5.19). Therefore except for TORP, the other non-glazed assemblage from *ca.* the mid/late 6th to the early 8th century.

The Mantai non-glazed assemblage (94% of the TCA) comprises 748 sherds[92] and 24 wares (Chapter 3.3.9.2; Figure 3.26; C3.9.26a) and are distributed from Phase III to the 'Surface'. Their regular occurrence, however, begins from Phase IV, thus dating from the mid-3rd to the 12th/13th centuries. The non-glazed assemblage can be divided into large storage/transport wares and table/serving wares.

Table wares

IWW and EGG are the only significant non-glazed table wares in the Mantai assemblage. More than 90% of IWWs are found from Phase VII, with six sherds are found in earlier phases which are considered to be intrusive. This assemblage, thus, is part of the 8th/9th century Middle Eastern ceramic package. Sherds found in the 'Disturbed' and on the surface are likely to date to the 10th century and even up to the 12th/13th century.

[91] While acknowledging that the quantity of sherds is statistically insignificant to make definite conclusions based on the proportions, tentative suggestions are made until the material from KR2 is analysed (Catalogue 1.2).

[92] 700 of them were included in the selected assemblage which was discussed

Our IWW[93] is similar to WHITE of Kennet (2004:77) who suspected an Iranian or Iraqi origin. IWWs vary considerably in our assemblage, which was also reported by Morgen and Leatherby (1987:83) and Kennet (2004:77) (C3.9.19). IWWs are noted from Sirjan (Morgen and Leatherby 1987:83–102) al-Mataf, Kush, Ras al-Khaimah (Kennet 2004:77) and Shanga (as Fine Creamware? Horton 1996:297) with a date range from the 9th to the 15/16th centuries for WHITE/IWWs. At Mantai they occur from Phase III to the 'Surface'.

Large storage/transport wares

Of the large vessels, the most important categories are TORP and PATO jars, which are used for delineating trade connections. Numerically, the other important large transport/storage wares are LARV and LIM (188 and 33 sherds, respectively), both of which appear in the Mantai sequence after Phase VII and continue up to the 'Surface'. These cargo/ storage wares are widely distributed from Eastern Africa, Arabian Gulf to India and Sri Lanka in South Asia (section 3.3.9.3). They collectively date from the Islamic period to late 14th to late 16th century (cf. Kennet 2004:79, 1994) and represent the larger Islamic trade during the 8th and 9th centuries. This trade with Mantai appear to have continued up to the 12th/13th century.

TORP and PATO

TORPs are defined as thick walled large jars with a slopping shoulders and a thickened rounded rim (Kennet 2004:85).[94] Their interior has a bitumen lining (Stern et al. 2008; Connan et al.

[93] All variants of certain wares such as IWWs were amalgamated in this table as IWW. The full ware list is found in the Seriated sequence.

[94] TORPs are also known as Buff Ware Torpedo Jars at Sanjan (Nanji 2011). At Shanga, Pale Green Earthen Ware seems to be the same ware (Horton 1996:296). They are also known as 'ring-necked handle-less storage jars (Simpson 1992:291) or handle-less amphorae with a "distinctive tall, narrow base and barrel-shaped body" (cited in Tomber 2006:39).

1998), presumably for the transportation of liquid; probably wine (Tomber 2008:39). They have also been termed as 'Resin-lined Buff Ware at Mantai by Prickett (1990:164). In the present study TORP and its variant PATO, chronologically a later development, represent this ware.

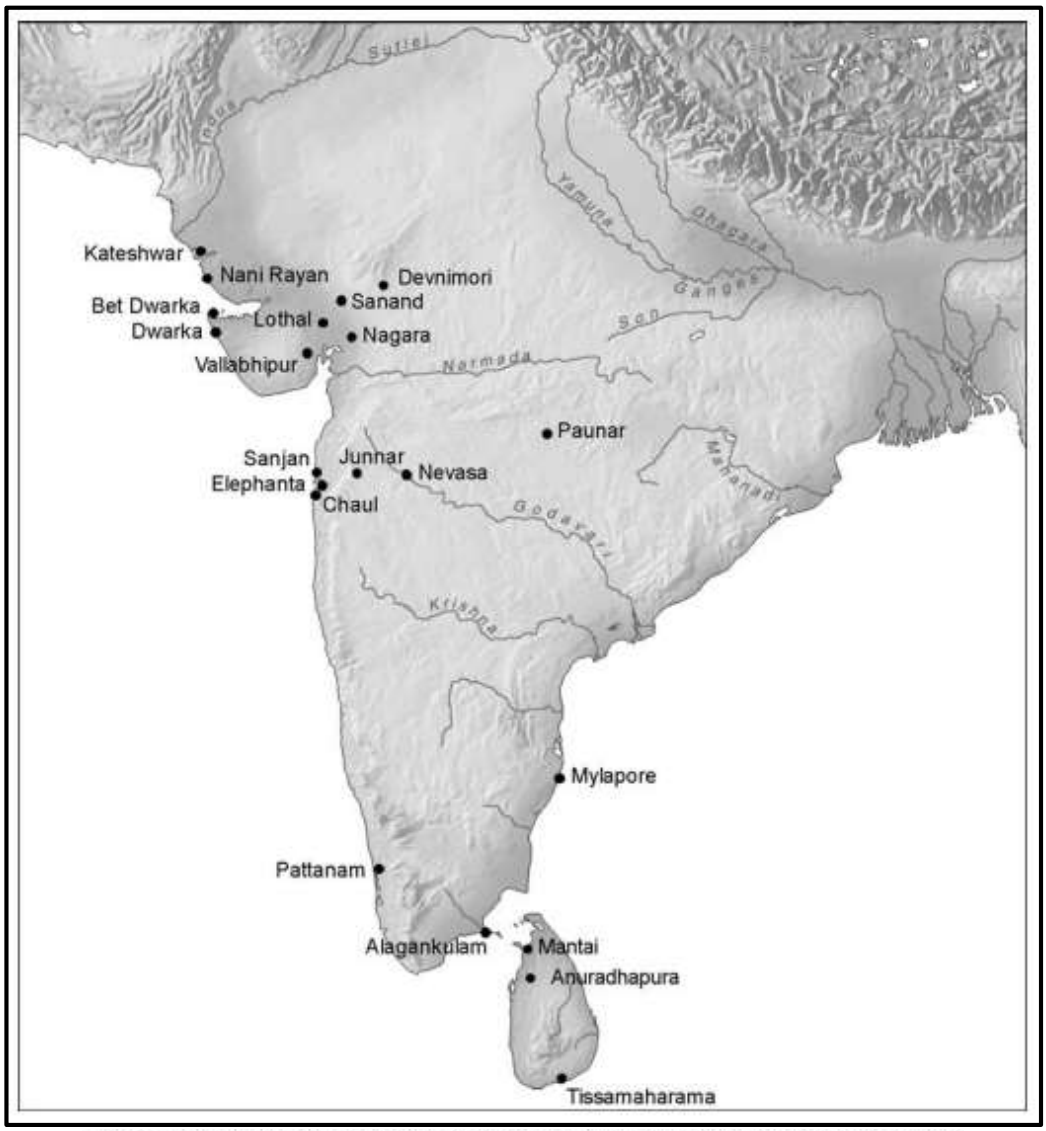


Figure 5.21: Distribution of Torpedo finds in India and Sri Lanka (Tomber 2007)

TORPS are distributed throughout Mesopotamia, the Gulf (Kennet 2004:85; Simpson 1992:291; Adams 1970:91–92), East Africa (Juma 2004:113; Horton 1996:296; Chittick 1984:83, 89;), India (Nanji 2011; Tomber 2007, 2008; Glover 2002;) and Sri Lanka (Prickett 1990; Schenk 2001; Seely et al. 2006). Their provenance is traced to Mesopotamia (Tomber 2007:973; Kennet 2004:85). Chronologically, TORP has a long production/circulation history

at least from late the Parthian to Early Abbasid/Islamic periods (Kennet 2004:85) and reached India at least during the Sassanian period (AD 224–651) (Tomber 2007, 2008:39).

For the present discussion, the distribution of TORP in India is more relevant since the same mechanism of dispersion might have been responsible for their arrival in Sri Lanka. Until recently TORPs have been misidentified as Roman Amphorae in the Indian sub-continent (Tomber 2007:972), making their identification from early publications difficult. Tomber (2007:972–988 and Table 1) summarized the distribution of TORP in India through samples from 18 selected sites. They range from stratified to surface finds and date from 300–100 BC (or 100 BC to AD 500)[95] at Alagankulam (Sridhar 2005) through the 1st to the 8th/9th century at Nagara (Mehta and Shah 1968) to the 8th/9th or to the 12th century at Sanjan (Nanji 2011). Tomber (2007:979) dated TORPs with applique designs from Pattanam from the 8th to the 10th centuries.

In Sri Lanka, TORPs are reported from Mantai (Prickett 1990), Anuradhapura (Seely et al. 2006) and Tissamaharama (Schenk 2001, 2007). Since the samples from the latter two sites and our-own samples from Mantai are derived from reliable stratified sequences and are independently dated they can be used for understanding the circulation of TORPs in South Asia. 59 TORP sherds are reported from ASW2, 36 come from periods dated to between AD 200–600, while others are Pre-Islamic and Islamic in date (Coningham and Batt 1999:129; Coningham 2006:1, 5, Table 1.1; Seely et al. 2006:107). Stern et al. (2008:410) dated the ASW2 TORP assemblage from the 3rd to the 9th centuries. Wijeyapala and Prickett (1986:17) assigned a date range of the 5th to the 9th centuries for the TORPs from Sigiriya and Mantai. 26 TORP

[95] Though the phase date is given the date of TORP is not clear.

sherds are found at Tissamaharama (Schenk 2001:59–195), the majority of which are dated to the 5th and 6th centuries. TORP are also found from layers dated to the 8th/9th and even later centuries at Tissamaharama (Tomber 2007:981, Table 2), where they are associated with Turquoise Glazed Wares of Parthian and Islamic periods (Schenk 2001:74). Therefore, Tissamaharama finds are taken to support the Sassanian date for some of the South Indian TORP finds (Tomber 2007:980). In this context, the association of Sassanian maritime traders with Sri Lanka by Cosmas (XI.15–16) is significant.

At Mantai, TORPs are reported by Prickett-Fernando (2003a:74) Graham (2013e:192, 201, 208, Pl 11.3, 11.5) while dealing with local wares presents figures that include both TURQs and TORPs, which he seems to post-date the 8th century, although he is certain that some of them belong to the 5th and 6th centuries.

Our Mantai assemblage includes 266 TORP sherds that range from Phases III to VII and to the 'Surface'. 105 PATO sherds are found from the Phases IV to the 'Surface' (Figure 3.28). Thus, PATO is clearly a later introduction. Therefore, TORP/PATO assemblage may date from the mid-3rd century to the late 9th/10th centuries. The sherds in the 'Disturbed' and on the surface could be residual.

Our Mantai TORP/PATO assemblage is the largest assemblage so far reported on the island and even larger than the selected Indian sample of Tomber (2007). Moreover, our sequence is well dated, particularly up to Phase VII. Chronologically, the lower level of Mantai TORP/PATO assemblage is comparable with that of Alagankulam (Sridhar 2005), while the upper levels match with Sanjan (Nanji 2011). Tomber (2007:980) suspected Pattanam and Alagankulam as a possible TORP transhipment point to Sri Lanka. Our fieldwork at Algankulam

in 2012 indicates a close similarity between the materials from the two sites situated on either side of the Palk Strait. During the time of author's field work in 2012, several hundred families of Sri Lanka origin were living in and around Alagankulam. They claim age-old trade and cultural contacts that existed between Mannar and Alagankulam until the separatist war broke in 1980s.[96]

5.3.3.7 Middle Eastern assemblage summary and trade routes

The Middle Eastern assemblage provides the best ceramic evidence for Sri Lanka's with the Middle East from at least the mid-3rd century to 12th/13th century and contradicts the established historical perceptions. While Mantai has the largest Middle Eastern assemblage, Kirinda contains only few wares. Anuradhapura, Sigiriya and Tissamaharama have strong ceramic evidence for Middle Eastern connections. The main Middle Eastern wares discussed in this chapter have parallels across the Indian Ocean, indicating extensive maritime networks since the last centuries BC.

The Middle Eastern glazed assemblage comprises of AGW and OGW categories. Since the Blue-Green (Alkaline/Turquoise) glaze of the Parthian period continued through Sassanian to the Islamic period (Lane 1947), the dating of these wares should be based on stratigraphy, vessel forms and decoration (Tomber 2008:51). Six rim sherds in our assemblage represent bowls and water jars. The high variability of AGW glaze makes their classification difficult

[96] Limited fieldwork was carried out in November 2012, along the western and eastern coasts of South India to study the ceramic and bead assemblages from sites that were compared with my sites, i.e. Pattanam, Alagankulam and Arikamedu. The sites were surveyed and the artefacts displayed and stored in museums were studied during this field season, in addition to obtaining specialist views from ceramists from around the world by showing samples carried from my sites, during the Indian Ocean Ceramic workshop held in Kerala at the same time period. It was during these site surveys that the author met a group of people with Sri Lankan origins at Alagankulam.

(Kennet 2004:35–37), a fact observed at Mantai as well. Excluding very few genuine Parthian period sherds such as those of Tissamaharama (Schenk 2007:57, 60; Tomber 2008:981–Table 2), the majority of so-called Parthian glazed wares are often found in association with Tang period Chinese wares and thus, belong to the Sassanian or early Islamic/Islamic periods. Our assemblage is likely to be late Sassanian. Following Tampoe (1989:32) and Kennet (2004:36), the provenance of our AGW assemblage is assigned to Southern Iraq.

The origin of Opaque glazed wares is also attributed to Southern Iraq (Kennet 2004:38; Priestman 2011:89–113) and are dated to the 9th/10th century. Disregarding the six sherds of OGW in Phase V and VI, our assemblage tallies with this time period, but apparently continued for much longer. Considering the strong similarities in ceramic assemblages (Tampoe 2003:77–94; also Francis 2013a), Siraf seems to be the main source of the Mantai OGW assemblage.

All glazed wares are tablewares such as bowls and water jars. The range of tablewares (13) and their limited quantity (271) may indicate the demand for Middle Eastern wares and the existence of a small affluent class who could afford them. The large proportion of our Middle Eastern assemblage, however, is comprised of non-glazed wares from Mantai and Kirinda and are divisible into table and transport/storage wares.

The largest of the non-glazed categories are the storage/transport wares, which were probably imported for their contents (below). This category is dominated by TORP and PATOs of which the interior is bitumen lined as waterproof for transporting liquid such as wine, oil and perfume (cf. Stern et al. 2008:409). Tang China is said have had a great demand for Middle

Eastern wine (Linrothe 2013:267–269), which may indicate that these liquids were transhipped to SEA and China via Mantai. The presence of TORPs in interior urban centres such as Anuradhapura and Sigiriya, however, indicates that at least part of what was transported in TORPs was consumed in Sri Lanka. Stern et al. (2008:409–428) analysed bitumen from the sherds sampled from ASW2 and concluded that they originated from a single source near Susa in Iran. In their assemblage, TORP dates from the 3rd and the 9th centuries (Ibid.409).

Middle Eastern historic relations

The earliest reference to the Middle East in Sri Lankan chronicles is found in *Mahavamsa* (*Mv.*10:90), which refers to King Pandukabhaya (*ca*. 500 BC) setting aside a quarter for *Yonas*[97] at Anuradhapura (Chapter 7.3.3). Indirect evidence for interaction with the Middle East may be inferred from the reference to the use of horses in pre-1st century BC inscriptions (Paranavitana 1970:28, 46, 72) as Cosmas (XI.23) says that Sri Lanka imported horses from Persia. Prickett-Fernando (1990:168; 2003a:53) also considered that horses were imported either from Oman, Fars in Persia or Sind. Archaeologically, the earliest horse remains in Sri Lanka date from *ca.* 600 BC (Ibid.; Chapter 7.2.3.2). The earliest Middle Eastern ceramic from Mantai is dated to few centuries later than these earlier contacts. A horse tooth was found from Phase III (late 1st century to the late 2nd/early 3rd century) in our excavation at Mantai, demonstrating the early interaction between the two regions.

During the first few centuries of the CE, Sri Lanka gained a reputation as a trading centre and initial contacts with the Middle Eastern seem to have expanded. The earliest Sri Lankan

[97] Deraniyagala (2004:740) identifies them as Greeks.

mission reached Madina during the reign of King Aggabodhi III (628–639) (Imam 2003:165–166) and the Sassanian emperors maintained links with Anuradhapura in the 5th century (Dewaraja 2003a:183). It is clear from both Procopius (I.20.9–13) and Cosmas (XI.15–16) that after the collapse of the Roman Empire, the Aksumites and Persians acted as Middle men in trade between Sri Lanka and the Mediterranean and the island was the pivot of Persian trade (see Perera 1952:303; Dewaraja 2003a:183-190). While Procopius mentions that the Ethiopians and Persians purchased Chinese Silk in Sri Lanka, Cosmas is explicit about the arrival of ships from China, India, Ethiopia and Persia in the island. Sri Lanka also dispatched its own cargo ships to those countries (Cosmas XV, XVI), indicating the transhipping role the island played. In the early 7th century, Vajrabodhi witnessed 35 Persian ships in Sri Lanka and Persians that had come to buy precious stones (Perera 1952:303).[98] Perera (1952:303–304) mentions that from the 5th to the 7th centuries, Sri Lankan goods were sold as Persian in Persia, though evidence for such a claim is not clear.

With the birth of Islam in Arabia in the 7th century and the establishment of the Abbasid Empire (751–1258), Muslim traders began to gain supremacy in Indian Ocean trade. In the subsequent (9th–10th) centuries, they control maritime trade from Baghdad to China (Dewaraja 2003a:183; Kiribamune 1986:89–112). During the 9th and 10th centuries, many references are found to *Sarandib*, ancient Sri Lanka, and its products in Arabic literature (Imam 1965:10; Dewaraja 2003a:184; Chapter 6). During the same period, the material evidence for Middle Eastern trade and Muslim settlements in coastal areas in Sri Lanka rapidly increased (Dewaraja 2003a:184). The ceramic assemblages from Phase VII upwards at Mantai and Phase III at Kirinda and elsewhere in the country testify to increased interaction with the Middle

[98] See also Journal Asiatique, May–June (1900), pp.418-421

Eastern region from *ca.* the 9th century upwards. Suleiman, an Arab merchant from the mid-9th century, mentions that most Chinese ships reached Siraf for merchandise via Sri Lanka (Sauvaget 1948:7 cited in Imam 2003:166), indicating the role of Chinese merchants in Indian Ocean trade and the significance of Sri Lanka as a trading partner.

Provenance of ceramics and trade routes

In the preceding sections, parallel finds of different Middle Eastern wares along with their possible origin and dates were discussed in order to established possible trade-exchange networks. Since the origin of Torpedo (TORP and PATO) is traced to Mesopotamia (Kennet 2004:85 and Tomber 2007:973) and their bitumen to Susa in Iran (Stern et al. 2008:224) trade-exchange links seem to have been established between Middle Eastern region, South India and Sri Lanka from the later Parthian through the Sassanian and into the early Islamic period (Tomber 2007:973-974). Trade/interactions could not have occurred with the same intensity or uninterruptedly throughout all these periods. Possible interruptions of trade such as during war could have been short-lived before the 11th century[99] after which trade with the Middle East seems to have decreased.

While some Middle eastern goods might have been transhipped from South-Indian port sites such as Pattanam and Alagankulam to Sri Lanka (Tomber 2007:980), it is highly unlikely that the all TORPs recovered on the island came via South India. The historical evidence (Chapter 7.3.5) indicates direct contact between the Middle Eastern region and Sri Lanka. The origin of later Middle Eastern wares such as LIM and LISV are traced to Bahrain and Iran, respectively (Kennet 2004:78, 79) and indicate the continuation of these exchanges. Although quantitatively limited, the occurrence of wares such as PREGG (equivalent to RED.EGG; 9th–

[99] As is clear from the continued occurrence of ME sherds.

11th century—Kennet 2004:83); YGRAF (*ca.* 10th–13th century—Horton 2013:60; 9th–11th century—Kennet 2004); IWW (equivalent to WHITE 9th/11th–15th/16th century—Kennet 2004:77); PIW (14th-16th century—Kennet 2004), at Mantai indicate the continuation of trade with the Middle East well after the Chola attack in 993. Their limited quantity, however, may imply a reduction in the volume of trade after the 11th century. Consequently, The Middle Eastern assemblage illustrates extensive trade-exchange relations between the Middle East and the island since the middle of the first millennium BC.[100]

5.3.3.8 Chinese assemblage

Sino-Sri Lanka historical relations date from the beginning of the CE and were intensified following the arrival of Fa-Xian in the island in the 5th century (Werake 2003; Chapter 7). Ceramics are the largest category of artefacts that represent these links, with the earliest Chinese ceramics found in Sri Lanka belonging to the period of the Tang Dynasty (610–907). .

The GTCA Chinese ceramic assemblage consists of 452 sherds (22 wares) from Mantai and Kirinda (Table 5.13). No Chinese ceramics were found at Kantharodai, as the site declined before Chinese wares first reached the island. A rescue excavation at Allaipiddy in Jaffna, however, recorded a huge quantity of Chinese porcelain belonging to the Southern Song Period (1127-1279) (Carswell 1985; Prickett-Fernando 1994:305; Prematilleke 2003:227), indicating Chinese connections during later periods.

Table 5.13: Chinese ware assemblage; % from TCA and ICA of each site

Mantai			Kirinda			All sites	
Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	GTCA
450	3.7	14.34	2	0.008	0.04	452	1.21

[100] Based on the finding from other interior sites such as Anuradhapura and Sigiriya.

99.6% of our total Chinese assemblage comes from Mantai (Chapter 3.3.10). Kirinda contains only two DUSUN sherds from Phases IC and II (Figure 5.22). Somadeva (2006) also reports only a single Chinese sherd from Kirinda, indicating limited interactions with China.

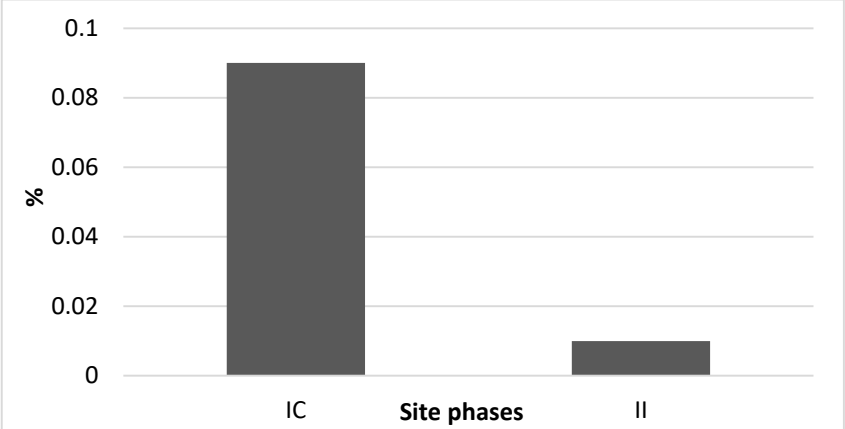


Figure 5.22: KR3 Chinese wares across phases (% from TCA phase total); based on C5.1.14

Sino-Sri Lankan relations are explored based on the Mantai Chinese assemblage, which occurs from Phase III to the 'Surface'. Their occurrence up to Phase VII is numerically insignificant and the five of these sherds seem to be intrusive. The occurrence of a DUSUN sherd from Phase V, however, seems to be genuine. More than 91% of the Mantai Chinese assemblage is found from Phase VII upwards and its latest sherds are likely to date to the 12th/13th century. Carswell (2013b:232–233) mentions that Mantai has the earliest Chinese wares found in Sri Lanka. A Chinese celadon sherd of the 13th/14th century recovered from Mantai is displayed in the Yapahuwa Museum. Our Mantai Chinese assemblage comprises 18 wares and 450 sherds, of which DUSUN (63%), CHANGSHA (13%) and YUE (7%) are the most common. They are the most widely distributed and discussed Chinese wares in the Indian Ocean. Having detailed the Mantai Chinese assemblage in Chapter 3, the distribution of selected wares in Sri Lanka and from elsewhere in the Indian Ocean region is discussed for tracing maritime trade networks (Figure 5.23). The Chinese assemblage can be divided into two categories: transport (DUSUN) and tablewares (CHANGSHA and YUE).

Dusun Ware

DUSUN is primarily a thick walled stoneware storage/transport jar with a green glaze on the exterior (Kennet 2004:65)[101], although other forms such as basins/deep bowls with flared sides are also found (Hansman 1985:33; Carswell 2013c:246; 249; Figure No. 2016). The ware is termed after the Dayak Borneo tribe who used it during the World War II (Harrison 1949:1–11; Carswell 2013c:246).

DUSUN is widely distributed in the Indian Ocean and reported at sites such as Shanga/Eastern Africa (Horton 1996:303), Ras al–Khaimah/Arabian Gulf (Kennet 2004:65), Siraf/Persian Gulf (Tampoe 1989), Sanjan/India (Nanji 2011), Mantai/Sri Lanka (Prickett 1990), and in Indonesia (Adhyatman 1983). It was one of the most common container wares during the medieval period (Guy 2008, Flecker 2001, Horton 1996:303). The container ware role of DUSUN is evident from a 12th century Chinese text that describes a ceramic shipment preparation at Guangzhou (Carswell 1985).

DUSUN is generally dated to the 8th/9th centuries (Kennet 2004:65), while at Shanga, the ware is found in layers dated to *ca.* 750–920 (Horton 1996:303). The ware is one of the earliest Far-Eastern wares imported to the Persian Gulf, around AD 800–825 (Whitehouse 1973:244–246). Based on the Belitung shipwreck, where DUSUN was used for transporting luxury wares (i.e. Changsha), the provenance of it is traced to Hunan Province (Flecker 2001:335), or to kilns in the vicinity of the Zhujiang River, near Guangzhou (Guy 2008:11).

[101] DUSUN is also known as the Olive-green Glazed Jar (Horton 1996:303), Coarse Grey Stoneware (Tampoe 1989:47) Guangdong Jars and Large Green-glazed Stoneware jars (Guy 2008:14) and Guangdong Grey Stoneware (Sasaki 2004:59).

In Sri Lanka, DUSUN is reported from Mantai (Carswell and Prickett 1984), Anuradhapura, Polonanruwa (Deraniyagala 2004; Seely et al. 2006) and Tissamaharama (Schenk 2001). Seely et al. (2006:112) report only two DUSUN sherds from ASW2. This may indicate that DUSUN was mostly confined to ports because it was a container ware. At Mantai Carswell et al. (2013) discussed/illustrated only 65 DUSUN sherds. Based on the same excavation, Prickett-Fernando (1994), however, reported 1,164 DUSUN sherds. While Graham (2013e:209) dated the earliest appearance of DUSUN at Mantai from 8th century onwards, Carswell (2013c:246) dated them to the 9th–12th centuries. According to Carswell (2013c:246; 1979, 1985), DUSUN is found into the 12th century at Allapiddy and Jethavana. Prickett-Fernando (2003a:74) also dates DUSUN from Mantai and Anuradhapura from the 7th to the 10th centuries.

Our Mantai DUSUN assemblage is comprised of 265 sherds, which occur from Phase V to the 'Surface', with nearly 96% dated from Phase VII and upwards. However, the assemblage seems to date from the late 7th/early 8th century to the late 9th/10th century (C3.9.30). Over 80% of DUSUN comes from the 'Disturbed' and the 'Surface' and some of them may belong to the late DUSUN mentioned by Carswell (et al. 2013:246). The Mantai assemblage is similar to those found at Sanjan (Nanji 2011) and Siraf (Tampoe 1989) and thus seem to be part of the same Tang Dynasty ceramic package that was in circulation in the Indian Ocean. Strong Sino-Sri Lanka trade connections had been established by the 6th century as is clear from Procopius (I.20.9–13) and Cosmas (XI.15–16). This is reflected by the increasing presence of Chinese - as well as Middle Eastern and 'Imported.Unknown'- ceramics from the late 7th century onwards. Most of these are container wares, indicating the arrival of a high volume of traded goods at Mantai.

Changsha Ware (CHANG)

Named after the Changsha region of Hunan province where it was produced (Hughes-Stangton and Kerr 1981:57–59; Carswell et al. 2013:256), Changsha ware has a greenish grey or buff body and a white slip on the interior and part of the exterior (Horton 1996:302; Kennet 2004:60).[102] The vessel form is invariably a bowl decorated (mostly floral and linear designs) in green or green and brown on a cream background. CHANG is distributed from China through South Asia, to the Gulf, Red Sea and to Eastern Africa (Liu 1991; Whitcomb 1989:182; Whitehouse 1973; Nanji 2011:80–81; Prickett 1990, Horton 1996:303). The Tang dynasty Changsha trade is considered to represent the first phase of Chinese ceramic trade with the West (Whitehouse and Williamson 1973).

The ware is suggested to have been introduced in the middle of the Tang dynasty and lasted until the late Tang and Five Dynasties period (907-960) (Liu 1991:225–236). Based on the Belitung shipwreck, Changsha is dated to the early 9th century (Flecker 2001, Guy 2008). At Shanga, however, Changsha is dated to between *ca.* 760–900 (Horton 1996:303). In Sri Lanka, Changsha is reported from Anuradhapura, Mantai, Yapahuwa and Polonnaruwa (Prickett 1990; Seely et al. 2006). Carswell et al. (2013:256–266) reported 108 Changsha sherds from Mantai, although from the same excavation Prickett-Fernando (1994; 2003a:56) reports 416 Changsha sherds and dates them from the 8th to the 10th centuries. Only three Changsha sherds are reported from ASW2, which are dated to late the Tang period (Seely et al. 2006:111). Sasaki (2004:62) dates all Changsha Wares from Sri Lanka to a period between the 9th and the 10th centuries.

[102] CHANGSHA is also known as Painted Stoneware (Rougeulle 1991:21–25) and Changsha Painted Stoneware (Horton 1996:302).

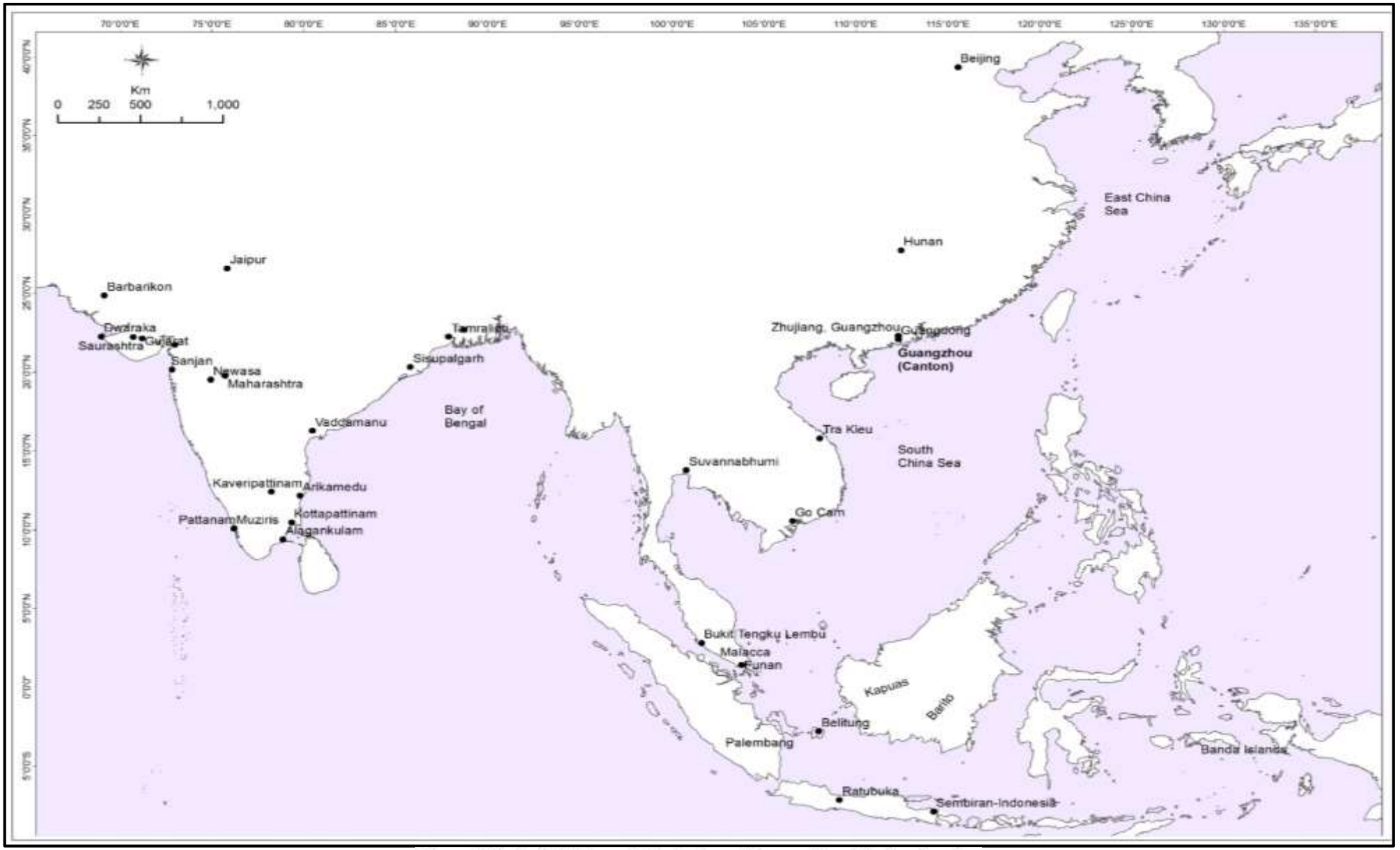


Figure 5.23: South Asian and Far-Eastern sites mentioned in the chapter

In our Mantai assemblage, there are 55 Changsha sherds of which 54 are from Phases VII upwards (C3.9.30). The single sherd in Phase VI is intrusive and the sherds in the 'Disturbed' and 'Surface' are probably residual. Thus our assemblage may date from the early/mid-8th to the late 9th/10th centuries. Carswell et al. (2013:256) trace the network that transported Changsha as far as the Far East and Japan and Korea in the east and the Persian and Arabian Gulfs, the Red Sea, Egypt and East Africa in the West. Archaeological and historical evidence illustrate that Sri Lanka was in the middle of this network and Mantai seems to have played an intermediary role (Prickett-Fernando 1994) prompting Carswell et al. (2013:233–234) to suspect the destination of the Belitung ship was perhaps Mantai. The discovery of a Changsha sherd depicting a West Asian musician as interpreted by Linrothe (2013:267–269, Pl. 12.8) is of great interest. Better known is the identical sherd of a Changsha ewer, excavated from Fustat, Egypt (Linrothe 2013:267). A similar fragment was found in our excavation (Figure 5.24). West Asian musicians and court dancers are said to have been a regular feature of the Tang Royal Court (Linrothe 2013:267–169), thus contact with China through trade and diplomatic relations also brought about cultural exchanges.



Figure 5.24: Sherd from Mantai resembling the sherd bearing west Asian musician figure

Yue Ware

Yue Ware is an olive green glazed stoneware with a dense grey body.[103] The forms are invariably bowls of which the glaze colour varies from brown to yellow brown (Kennet 2004:61), although jars are also found.

Chekiang Province is considered to have been the production site of Yue (Carswell et al. 2013:239). The ware is dated to the Five Dynasties and Ten Kingdoms. It is suggested to have lasted until AD 978, or even until the Song period (Xinxiong 1994; Shimin 1999 and Morita 1987 all cited in Kennet 2004:61). At Shanga, Yue continued up to the 13th century (Horton 1996:307). Yue ware is reported from coastal sites in the Gulf (Williamson 1987:12–13) and rarly on the Arabian side (Rougeulle 1991:32–37), but abundant at Siraf (Tampoe 1989). It is also present in East Africa (Horton 1996:307; Juma 2004:108) and in India (Nanji 2011).

[103] Yue Ware is also known as Longquan Greenware (Horton 1996:307), Celodone-1 (Nanji 2011:83), Yue Stoneware (Carswell et al. 2013:239–245) and Yue Green Ware (Seely et al. 2006:111).

In Sri Lanka, Yue Ware is found at Anuradhapura, Mantai, Yapahuwa and Polonnaruwa (Prickett 1990, Coningham 2006, Prematilleke 1982). Nine sherds of Yue are reported from ASW2 and they are dated to between the 9th and 10th centuries (Seely et al. 2006:111). Carswell et al. (2013:239–245) reported 66 Yue sherds from Mantai, whereas Prickett-Fernando (1994) recorded 340 Yue and Yue Ware related sherds from the same excavation. While Prickett-Fernando (2003a:75) dates Yue ware from Mantai from the 8th to the 11th centuries, Sasaki (1989:126) assigned them a 10th century date. Our Mantai Yue ware assemblage is comprised of 30 sherds, which occur from Phase VII onwards and date from the 8th/9th to the late 9th/10th centuries (C3.9.30). Some of the sherds found in the 'Disturbed' and on the 'Surface' may belong to the 11th century (cf. Prickett-Fernando 1994).

5.3.3.9 Chinese assemblage summary and discussion

Almost of all Chinese ceramics in our assemblage comes from Mantai, occurring from Phase V to the 'Surface'. The 'Disturbed' and the 'Surface' deposits also contain a small quantity of Ding and Southern White Wares, which date to the 11th/12th century. Thus, our assemblage seems to fall between the Chinese dynasties of T'ang (618–907) and Song (960–1279). Southern Song Dynasty (1127–1270) ceramics are also reported from Mantai (Prematilleke (2003:227) and from Vankkalai, near Mantai (Carswell (1978: esp.134, Figure 5.2). It is during this entire period that the Sino-Sri Lankan relations flourished.

Although coastal sites such as Allapiddy—a dump of Chinese ceramics from a shipwreck' (see Carswell 1985:31.49 and Carswell 1996:501-515) —and Tissamaharama have reported Chinese wares, our ceramic analysis suggests Mantai as the main port through which Chinese ceramics were imported to the island. Prematilleke (2003:227) notes the striking similarity

between the Chinese and Middle Eastern assemblages discovered at Mantai and Anuradhapura, with the former being the port for the latter.

Our Chinese assemblage comprises a large quantity of storage/transport ware sherds and a limited number of sherds representing a wide range of tablewares. Nearly 63% of the Chinese sherds belong to the single storage type, Dusun jars. Almost 51% of Prickett-Fernando's (1991:309) Mantai Chinese assemblage also consisted of Dusun sherds. The presence of a large amount of large storage jars at port sites indicates that they were traded rather than being offerings or gift items (Prickett 1990:173). The limited number of sherds of a wide range of tablewares may indicate that they were meant for a small section of the society. The Chinese wares discussed here are widely distributed across the Indian Ocean and were components of the trade networks with the region that commenced from around late 7th/8th century.

It is clear from historical evidence that Sino-Sri Lanka relations went back much further than the ceramic evidence would suggest. These began with the arrival of emissaries from the Han Dynasty (206 BC–AD 220) delegation that was returning from their visit to Huan-chih at the beginning of the CE (Werake 2003:213). Since it was during the Han Dynasty that China first began its external political-commercial expansion and Sri Lanka was an emerging as commercial centre, this visit likely to have had an economic interest. Sri Lanka sits midway between China and the western world and establishing relations with Sri Lanka/South Asia was a necessary step in China's attempt to explore maritime commerce with the western Indian Ocean region.

In subsequent centuries, Buddhist monks played an important role in strengthening Sino-Sri Lankan relations. Buddhist missionaries were effectively used by Sri Lankan kings to enhance political and trading connections with China. King Mahanama (410–432), for example, employed Buddhist monks both as missionaries and royal emissaries to the Chinese court (Chapter 7.3.4). Sino-Sri Lankan interactions intensified with the arrival of Fa-Xian and the establishment of Sri Lankan order of nuns in China in the early 5th century. Chinese texts record 11 religious missions between Sri Lanka and China before AD 600 (Werake 1984:23–26). The highest diplomatic, cultural and commercial interactions between the two countries took place during the Tang dynasty (618–905). Their prosperity might have attracted the Sri Lankan kings and eight missions were dispatched to China between the 7th and 8th centuries (Ibid.).

The earliest Chinese ceramics in our Mantai sequence also date from the late 7th/early 8th century, the period of the Tang Dynasty. Although the Chinese high fired glazed ware had its origins in the first millennium BC and Porcelain/White Wares in *ca.* 6th century (Kerr 2002:125) the traded ceramics were not produced before the Tang Dynasty (618–906) (Rougeulle 1996:160). The distribution of Chinese traded ceramics seems to coincide with the rise of Islam and the spread of Islamic trade in the Indian Ocean. Persian traders were trading in the Indian Ocean from the early centuries of the Christian Era, but their influence spread to India, Sri Lanka, and then to Southeast Asia and China only after the 7th/8th centuries (Hourani 1995; 1963:87–114). Chinese ceramics analysed in this thesis accords chronologically with these historical developments. From around the 6th century, Sri Lanka appears to have acted as an intermediary in this trade (Procopius I.20.9–13 and Cosmas (XI.15–16); Prickett-Fernando 1994; Whitehouse and Williamson 1973). Major Chinese ware finds in places such as Mantai,

Siraf (Tampoe 1989) and Belitung (Krahl et al. 2011), Sanjan (Nanji 2011) in the Indian Ocean fall roughly into this period.

According to historical records, Sino-Sri Lankan relations declined after the 8th century. Only a single Sri Lankan mission was dispatched to China between the 9th and 13th century (Werake 2003). Competition from the South Indian—Chola, Pallavas and Pandyas—kingdoms, the increasing influence of Arab trade with SEA and China reduced the significance of Sri Lanka as a trading partner. Increasing military activities in the Palk Strait, and the advancement of nautical technology enabling direct trade between China have been cited as possible reasons for this reduction (Gunawardena 2003; Kiribamune 1987; Werake 2003). I argue that the decline of Buddhism in China was the most crucial factor that contributed to the weakening of cultural and political interactions between the two countries (Chapter 7.3.4). Our ceramic assemblage, however, amply illustrates the continuity of trade contacts. The quantity of Chinese ceramics rapidly increased from *ca.* the 9th/10th centuries and continued until the 12th/13th century at Mantai and much later at places such as Polonnaruwa, Yapahuwa Allaipiddy and Vankalai (Prematilleke 2003:225–229; Carswell and Kirkride-Helback 1978), indicating continued trade and contrasting with the chronicles.

5.3.3.10 Southeast Asian (SEA) assemblage

Historical evidence for interaction between Sri Lanka and SEA is negligible. Nevertheless, when reconstructed, these interactions stretch from the last centuries BC to the pre-modern period. The archaeological evidence for such interactions is also meagre.

In our assemblage, ceramics identified as possible SEA wares are confined to 87 sherds (0.18% of the GTCA). Of these 91% are from Mantai and the rest are from Kirinda. Although no SEA wares were identified at Kantharodai, a considerable amount in the 'Imported.Unknown' are suspected to be SEA (Table 5.14).

Of all the SEA wares found at Mantai (C3.9.32), only OFEW occurs from Phase III to the 'Surface'. Similarly, only PIOW (Phase V to 'Disturbed') and BLAG (Phase VII–'Surface') are found in more than three phases. All other wares occur in fewer than three phases and account for fewer than three sherds. Apart from HIT (two sherds, in Phase IV), all other wares are found after Phase VII. Thus, while the earliest SEA assemblage at Mantai may date from *ca.* the late 1st/2nd century, its frequency of occurrence increased after the 7th century and the highest concentration postdates early/mid-8th century. This time period agrees with the dates assigned by Solheim and Dearaniyagla (1972:31–32) for their SEA assemblage and with our surfaced treatment analysis findings.

Table 5.14: SEA assemblage; % from TCA and ICA of each site

Origin	Mantai			Kirinda			All sites	
	Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	GTCA
SEA	79	0.65	2.52	8	0.03	0.13	87	0.23

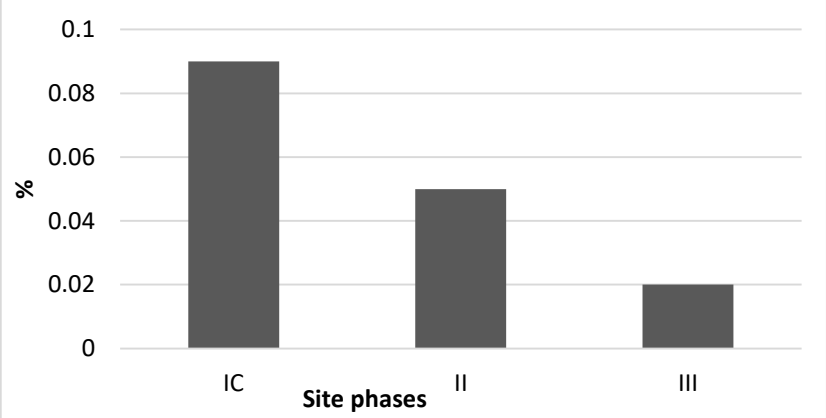


Figure 5.25: KR3 'SEA' wares across phases (% from TCA phase total); based on C5.1.15

At Kirinda only a single SEA ware (PIOW) occurs in Phase IC, while the rest (7) are found from Phases II and III (Figure 5.25). The Kirinda assemblage, therefore, belongs roughly to the same period (early 6th/mid-7th to early 8th century) as those of Mantai. The chronological distribution of the SEA assemblage at both sites is similar to that of the Chinese (Below).

Discussion

Surveys conducted by Solheim and Deraniyagala (1972) in order to determine the Southeast Asian influence in Sri Lanka produced only a few paddle impressed sherds of suspected SEA origin. Since ceramics identified as being SEA are rare in Sri Lanka, I employed surface treatment analysis (Chapter 3.3.13.1) to find possible parallels. It revealed that the decorations and designs found in wares tentatively identified as SEA have parallels in various places in India and SEA. The decorations of PIOW and MITW, for example, were similar to those of Kottapattanam Stamped Wares, which are identified as SEA in origin (Rao 2004:11–15; Plates 5:2; 6:2; Sasaki 2004:16–20 Plate12; 48–50). The PI/ST decorations found in our SEA wares also match with those of Solheim and Deraniyagala (1972). Thus, our surface treatment analysis supports the confirmation of wares tentatively identified as SEA in our general analysis and assists in the identification of a few more wares (POW and OBW, originally assigned to 'Imp.Unk') as possible SEA wares. This may suggest possible trade-exchange networks (Figure 5.23). The SEA assemblage indicates that the initial contacts established around the late 1st/2nd century became more regular by *ca.* the 7th century and reached their peak after the early/mid-8th century when the maritime trade became firmly established.

The earliest historical reference to SEA in *Mahavamsa* is about the dispatching of a Buddhist missionary to S*uvannabhumi*[104] by the Emperor Asoka in the 3rd century BC. This was followed by the arrival of a Buddhist monk named Suriguttha of Kelasa monastery (in Burma), along with a large delegation of monks, during the reign of *Dhutthagamini* (161 to 137 BC) (*Mv.*29:13; Wickramasinghe 1960:39). Based on the Perimiyamkulam inscription, Paranavitana (1983:63, and note 1; PP. 66) traced Sri Lanka's early interaction with Java to the first century. Descriptions in *Mahaniddesa* (1st/2nd century)[105] prompted Gunawardena (2003:19–20) to conclude that Sri Lanka had been a transit port in the journey between India and SEA by the 1st/2nd century. Levi (1925:52, cited in Gunawardena 2003:20) thought that Satavahana's from Deccan, India (230 BC–AD 220) dispatched their trading ships to *Suvannabhumi* via Sri Lanka. This indicates the significance of the island in the maritime trade between India and SEA at this time (Gunawardena 2003:19–20), which is roughly when our SEA assemblages appears at Mantai.

By the 5th century Sri Lankan ports were connected through maritime routes to various ports in SEA and from there to China. As is clear from the journeys of pilgrims such as the Kashmiri monk Gunawarman (Pachow 1958:9–12), Fa-Xian (Wolters 1967:55, 206) and the accounts of It-Sing who recorded travel details of Chinese monks up to the 7th century, Sri Lanka was been used as a stopover for most of the Chinese Pilgrims (Gunawardena 2003:24/65). These pilgrims always travelled in merchant ships and therefore their journeys were determined by trade routes, indicating Sri Lanka's position in maritime trade during this period. According to Cosmas (XI.15–16), by the 6th century Sri Lanka was the 'mediaex' in east–west maritime trade

[104] Swarnabhumi may be identified in the general area in Dvaraka and Funan (see Phanomvan 2012).

[105] Dated to the time of Ptolemy's Geography by Levi 1925:51 cited in Gunawardena (2003:19).

(McCrindle 1901:160–162). Clove, considered as an import from Indonesia (Wolters 1967:80–81; 153), was among the many goods sold in the ports of Sri Lanka. This period matches with the regular occurrence of SEA wares at both Mantai and Kirinda, indicating the wider contacts with SEA, reaching Southern Sri Lanka as well. During this time Mahayana influence is seen in the Buddha images in Southern and Southeastern Sri Lanka; perhaps the main factor for increased interactions between the two countries (Chapter 7.3.4).

From about the 7th century interactions with regions in SEA increased as is clear from the Ratubuka inscription and the iconographic influences (Chapter 7.3.4). By the time of Vijayabahu I (1055–1110) historical sources are explicit about Sri Lankan political and cultural relations with Burma (*Mv.*60:4–8; Wickramasinghe 1960:38–58). The expansion of these cultural and political relations into trade and commerce is clear from the declaration of war on Burma by King Parakramabahu I (1153–1186) to settle a dispute related to the elephant trade (Wickramasinghe 1960, Chapter 7). This last phase seems to match with the increase of SEA wares from Phase VII upwards in our assemblage, particularly at Mantai.

5.3.3.11 'Imported.Unknown' ('Imp.Unk') assemblage

A group of wares with ceramic attributes such as fabric and firing that are significantly different to those of local wares are considered to be non-local. Since they do not match any of the known imported wares in Sri Lanka, they are categorized as 'Imported.Unknown'. Although, the possible provenance of some 'Imp.Unk' wares were subsequently determined through the surface treatment analysis, they were retained in this category until further verification. The 'Imp.Unk' account for 4% of the GTCA (1772 sherds) and are the single largest imported provenance group (33%) in our assemblage. While a higher percentage of 'Imp.Unk'

sherds are recorded from Kirinda and Mantai, they are a fraction of the total assemblage at Kantharodai (Table 5.15). 33 different 'Imp.Unk' wares were recorded at Mantai, however, Kantharodai (3) and Kirinda (8) lacked that diversity. The range and the quantity of 'Imp.Unk' wares/sherds found at Mantai may testify to the breadth of its external interactions.

Table 5.15: 'Imp.Unk' assemblage; % from TCA and ICA of each site

Kantharodai			Mantai			Kirinda			All sites
Sherds	TCA	ICA	Sherds	TCA	ICA	Sherds	TCA	ICA	GTCA
45	0.41	4.54	725	5.96	23.1	1002	3.98	18.55	3.67

Although the Kantharodai 'Imp.Unk' assemblage occurs from Phases IV to VIII, (Figure 5.26), nearly 90% of these are recorded from Phase IV (mid-4th to the late 3rd century BC). Of these OW, a tableware, accounts for more than half of the total 'Imp.Unk' with RGW, a storage ware, comprising 44% of the assemblage. Though 'Imp.Unk' account for only 0.41% of the Kantharodai TCA, they link the site with unknown overseas locations from the mid-4th century BC.

Kirinda had the largest quantity (4% TCA) of sherds of 'Imp.Unk', although they only represent eight wares. Of these, THBRW1 and THBRW collectively account for more than 94% of the total 'Imp.Unk' at the site. Only these two wares occur from Phase IC to III. With the exception of COW (two sherds in IB) and OW (4 sherds in IC), all other wares are found in Phases II and III (Figure 5.27). Thus, although 'Imp.Unk' appeared from around the mid-3rd century, the assemblage composition became diversified only from the mid to the late 6th century. The Mantai 'Imp.Unk' assemblage, the most diverse among all three sites (Chapter 3.3.12), illustrates its wide range of external interactions with regions yet unknown. These wares occur from *ca.* the late 1st century and peaking from *ca.* the early/mid-8th century. These wares can be separated into large storage/transport and table/decorative wares.

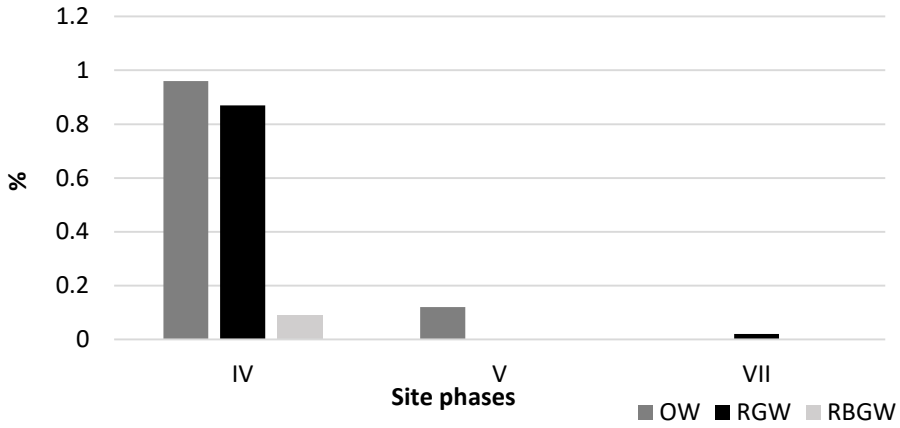


Figure 5.26: KTD 'Imp.Unk' across phases (% from TCA phase total); based on C5.1.16

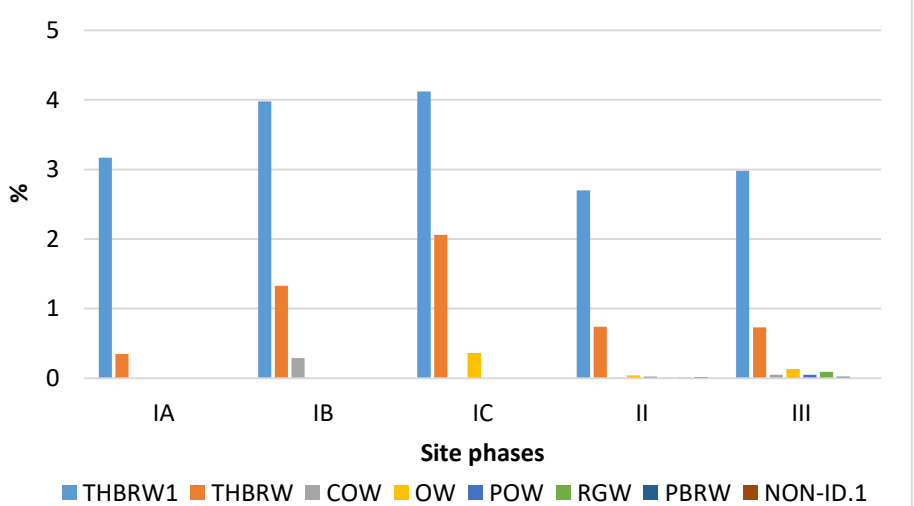


Figure 5.27: KR3 'Imp.Unk' wares across phases (% from TCA phase total); based on C5.1.17

Storage/Transport wares

The significance of 'Imp.Unk' is that the vast majority of their vessel forms at Mantai (87%) (3.3.12.3), Kantharodai (44%) (C7.1.2.6a) and Kirinda (96%) (C7.2.26a) are transport/storage wares. Of these THBRW1 and THBRW are the most significant and collectively account for nearly 60% of the total 'Imp.Unk' in our assemblage. While the former is recorded only from Kirinda, the latter is found at both Kirinda and Mantai. They are variants of the same large storage/transport vessel form with heavy thick bodies. They could be Indian or even local, though such parallels are not known to the author. At Mantai, THBRW dates from the late 1st

century to the 12th/13th century while at Kirinda both variants date from late 3rd to the early 8th century, occurring later than those of Mantai. If these wares were non-local, they would have arrived as cargo wares from yet unknown overseas locations.

Table/decorative wares

A group of orange wares differentiated by minor variations in their fabric, inclusions and decorations make up this category. The vast majority of these are from Mantai where the prominent wares are OW and PROW (C3.9.42). Of these, only OW occurs from Phase II to the 'Surface'. Other wares are found in fewer numbers and only in the 'Disturbed'. Though 'Imp.Unk' tablewares appear from the late 1st century, their arrival in quantity and variety increased only from around the early 7th/mid-8th century. At Kantharodai only OW can be identified as an 'Imp.Unk' tableware. It occurs only in Phases IV and V, but accounts for more than half of the total 'Imp.Unk' at the site. The ware, therefore, dates from around the mid-4th/late 3rd to the late 3rd/mid-2nd century BC (C5.1.16). At Kirinda 38 sherds representing four 'Imp.Unk' tablewares were found. Apart from OW, which is found at Mantai and Kantharodai, all of the others are found at Kirinda only. OW, which has the highest number of sherds is found only in Phases IC, II and III and therefore date from the early 6th to the 8th century. The differences in the 'Imk.Unk' assemblages across sites may indicate different interaction patterns and chronological variations between the sites. Kirinda is situated on the Southeastern coast of Sri Lanka whereas the other two sites are on the northern and north-western coast and close to India. Considering the strong SEA connections of the sites, seen in the bead assemblage and the Mahayana influence on Buddhist images (Chapters 6.4.4.3&7.3.4) that is visible in the southern and Southeastern maritime regions, most of the 'Imp.Unk' wares at Kirinda may have derived from the SEA.

Except COW, PBRW and NON-ID.1 recorded from Kirinda, most of the other wares in the 'Imp.Unk' tablewares seem to belong to the same SEA ceramic tradition. The assemblage as a whole date from *ca.* the early 6th/mid-7th to the early 8th century. That is when historical sources indicate Sri Lanka's regular and increasing contacts with SEA and China.

Schenk's (2014:96) Figure 1.3 ware recovered from Tissamaharama seems to be the closest published SEA ware known to the author in Sri Lanka (Figure 5.28). This particular sherd is somewhat similar to our PLOW ('Imp.Unk') and PIOW (SEA) found at Mantai. Schenk assigned that particular sherd a SEA origin as she identified similar wares from Angkor Borei, Cambodia (Ibid.). This seems to support my suggestion that some wares included in 'Imp.Unk' might be of SEA origin. Schenk's (2014:96; Figure 1, 2-3) sherd from Tissamaharama is dated to the 4th/5th century and is therefore considered as the "earliest proof of Southeast Asian pottery in South Asia." The earliest ceramic evidence for SEA from Mantai, however, may date from *ca.* the late 1st century, with them becoming more common from *ca.* the 7th century (Chapter 3.3.11). In Solheim and Deraniyagala's (1972:31, 38) study, the earliest Paddle and curved impressed pottery which were tentatively identified as SEA were dated to AD 100–500, while the majority of them date from AD 600. The latter date matches with our surface treatment analysis as well. While a few 'Imp.Unk' wares such as OW and OBW, could be clearly suggested as being of SEA origin, the exact provenance of many wares remains unresolved. The provenance of these wares could vary from India to SEA (Chapter 3.3.13.3). Further studies are needed to establish their precise origin. Nevertheless, these wares link Sri Lanka with unknown overseas regions since at least the late 1st century.

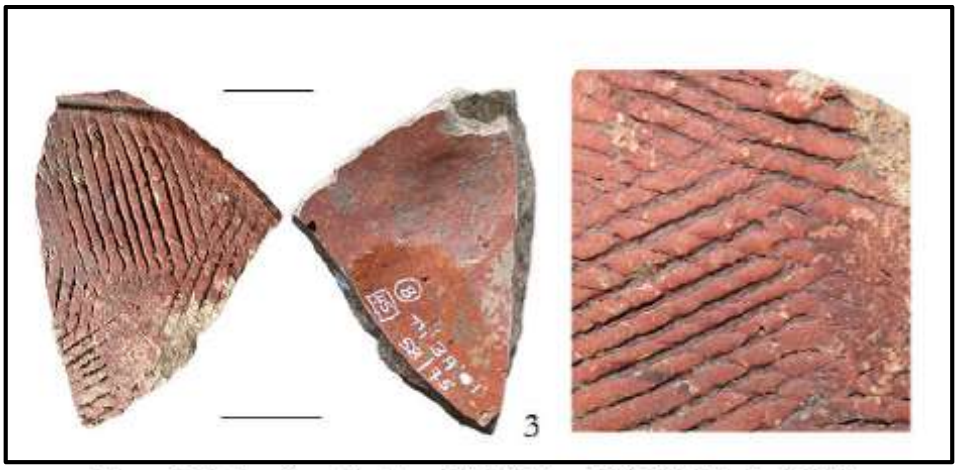


Figure 5.28: Jars from Southeast Asia (Schenk 2014:96, Fig. 1; 2-32-3)

5.4 Chapter conclusions

The three ceramic assemblages discussed in this chapter are diverse in their size, composition and chronology. They illustrate different consumption, trade-exchange patterns, and different interaction spheres. Kantharodai operated from *ca.* 500 BC to the beginning of the CE. Its ceramic assemblage is essentially a combination of Sri Lankan and Indian materials. It demonstrates regular and intense interaction with southern and northern India and limited contacts with Southeast Asia. The interactions with western Indian Ocean, if there were any, could have been either via Mantai or South Indian ports.

Kirinda functioned from *ca.* the 4th to the 8th/9th centuries and was essentially a minor regional port which had limited external interactions. The Chinese presence is limited to two DUSUN sherds, while suspected SEA wares are larger in number. Kirinda was active whilst Mantai was having intense interactions with the Middle East during the peak of Islamic trade. Middle Eastern ceramics are, however, confined to 0.11% of the TCA sherds representing four wares. Kirinda might have received some of these foreign wares through nearby Tissamaharama.

Mantai has a comparatively lager (8% of the TCA) Middle Eastern assemblage, which contains a cross section of the ceramics that were in circulation in the Indian Ocean for over two millennia, from the first century BC. It overlaps chronologically with the other two sites, providing an excellent opportunity for comparison. Disregarding possible brief interruptions during South Indian invasions, Mantai seems to have had regular and intense interaction with the Indian Ocean from around the middle of the first millennium BC, as is evidenced from texts, although imported ceramics appeared only by *ca.* the 2nd century BC. Its earliest external interactions were with north India and the eastern coast of India. These external relations were extended to the Far-Eastern and Middle Eastern regions from around the 1st century. Prickett-Fernando (1990:170, 2003a:55) and Sanmuganathan (1951:G15) also report a small quantity of ceramics from the Mediterranean and the Red Sea.

While the identification of interaction spheres based on the provenance of material culture is possible, extreme caution should be maintained in making generalizations. The presence of incidental material may not necessarily indicate direct interactions with a given region, as the material might have reached through various indirect mechanisms. Similarly, the absence of material/ceramics from a given site/period does not necessarily indicate the non-existence of interactions with the region during that period. They might indicate different kinds of interaction-exchange patterns.

5.4.1 Shared ceramic traditions, and internal networks through local–'Ind/SL' assemblages

Due to long-standing shared ceramic traditions, the differentiation of local coarse wares from those of Indian imports is difficult. The 'Ind/SL' provenance group was created to acknowledge these traditions. While clearly identifiable local ceramics account for over 70% of each of the

three sites studied the 'Ind/SL' account for 1.66% GTCA of our assemblage. PLRE and RESL, the most common local wares, are strikingly similar, the main difference being the latter having a slip on the exterior. Their chronological distributions across sites are also identical. However, considerable variations in fabric, firing and inclusions exist in PLRE and RESL and other local wares, due to them being produced at multiple workshops. Since coarse wares were mass-produced locally, they were rarely traded across distances.

Regional specific ritual/decorative ceramics, however, likely traded across regions, indicating internal networks. Across the variations cited above, local wares share a number of similarities in rim types, ware forms, and surface treatment, indicating a shared ceramic tradition. A progressive increase in local production is visible in all sites. Craft specialization of ceramic production may be inferred from the standardization of surface treatment, rim and vessel forms.

5.4.2 Imported ceramic assemblages and the island's external interactions

Sri Lanka's external connections, visible from ceramics, include the geographical regions of India, the Far-East, the Middle East and yet unknown overseas regions. Of these, Indian ceramics are the earliest to arrive in Sri Lanka.

5.4.2.1 Connections through Indian assemblages

While Indian-derived BRW and Red Wares occur in the Protohistoric (*ca.* 1000/900 BC) contexts on the island, Grey, NBPW, and Rouletted wares of GWF are the earliest imported ceramics in our assemblage. Grey Ware (GREW), which is ancestral to other GWF wares, probably originated in the Ganges Valley around 500 BC. Buddhism also originated in the same

region a short time earlier and spread to areas as far south as Sri Lanka. Coeval occurrence of the earliest Grey Ware and NBPW along with the earliest *Brahmi* letters at Anuradhapura coincides with the first recorded Indian migrations signified by the arrival of Prince Vijaya (*ca.* 500 BC; *Mv.*8) in Sri Lanka. The *Divyavadana* describes Vijaya as the son of a merchant (*Div.*:523) and his arrival when maritime trade was gaining momentum in the Bay of Bengal probably had a commercial motivation. Grey Ware in our assemblage occurs in reliable contexts dated from *ca.* the mid-4th BC (Kantharodai) to the early/mid-8th century AD (Mantai and Kirinda). Coningham et al. (2006:128) reports similar evidence from ASW2. Therefore, the traditional view that Grey Ware discontinued after 500 BC (Prickett-Fernando 2003a&b) needsrevision. While the provenance of the earliest Grey Wares in Sri Lanka could be the Gangetic plains, later arrivals might have been from any of the eastern and Southeastern coasts of India. It is also possible that Grey Wares were produced/imitated locally.

Rouletted Ware from the three sites studied in this thesis date from the 5th/4th century BC (Kantharodai) to the late 2nd/early 3rd century AD (Mantai). The lower boundary of our Rouletted assemblage is almost similar to those of ASW2 (Coningham et al. 2006:133, 159). While the origin and the chronology of Rouletted ware is being debated, their distribution from Berenike in the west (Tomber and Begley 1999) to Bali (Ardika et al. 1993) in the east provides ample evidence for pre-Periplus maritime trade in the Indian Ocean. Sri Lanka was part of this network.

Our GWF wares are a single ware group with diverse fabrics, firing, and decorations and wares such as TTGW seem to be local imitations. This contrasts with Ford et al.'s (2005:918) claim that the Fine Wares (GWF) were made 'with a consistent fabric' from *ca.* 500 BC to AD 200

and there probably existed a 'single long-running major production centre'. While our inferences about possible local imitation of GWF were made completely independently, there appear to be similar finds at other sites, such as Tissamaharama (Schenk 2001:94), and at Sembiran/Pacung in Bali, Batujaya on Java (Calo et al. in press:8, Figure 5; Bouvet 2012:285, Figure 107, 6; both cited in Schenk 2014:114).

The distributions of GWF and Rouletted wares are particularly useful for tracing early trade routes. They are closely associated with these routes and the locations of Buddhist sites and therefore, argued as being tied to the spread of Buddhism (Schenk 2014:113), which was always patronized by traders. Buddhist monks have often been associated with maritime trade and Chinese pilgrim monks who journeyed to and via Sri Lanka travelled in merchant vessels. Sea-going vessels are depicted on many Buddhist sites from the 2nd century BC (Ray 2007:60); Duvegala, in Sri Lanka is one such example (Gunawardena 2003:18). GWF wares, such as NBPW, could have arrived as Buddhist ritual wares, while others were traded as luxuries. They link Sri Lanka with the wider Indian Ocean Rouletted ware networks from the middle of 1st millennium BC.

REPO and Western Indian connections

Although REPO ware are widely distributed within and outside India, origin is largely traced to Gujarat and Saurashtra in India (Orton 1991:46–81). They are found in small quantities at all the main urban sites in Sri Lanka and date to between the 1st and 4th or 7th centuries. At ASW2, REPO continued until AD 1100. Though REPO from a disturbed context at Kantharodai dates from the end of the 1st century, our REPO assemblage from all three sites seems to come from *ca.* the mid-3rd to the early/mid-8th or 9th century. Nevertheless, considering the date of

REPO from other sites and inscriptional evidence, connections with western India can certainly be traced to the beginning of the CE.

Routes of Indian wares to Sri Lanka

Schenk (2014:114) opines that 'Fine Grey Pottery' was distributed via the southern tip of the Indian subcontinent to other places. Historical sources such as *Seehalavatthuppakarana* indicate that Sri Lankan Buddhist pilgrims took routes along the eastern Indian coast to reach sacred places in northern/north-eastern India. *Tamralipti* and *Kaveripattanam* in India and *Mahatittha* and *Jambukolapatthana*/Kantharodai in Sri Lanka are the most frequently referred to ports in the Sri Lankan chronicles (Gunawardena 2003:17). The author's limited field survey at Alagankulam (India) revealed striking resemblance of beads and Rouletted sherds to those of Mantai and Kantharodai. The presence of a community of Sri Lankan origin who claim historic trading connections with Sri Lanka may portray Alagankulam as being one of the potential sites through which GWF reached the island (cf. Tomber 2007: 980).[106] Close connections between the Mauryan Empire and the Anuradhapura Kingdom, either via South Indian ports or directly through *Tramralipti* (Tamluk), are evident from the chronicles and the archaeological record. Therefore, while the earliest wares of the GWF (GREW and NBPW) might have reached the island via *Tamralipti*, South India could be the source of later developed wares/forms.

5.4.2.2 Middle Eastern connections

While historical evidence for Sri Lanka's connections with Middle East predate the CE, the earliest ceramics in our Mantai assemblage date from *ca.* the early/mid-3rd century.

[106] Alagankulam is considered as a transhipment point for TORP to the island as well (Tomber 2007: 980).

Comparatively large quantities of Middle Eastern ceramics for early connections are reported from interior sites such as Anuradhapura. By around the 5th/ 6th centuries, the Sassanians began to control maritime trade (Whitehouse and Williamson 1973:43–45). It is also in the 5th century that Sri Lanka established contacts with the Sassanian Empire (Weerakkody 1997: Dewaraja 2003). By the 6th century, the island became the centre of east–west maritime trade in the Indian Ocean (Cosmas XI.15–16) and Persians were strong partners in Sri Lanka's external trade. Middle Eastern ceramics before the mid-3rd and early 7th century in our assemblages are limited and largely confined to large storage/transport wares. A few TORP sherds in Phases III and early IV at Mantai may belong to the late Sassanian period as Sassanian ceramics are also found in Anuradhapura (Coningham and Batt 1999:129).[107] Middle Eastern ceramics, both table and storage forms, gradually increased and were widespread from *ca.* early/mid-7th century, coinciding with the rise of Islam. The earliest Middle Eastern ceramics at Kirinda appeared during this period. Extensive trade and diplomatic relations between Sri Lanka and the Middle East were established after the 9th century. This is corroborated by the profusion of Middle Eastern wares at Mantai and other coastal and interior sites. YGRAF, MONOLUS, PIW, IWW, POLYCHROM SPLASH, and LIM, which are datable from the 11th to the 14th or 15th centuries account for little over 11.5% of the total Middle Eastern assemblage. Thus, trade relations were maintained beyond the presumed demise of Mantai after the Chola attack.

Our Middle Eastern assemblage is comprised of both glazed and unglazed wares. Alkaline, the largest of the glazed category, dates from the late Sassanian or Early Islamic period onwards.

[107] ASW2 (Anuradhapura) also includes potentially Parthian ceramics (Seely et al. 2006:99). It is almost certain that they were imported through Mantai and therefore the finding of Parthian ceramics at Mantai is not surprising.

The OGW, the other glazed category, post-dates the 8th century and coincides with the intensification of Islamic trade. All glazed wares are tablewares. The unglazed wares, the largest category of Middle Eastern wares, are large transport/storage wares.

The origin of Torpedo (TORP and PATO) wares is traced to Mesopotamia (Kennet 2004:85 and Tomber 2007:973) and their bitumen to Susa in Iran (Stern et al. 2008:224). Considering this evidence and historical sources, trade-exchange relations seem to have been established between Middle East, South India and Sri Lanka from the late Parthian period onwards (Cosmas XI.15–16; Tomber 2007:973–974). While some of these might have been transhipped from South Indian port sites such as Pattanam and Alagankulam to Sri Lanka (Tomber 2007:980), it is highly unlikely that the all TORPs and other Middle Eastern ceramics recovered on the island came via South India. Historical evidence (Chapter 7.3.5) indicates direct contact between the Middle East and Sri Lanka. The origin of later Middle Eastern wares, such as LIM and LISV, are traced to Bahrain and Iran, respectively (Kennet 2004:78–79); they indicate the continuation of these exchanges. Thus, the Middle Eastern assemblages illustrate extensive trade-exchange relations between the Middle East and Sri Lanka from the middle of the first millennium BC to about the 12th/13th centuries. The Intensity of trade might not have remained the same throughout. There might have been periods when there was little or no trade at all through northern ports due to Indian attacks. Such breaks, however, cannot be identified in our assemblages. Quantitatively, Middle Eastern assemblages from both Mantai and Kirinda are significantly larger than the Chinese assemblages, indicating stronger trade-exchange connections with the former, in contrast to the connections apparent from Chinese and Sri Lankan texts.

5.4.2.3 Chinese connections

Material evidence for Sino-Lankan relations dating to the early centuries of the CE is not found in Sri Lanka; the only possible exception being the piece of Chinese silk from Dedigama Kotavehera, which dates to the 2nd century (Chapter 7.2.4.2). While Chinese ceramics are widely found at port and interior urban/religious sites, no assemblage seems to pre-date the Tang dynasty. Almost our entire Chinese assemblage comes from Mantai. Other than a few sherds that are considered intrusive/mixed in the early phases, our Chinese assemblage also dates from the Tang period onwards. This coincides with the strong Sino-Lankan connections visible from texts and the rise of Islam/Islamic maritime trade in the Indian Ocean.

The historical conclusion that Sino-Sri Lankan relations declined after the 8th century (Wickramasinghe 1960) and that Mantai completely collapsed after the Chola attack (Carswell et al. 2013) is at variance with our Chinese assemblage, whichrapidly increased from the 8th to the 10th century and continued up to the 12th/13th century. Similarly, 13% of the total Chinese sherds at Mantai belong to Xing, Ding, WWS, GDC1 and GDC2, and SSC1 and SSC2 dated to the 11th century, or later periods up to the 13th century. While Prickett-Fernando (1994:302) considered most of the Mantai Chinese assemblage to predate the 11th century, she (Ibid.: 308) also records Northern celadons (Xing and Guangdong), which she assigned to the 13th century. Huge quantities of Song Dynasty period materials have been recorded from Polonnaruwa and Yapahuwa (Prematilleke 2003). This indicates that while Mantai still continued to operate as an international port, new trade routes linking SEA/China and eastern, southern, and Southeastern coasts in Sri Lanka gained significance after the 11th century.

The Chinese assemblage is comprised of both storage/transport vessels and tablewares. The main wares in both categories are among the most widely traded Chinese wares in maritime trade; Sri Lanka, and Mantai in particular, was a main partner in this trade network. Chinese wares link Sri Lanka directly or indirectly with both southern (XING and DING) and northern (Yue ware) regions in China.

5.4.2.4 Southeast Asian (SEA) connections

Our ceramic analysis sheds new light on rather patchy historical and material evidence regarding the Sri Lanka's interaction with SEA. Epigraphic and textual evidence suggest that these interactions date from the last centuries before the CE. They became more regular from *ca.* the 5th century and intensified only after the 7th century, as testified by the Sri Lankan missions sent to China, the travel accounts of Buddhist pilgrims, epigraphic and iconographic evidence. Other than a few sherds identified as SEA from Tissamaharama dated to the 4th/5th century, no SEA ceramics in the island seem to predate the 7th century. Our Kirinda SEA assemblage also dates from *ca.* the early 6th/7th century to the early 8th century. A few sherds in our Mantai SEA assemblage date from late 1st century. Even there, the large occurrence of SEA wares post-dates the 7th century andcontinued up to the 12th/13th century. This last phase coincides with historically known trade/military relations with Burma (Kiribamune 2013). The surface treatments identified as being SEA in our assemblage have parallels in India and the SEA region. Our ceramic analysis provides new archaeological evidence for Sri Lanka–SEA relations during the early centuries, as reflected in the historical records.

5.4.2.5 Connections with yet-unknown overseas regions

The 'Imp.Unk' assemblage highlights gaps in our understanding of imported ceramics in Sri Lanka and that of the island's external trade relations. The earliest 'Imp.Unk' ceramics at Kantharodai date from *ca.* the mid-4th/late 3rd century BC. Their volume increased, in terms of both sherd and ware counts, from *ca.* the 1st century, as is clear from Mantai. Several wares which are present across many phases and are comparatively large in number might indicate regular contacts, while the majority, found in a few phases and in small quantities, reflect short-lived interactions with other regions, as in the 'Imp.Unk' assemblage, which occurs across the sequence at Mantai. Despite having the largest quantity of 'Imp.Unk' sherds, the Kirinda assemblage is confined to a few wares, indicating the limited external interactions that it had.

Since all 'Imp.Unk' are unglazed, their origin is unlikely to be Chinese as our entire Chinese assemblage is glazed. Since Kantharodai's connections were primarily confined in India and possibly to SEA, 'Imp.Unk' wares could have come from either region. Some wares, such as VETE, VTLRW, and LIME in the Mantai assemblage might be of Middle Eastern origin; the rest could have come from South Asia and SEA. Confirmation, however, requires further analysis. The origin of some 'Imp.Unk' wares such as PIOW, MTIW and POW have already been identified as possibly from SEA as a result of our surface treatment analysis.

Our 'Imp.Unk' and imported assemblages, excluding Indian wares, are comprised of both table/decorative wares and storage/transport wares. While the small quantity of the former category could have arrived as gifts and religious offerings, the majority were no doubt imported for the use of the elite. Aside from small storage vessels that could have been used

for domestic storage, all of the large transport wares could have arrived as container wares. While the sherd count might be slightly affected by brokenness due to the size of cargo wares, they are the largest quantity of our non-local assemblage. The arrival of these wares from *ca.* the middle of the first millennium BC marks the arrival of large cargoes on the island.

The main imported wares discussed in this thesis have parallel finds spread across the Indian Ocean and help to establish possible provenances and trade-exchange networks. While our ceramic analysis confirms some historical narratives and established historical scholarship in certain cases, it contrasts and challenges both in others. The Middle Eastern assemblage illustrates much stronger and early relations with the Middle East than are depicted in local historical sources, whereas, there is very little ceramic evidence for the early Sino-Lankan relations cited in texts. Moreover, ceramic evidence stands in contrast to the historical texts and those historians who stress a decline in Sino-Lankan relations after the 8th century. On the contrary, ceramics support the case for increasing relations between the two countries but changing or expanding trade routes linking ports in eastern, Southeastern, and southern Sri Lanka. Mantai, which was the premier port until the end of the 10th or even the middle of the 11th century, faced competition from new ports due to changing patterns of Indian Ocean trade, not merely because of the Chola attack. Our ceramic analysis also highlights the potential for ceramics to fill the gap that exists between the archaeological record and the historical evidence for Sri Lankan–SEA relations. New approaches and scientific analysis of ceramics are needed to comprehend those wares categorized as ‘Ind/SL’ and ‘Imp.Unk’ in our assemblage.

CHAPTER 6

CONTEXTUALIZING CONTACTS THROUGH BEADS, AND OTHER NON-CERAMIC ARTEFACTUAL EVIDENCE

6.1 Introduction

A considerable amount of non-ceramic material was recovered from Mantai, Kantharodai and Kirinda. Quantitatively, beads are the second most abundant type of find, while the bangle industry also flourished at Mantai. These two types of artefacts appear to have been major exports for nearly two millennia. Meanwhile, exotic items such as gems, pearl and red coral are historically important and were traded/exchanged in pre-modern Sri Lanka. Nevertheless, they are yet to be adequately evaluated from an archaeological perspective to establish the island's external connections. Likewise, there existed a number of local products (e.g., iron/steel production), which were crucial to the economy and external connections but are inadequately incorporated into the economic history of the island.

These local products are extremely important for establishing Sri Lankan agency in maritime trade and connectivity. This chapter, therefore, establishes the significance of these industries, as well as red coral/pearl exchange networks, and inserts them into a wider trading narrative based on a sample selected from our excavations cited above.

6.2 Beads and connections

Beads were made, used and traded across great distances since at least 2000 BC (Francis 2002:3) and are found on a wide variety of sites across the Old World. They provide a distinctive perspective on the socio-economic structures of the past (Rumrill 1991; Karklins 1985). Like beads, bead workers travelled and lived in different places, highlighting regional

exchange networks. The archaeological distribution of beads, therefore, may reveal the routes and mechanisms by which both beads and bead workers moved as well as the transfer of technologies, although techno-typological similarities do not necessarily reflect the movement of people. Beads also indicate cultural practices such as customs of personal beautification and rituals.

6.3 Total bead assemblage

The 'Grand Total Bead Assemblage' (GTBA) from Mantai, Kantharodai and Kirinda comprises of 2247 items. Of these, synthetic beads account for 81% of the assemblage, of which 98% are glass. The only other numerically significant category for quantitative analyses is stone beads (12%) (Table 6.1). Both synthetic and stone beads have adequate parallel occurrences within and outside Sri Lanka, making comparisons and establishing connections possible.

Table 6.1: Medium of beads across sites (% from GTBA)

Sites	Synthetic		Organic	Stone	Metal	Other	Total
	Glass	Other					
Mantai	1235	37	61	238	1	8	1580
	54.96	1.65	2.71	10.59	0.04	0.36	70.32
Kantharodai	178	1	1	28		12	220
	7.92	0.04	0.04	1.25		0.53	9.79
Kirinda	360		75	4	1	7	447
	16.02		3.34	0.18	0.04	0.31	19.89
GTBA	1773	38	137	270	2	27	2247
	78.91	1.69	6.10	12.02	0.09	1.20	100.00

6.4 Glass Bead Assemblage (GBA)

Glass beads are one of the most common finds across many Indian Ocean sites, and have been widely discussed since the early 20th century (e.g., Beck 1928). Due to its inherent qualities (durability, ubiquity, variability and flexibility), glass has been the most desired material for making beads and bangles throughout history (Francis 1990:1; Kanungo 2004:123). Although there exists a general understanding of the geographical distribution of glass beads, their

chronological occurrence across sites remains unresolved due to a lack of stratigraphic clarity, and reliable scientific dates. Moreover, most previous studies are site-specific, and only a few have attempted regional and inter-regional comparisons (Abraham 2013). Consequently, throughout this study—in addition to quantitative details—special emphasis is placed on assessing both the geographical and chronological distribution of beads more broadly.

6.4.1 Sources of glass for our bead assemblage

Glass beads, with 79%, dominate the assemblages from Mantai, Kantharodai and Kirinda (Table 6.1). From a total glass bead assemblage (GBA) of 1773 items from the three sites, 52% were production debris, suggesting on-site glass bead manufacture. The percentage of glass bead production debris both at Mantai and Kirinda is over 57%, whereas at Kantharodai this accounts for only 2%, suggesting perhaps that unlike the other two locations, glass beads were not made there (Table 6.2).

Table 6.2: Glass bead evidence of production (% from GBA of each site)

Finishing	Mantai	Kantharodai	Kirinda	Total
Finished	350	174	113	637
%	28.34	97.75	31.39	35.93
Production debris	706	2	208	916
%	57.17	1.12	57.78	51.66
Unknown	179	2	39	220
%	14.49	1.12	10.83	12.41
Total Glass beads	1235	178	360	1773
%	100	100	100	100

The scale of glass bead production visible at sites such as Mantai required an enormous quantity of glass. While there is indirect evidence for glass production and the possible re-melting of glass from elsewhere at Mantai (below), it is almost certain that glass production existed elsewhere in the country. Since glass making is a more complex process than that of bead making, glass-making centres were likely to have been less prevalent than their bead-

producing counterparts (Wood 2000:78). Accordingly, glass was likely often transported across great distances and the identification of glass-making locations has the potential to provide insights into trade-exchange networks.

Furnaces with vitrified linings and blocks of raw glass have been found at Giribawa (Bopearachchi 2002). However, Giribawa alone was unlikely to have been capable of supplying all of the glass required for the glass bead industry. Except for a single suspected example at Mantai, our investigations at all three sites did not reveal any convincing evidence for furnaces for glass making. It is possible, however, that a glass production existed at the vicinity of Kirinda (Thantilage 2014 pers.comm.). Ample indirect evidence for glass production is also available at Mantai. Glass slag and production debris were found throughout our excavations at the site and on the surface. Based on the recovery of glass chunks, splatters and wasters, as well as raw glass chunks of red, orange, blue and green glass, Francis (2013a:362) also inferred possible glass production at Mantai.

Similarly, Carboni (2013:313–348) studied glass objects from Mantai and suggested that they could have been cullet/broken glass originating from Iraq/Siraf and meant for trade in Southeast Asia and China. Cullet was low priced and could be easily melted for making glass. If cullet was being transhipped via Mantai, it could also have been processed there.

The possibility of glass being imported to Sri Lanka is inferred from the glass ingots recovered from the Godavaya shipwreck off Tissamaharama (Lankton 2011), which has been identified as being of Indian origin (Gaur et al. 2011:9–17; Mutukumarana et al. 2014). Based on the similarity of production debris relating to the making of IPB glass beads at Mantai and

Arikamedu (South India), Francis (2002, 2013a) suggested that Arikamedu bead workers may have travelled to work in Mantai. If such a migration took place, the knowledge of glass production technology could have been transferred to local workers and glass could have been produced locally.

Thus, multiple sources could have supplied glass to the bead/bangle production in Sri Lanka, indicating complex trade-exchange networks within and with the outside world at least since the latter part of the first millennium BC (Figure 6.1).

6.4.2 Total Glass Bead Assemblage (TGBA)[108]

Glass beads dominate the assemblages from all three sites, including Kantharodai, which declined before the commencement of the CE. The distribution of glass beads across the Mantai sequence was discussed in Chapter 4 and Tables 6.3 and 6.4 provide their occurrence at Kantharodai and Kirinda.

Table 6.3: KTD Glass beads across phases (% from TBA phase total)

Material	IV	V	VII	Total
Glass	7	1	171	179
%	70	100	81.82	81.36
TBA	**10**	**1**	**209**	**220**

Table 6.4: KR 3 Glass bead distribution across phases (% from TBA phase total)

	IA	IB	IC	II	III	Total
GLASS	7	30	35	198	90	360
%	87.5	75	87.5	87.22	68.18	80.54
TBA	**8**	**40**	**40**	**227**	**132**	**447**

[108] From all three sites studied.

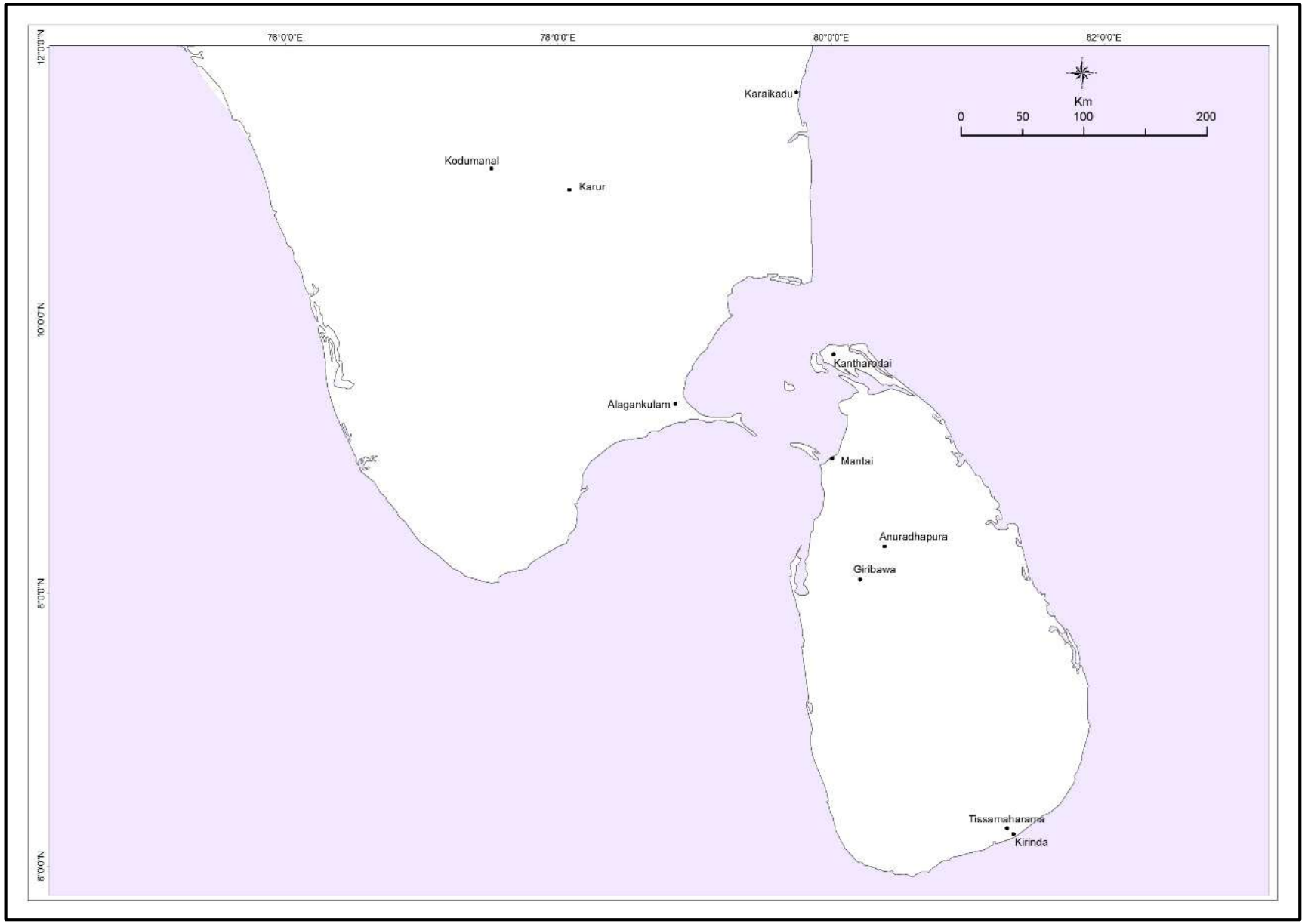


Figure 6.1: Location of main sites in Sri Lanka and South India mentioned in the chapter

Local glass beads account for 92.7% of the TGBA and only 2.4% were imported (Table 6.5), which demonstrates the magnitude of local glass bead production. Of the imported glass beads, nearly 81% (34) of them are from Mantai, with only limited numbers of imports at Kirinda (6, 14.3%) and Kantharodai (2, 4.8%). This clearly illustrates that Mantai was the main glass bead production centre of the three sites considered here and the key seaport for international trade.

Table 6.5: Glass bead origins across sites (% from GBA)

Origin	Mantai	Kantharodai	Kirinda	Total
Sri Lanka	1119	170	354	1643
%	90.61	95.51	98.33	92.67
Unknown	82	6	-	88
%	6.64	3.37		4.96
Imported	34	2	6	42
%	2.75	1.12	1.67	2.37
Total	1235	178	360	1773
%	100	100	100	100

The provenance/origins of the beads recovered from all three sites are given in figures 6.2, 6.3 and 6.4 and are discussed separately. Mantai has the most diversified assemblage with regards to the possible provenance of beads–particularly after Phase VII–which coincides with the peak of international trade at the port.

6.4.3 Local (Sri Lankan) glass bead assemblage (GBA)

At the three sites studied, 'Indo-Pacific Beads' (IPB; 74%), disc (13%) and *stupa* (0.1%)[109] beads collectively account for 87% of the Sri Lankan GBA and 81% of the total GBA (Figure 6.5, 6.6 and 6.7; C6.1.3a&b). They are also the most significant local bead varieties and illustrate trade-exchange networks. Consequently, the local glass bead discussion is based on them.

[109] Included due to their historical significance.

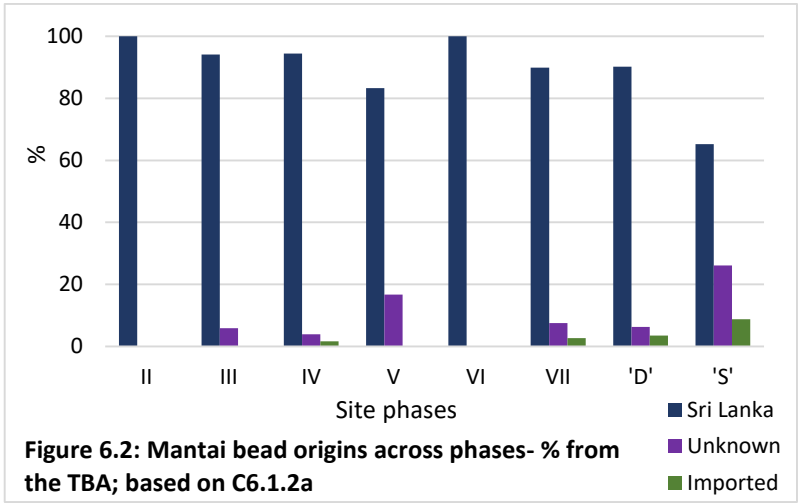


Figure 6.2: Mantai bead origins across phases- % from the TBA; based on C6.1.2a

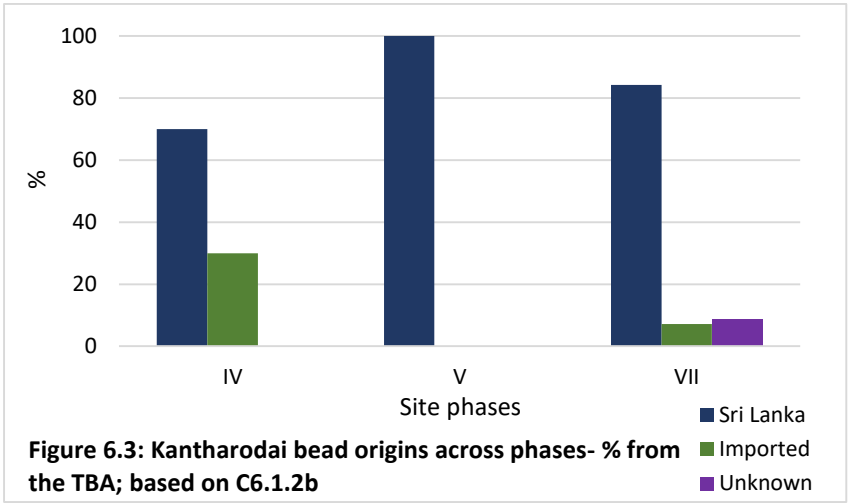


Figure 6.3: Kantharodai bead origins across phases- % from the TBA; based on C6.1.2b

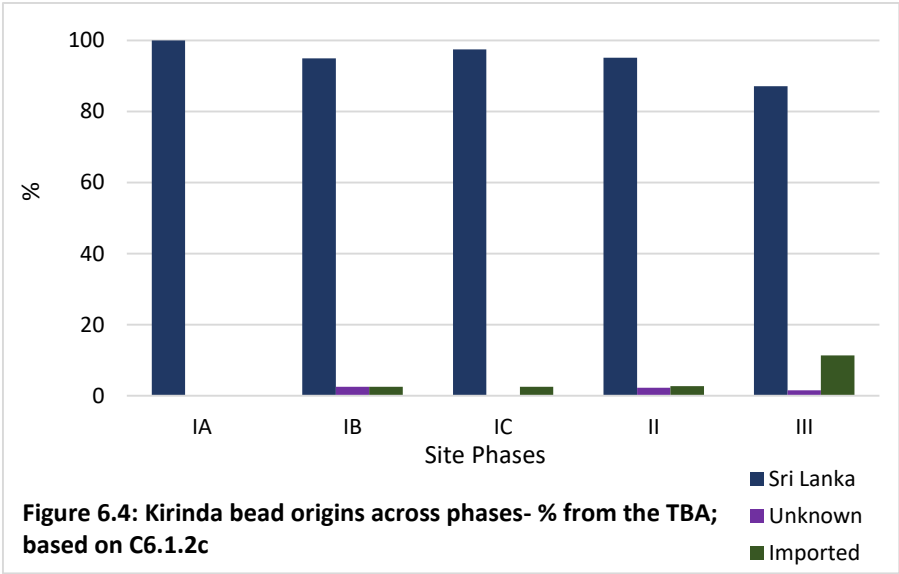


Figure 6.4: Kirinda bead origins across phases- % from the TBA; based on C6.1.2c

The occurrence of Sri Lankan beads at Kantharodai and Kirinda is illustrated in Figures 6.6 and 6.7 (see Chapter 4.10.1 for Mantai). The near absence of IPB and the predominace of disc beads at Kantharodai is noteworthy. In contrast, IPBs dominate the local GBA at Mantai and at Kirinda where they were considered to have been produced.

6.4.3.1 Indo-Pacific bead assemblage (IPB)

IPBs are cut out of drawn glass tubes[110], with rounded ends caused by re-heating. They are monochrome and made in a limited range of colours, with various shades; their glass composition also varies (Francis 2002:19, 362; Wood 2000:85). At Papanaidupet, Andhra Pradesh, India, Francis (1989b:2–4) observed the continuation of the same drawn bead technology used for making IPBs at Arikamedu, which led to him concluding that IPBs were first made there. Beck (1930:176–178) was the first to report these beads at a number of sites in Southeast Asia, South India, East Africa and South Africa, following which there have been a number of attempts to analyse them (Sleen 1956:95; 1958:208-212; 1973:76-82 Lamb (1965). The majority of the beads in these studies comprise what Francis (1989:4; 2002:19–20) termed 'Indo-pacific beads' (IPB)[111] and found at sites across the Indian Ocean, in particular in South and Southeast Asia. The simple technology used for their manufacture made it possible to mass-produce IPBs at low cost (Horton 1996:328). These simple beads, when arranged in combinations of various colours and types in items such as necklaces, would have increased their value and meaning across cultures (Abraham 2013).

[110] Drawn techniques are widely discussed and see for example; Harris & Harris 1967:135; Kidd & Kidd 1970:50; Horton 1996:328; Basa 1991:145; Sprague 1985:85-87; Kanungo 2004:128, and more specifically Francis 2013b:362.

[111] 'Indo-Pacific Monochrome Drawn Glass Beads' (Francis 2002:223

6.4.3.2 IPB in our assemblage

The IPB assemblage from the three sites comprises of 1,216 beads (C6.1.3a&b). This accounts for 69% of the TGBA. This accords with the general pattern in almost all glass bead assemblages from Sri Lankan sites, although at many sites IPBs are categorised according to their forms, such as oblates and cylinders. Having discussed the Mantai bead assemblage in Chapter 4, in this chapter only the key points are recapped to identify the patterns that emerge and to identify IPB trade networks.

Mantai IPB assemblage

Of the three sites studied, Mantai has the largest IPB assemblage and longest lasting tradition (See Chapter 4). With 936 beads (59%), IPB are the main type recovered (Table 4.2) and occur from Phase II to the 'Surface' (2nd century BC -12th/13th century AD), indicating the longevity of production. More than 60% of the assemblage comprised of half-processed beads and wasters, demonstrating on-site production.

IPB production at Mantai was standardized and increased in the mid-3rd century (Phase IV). It further flourished from *ca.* the early/mid-8th century (Phase VI), with the highest concentration of IPB beads occurring after the 8th/9th century (Phase VII), which corresponds with the peak of the east–west trade in the Indian Ocean and at Mantai.

The standardization in producing a few artefacts/bead types over a period of time reflects craft specialization (Chapter 4.10.2.2).[112] Mantai's IPB assemblage clearly demonstrates signs

[112] See also Kenoyer (1989; 1991a; 1995; and 2000) and Kenoyer et al. (1991) on model of craft specialization and social stratification.

of specialization in the production of a limited range of bead types from the mid-3rd century onwards. 95% are regular rounded beads, with the assemblage being dominated by the oblate (51%) and cylinder (41%) classes, which account for more than 92% of the IPB assemblage. Disregarding fragments, all the remaining bead classes comprise less than 3% of the total IPBs. A similar selectiveness is also visible in colour, surface lustre and diaphaneity of the beads.

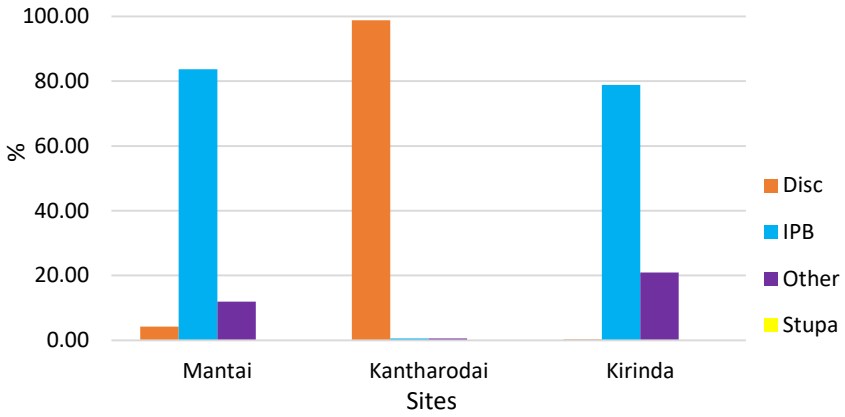


Figure 6.5: Main local glass bead types across Mantai, Kantharodai, and Kirinda- % from the TBA; based on C6.1.3a

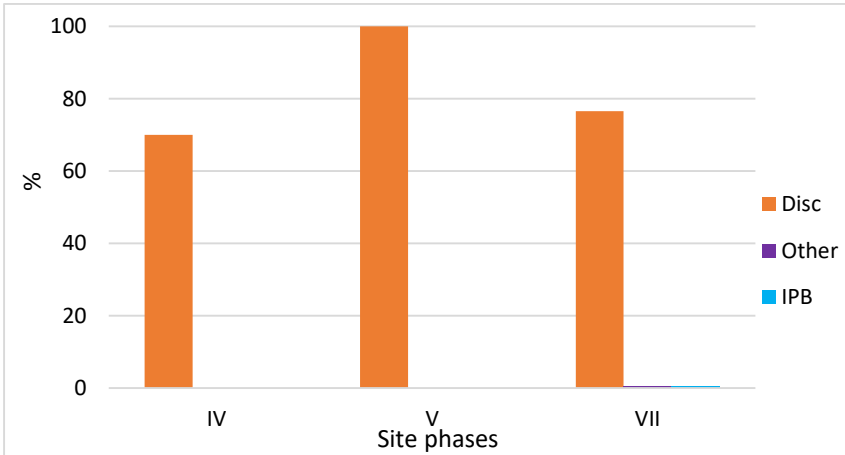


Figure 6.6: Kantharodai main local glass bead types across phases- % from the TBA; based on C6.1.4a

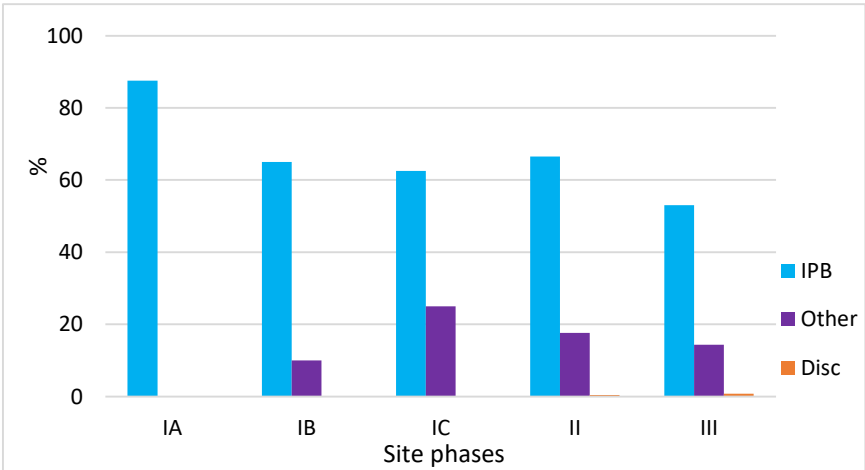


Figure 6.7. Kirinda main local glass bead types across phases- % from the TBA; based on C6.1.4b

The Mantai IPB assemblage is dominated by red (34%) and blue (31%) beads, which account for 65% of the total IPBs and occur consistently from Phase II to the 'Surface'. Green (18.5%) and yellow (12.7%) are the next most prominent colours, which have a similar chronological distribution to those of red and blue, although yellow was only introduced in Phase III along with black (2.9%), white (0.3%) and transparent (0.1%).

The quality of the surface lustre indicates the level of technological advancement and specialization of glass bead production. 83.5% of Mantai IPBs are shiny and 2.4% are very shiny. Only 13.5% of the beads have dull surfaces, thus high surface lustre is the most striking feature of the Mantai IPBs. With regards to their diaphaneity, the IPBs – and the glass beads in general – are predominantly translucent (58%) and opaque (40.5%). Only 1.5% of the IPBs are transparent. These morphological features are useful signatures that can be used for comparing assemblages.

Thus, it is clear that the bead workers at Mantai specialized in the production of a few selected bead types with limited forms, with a preference for a few colours and a high degree of surface lustre. The same high standards were maintained throughout the period of glass bead production, which was likely driven by the market demands of the maritime bead trade. Mantai was a key IPB-production centre for exports, a position that it retained for well over a millennium.

Kantharodai IPB assemblage

Occupation at Kantharodai came to an end before the widespread production of IPBs in Sri Lanka . The Kantharodai bead assemblage consequently contained only a single IPB from the

upper disturbed levels (early to mid-1st century BC; Figure 6.6). Furthermore, nearly 98% of the assemblage comprises of finished beads, demonstrating that Kantharodai was not a production site. Nevertheless, its material culture alongside historical records (*Mv.*19) illustrates Kantharodai's connectivity with India and Anuradhapura. Consequently, it was perhaps not a lack of access to IPB's that underlies their absence from Kantharodai but cultural choice as over 94% of the GBA comprises of disc beads, which indicates a clear preference for that particular type of bead over others (C6.1.3b).

Kirinda IPB assemblage

279 IPBs, 77.5% of the GBA, were recovered from Kirinda dating from the late 3rd to the early 8th century (Figure 6.7). Their frequency increases through the stratigraphic sequence. 27.6% are finished beads, while 63.4% are half-finished (58.8%) and wasters (4.7%; Figure 6.8), demonstrating like Mantai evidence for local production. Unlike Mantai, however, (Catalogue 7.2-Kirinda3), it does not appear to have operated as a major trading port, but rather as a regional fishing harbour, as is evident from the recovery of a large quantity of fishing hooks.

The Kirinda IPB assemblage shows a high level of standardization with 95% regular rounded beads and cylinders (144, 51.6%) and oblates (111, 39.8%) being the dominant bead classes. This is in contrast to the pattern at Mantai (Figure 6.9) where oblates dominate the assemblage. The range of bead colours at Kirinda is more restricted than those at Mantai (Figure 6.10), although red is by far the most preferred colour at both sites. The percentage of red beads at Kirinda, however, is 82.8% (231) compared to 34.2% at Mantai. As at Mantai, blue (7.9%) and green (6.4%) are the next most preferred bead colours at Kirinda, but at

Mantai blue accounted for 31.3% while green represented 18.5% of the IPB. All of these colours occur across the Kirinda sequence.

If surface lustre is taken as evidence for the quality of glass/IPB bead production, then the Kirinda IPB assemblage is technologically less advanced than that found at Mantai. IPBs with a shiny surface, the most dominant type, account for 75.6% at Kirinda and occur across the sequence (Figure 6.11) compared to 83.5% at Mantai. The percentage of very shiny surfaced beads is less at Kirinda (0.36%) than Mantai (2.35%), where the opposite is observed with regards to the dull lustre surfaced beads. At Kirinda, they account for 21.5% as compared to 13.5% at Mantai.

The diaphaneity of beads reflects the quality of glass, the technology employed in glass production and even the cultural choices of consumers. At Kirinda 85% of the IPBs are opaque. The absence of transparent IPBs and the limited number of translucent specimens (15%) illustrate that the source of glass/IPBs at Kirinda were different to those at Mantai.

These patterns suggest that while IPB production at Kirinda was also a specialized and standardized craft industry, it was; however, technologically less advanced than that at Mantai and as a regional fishing port, rather than as an export centre, it catered to a different clientele.

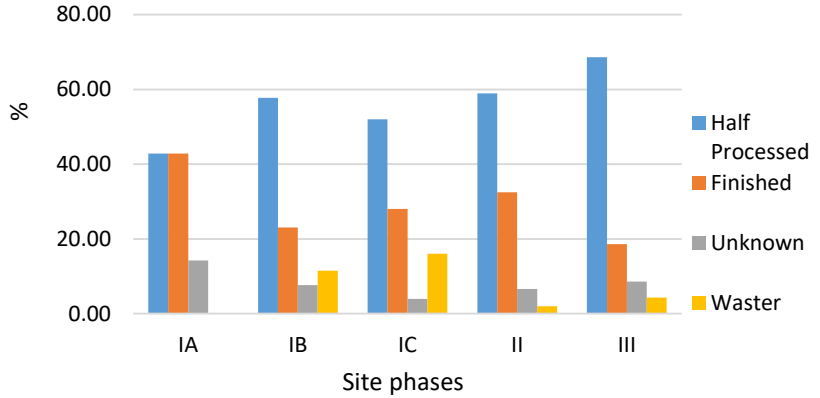


Figure 6.8. Kirinda IBP finishing across Phases- % from IPB phase total; based on C6.1.5a

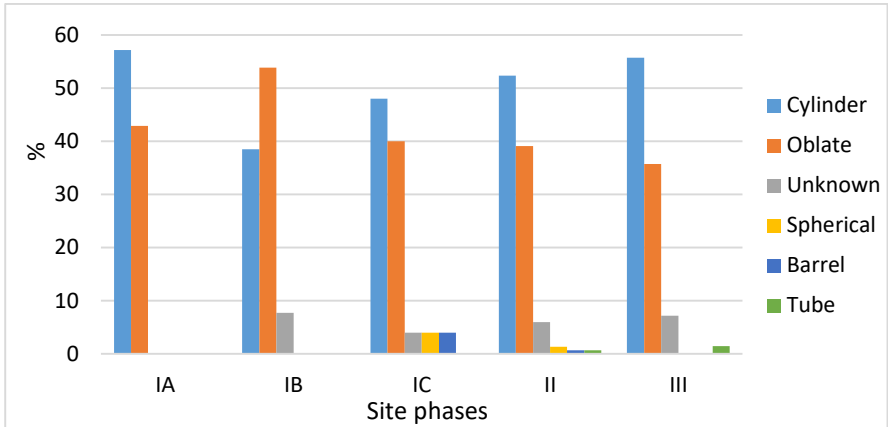


Figure 6.9: Kirinda IPB bead classes across phases - % from KR3 IPB phase assemblage; based on C6.1.5b

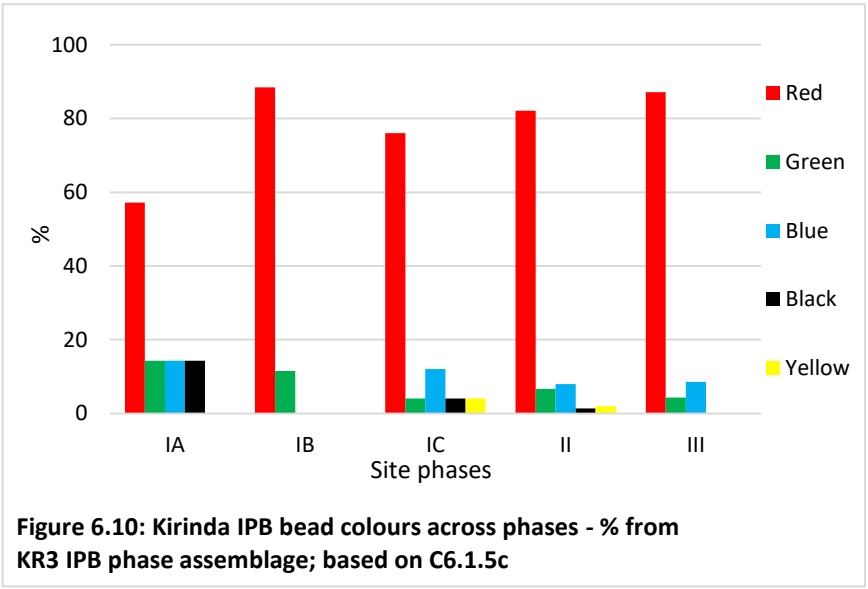


Figure 6.10: Kirinda IPB bead colours across phases - % from KR3 IPB phase assemblage; based on C6.1.5c

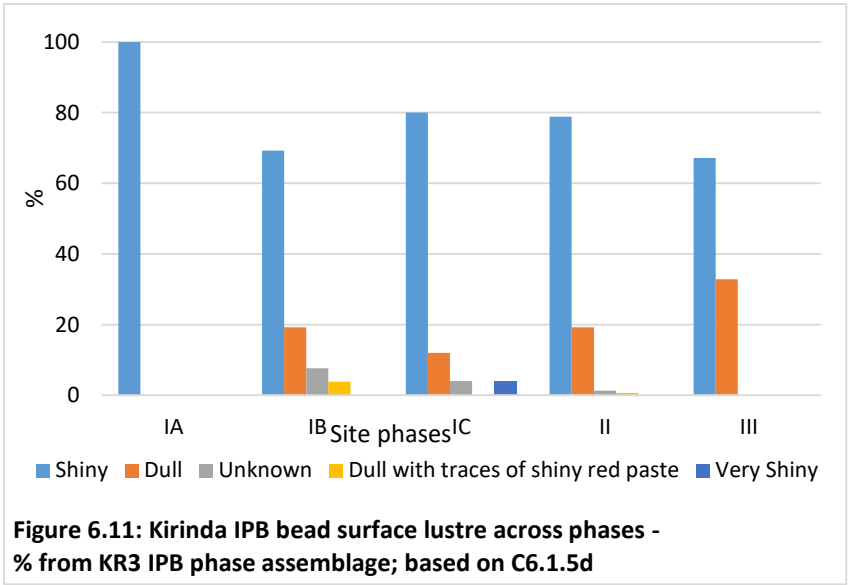


Figure 6.11: Kirinda IPB bead surface lustre across phases - % from KR3 IPB phase assemblage; based on C6.1.5d

6.4.3.3 IPB production in other Sri Lankan sites

Although IPBs are generally categorised based on their form at many sites in Sri Lanka – and do not provide clear quantitative data – they are compared with those from my study in order to establish the existence of possible trade networks. While having distinctive individual characters, the IPB industries across sites in Sri Lanka are generally similar in their typology and technology. They overlap chronologically and collectively date from *ca*. the 4th century BC to the 12th/13th century AD, sharing a continuing tradition. Since the Anuradhapura and Tissamaharama assemblages are reported in detail, emphasis is given to them.

Anuradhapura

The earliest beads recovered from ASW2 are "drawn monochrome glass beads of South Indian tradition (IPBs) dating to *ca.* 400 BC" (Coningham 2006:357). Since production debris was not found in the earliest levels, these beads are considered as imports. They predate those at Arikamedu, where production began *ca.* the 3rd century BC (Francis 1991b:35, 2013a:362), prompting Coningham (2006:357) to suggest that the 'drawn monochrome glass beads' were produced at other places predating Arikamedu. At ASW2, 'sectioned and unperforated beads', 'glass ingots' and 'unformed glass fragments' are found after the 1st century, which is taken as evidence for the production of glass objects close to the excavation. Coningham (2006:353) records that 'drawn monochrome glass beads' are the most prominent and generally the earliest (from *ca.* 1st century) of the stratified bead assemblage at ASW2.

Tissamaharama

At Tissamaharama, 'monochrome drawn glass beads' (IPBs) are reported 'in great numbers throughout all phases of settlement' (Hannibal-Deraniyagala 2001:204). More than 70% of the

glass beads from the Akurugoda site are reported as 'produced from drawn glass rods' (Ibid.:206), although it is difficult to know if all of them qualify as IPBs. These beads date from the early historic period up to the 8th/9th century AD (Hannibal-Deraniyagala 2013:370).

6.4.3.4 Distribution of IPB and trade- exchange networks

Although, Arikamedu, where IPBs occur from *ca.* 250 BC, is considered to be the original centre of IPB production (Francis 1986; 2013a:362), IPBs at ASW2 predate them with examples from 400 BC (Coningham 2006:357). Hannibal-Deraniyagala (2001:204) suggests that IPBs were produced in South Asia from the 4th century BC. While none of the sites I studied produced IPBs pre-dating the 2nd century BC, I agree with these authors and further suggest that both Anuradhapura and Mantai are potential sites for the early production of IPBs. The lack of evidence for the early production of IPBs reflects the limited sampling and the approaches adopted to analyse beads.

The distribution of IPBs in different regions is discussed below in order to establish possible inter-regional connections.

South Asia

In South Asia, India and Sri Lanka were the main producers of IPBs. Indian bead production sites include Ahichchatra, Kausambi, Arikamedu, Karaikadu, Pattanam, Papanaidupet, Kolhapur and Nevasa (Kanungo 2002:121, 2004:123–124), the majority of which made IPBs. Francis (1989:2) while proposing Arikamedu as the original place of IPB production (1990:5; 2002:36–37), also suggested that after the collapse of Arikamedu (end of the 3rd century BC), glass bead workers migrated to Mantai and Southeast Asia. Carswell (1983:85) mentioned that

after the demise of Mantai in the 10th century, the Mantai lapidary workers moved to Nagapattinam in India. Francis (1990:6, 2002:20, 2013a:363), however, found no evidence for 'glassmaking' at Nagapattinam. IPB production, nevertheless, continued in India at centres other than Arikamedu after the demise of Mantai (Francis 1989b; 1990).

Abraham (2013:247) studied 25 glass bead-producing sites in southern India. Of these, nine sites reported IPBs and five of these sites – Nagapattinam, Kaveripattinam, Alagankulam, Karaikadu and Arikamedu – are located along India's Southeastern coast, while the remaining site is Pattanam on the Malabar Coast. The best evidence for IPB production comes from Pattanam and Arikamedu and 80% of the total beads at Pattanam comprised IPBs (Abraham 2013:247). These sites, including Kaveripattinam, are relevant to this study because historical records (Chapter 7.3.4) indicate a strong connection between Sri Lanka and the Southeastern coast of India.

Similarly, the LA-ICP-MS analysis of beads from Mantai indicated that the two beads SMA005 and SMA013 belong to the soda-rich m-Na-Ca-Al glass, which is reported from Arikamedu and Phu Khao Thong in Thailand (Chapter 4.12). While the origin of this glass group remains undetermined (Dussubieux pers.comm. 2014; Catalogue 4.2), their distribution indicates trade-exchange connections between Southeast Asia and South Asia, including Sri Lanka.

Southeast Asia

Southeast Asia was one of the major consumers of imported IPBs, although evidence for local production also occurs in Thailand in particular (Bellina and Silapanth 2006; Abraham 2013:244). The IPB industry in Southeast Asia, and the system that circulated these beads

across the region, collapsed after the 11th/12th century. IPB production at all sites in Srivijaya ceased by end of the 11th century (Francis 2002:48). Takua Pa functioned only in the early 9th century, while Sungai Mas had stopped producing by 1100 (Ibid.). Although Francis (2002:31), based on Carswell (1983:85), considered that Mantai and its IPB production collapsed after the Chola attack in 993, our investigation suggests that Mantai and its production continued up to the 12th/13th century. This seems to suggest that the termination of IPB circulation in Southeast Asia may have coincided with the demise of Mantai.

Close cultural relations, based on Buddhism, developed between Sri Lanka and Southeast Asia during the Early Historic period. This is illustrated by the Ratubuka inscription in Central Indonesia, and finds of Sri Lankan-made *stupa* bead across the region (Chapter 7.3.4). These links accentuate the possibility that Sri Lankan-made IPBs reached Southeast Asia. Carter (2012:206) considered Sri Lanka as one of the possible sources of garnet in Southeast Asia. Similarly, Thailand is considered to have been one of possible sources of carnelian found on archaeological sites in Sri Lanka (Theunissen 2003: 98,100), while glass beads from Ankor have been sourced to Giribawa in the island (Dussibieux 2001). Thus, the trade and exchange of beads between Sri Lanka and Southeast Asia seem to have been commonplace.

Far-East

Large quantities of IPBs have been recovered from the eastern regions of the Old World, as far east as China, Korea and Japan (Francis 2002:46). Most of these have come from royal tombs, indicating their prestige value between the 3rd century BC and the 6th/7th century AD. Thousands of IPBs were recovered from the tombs of Han aristocrats in the southern Chinese

provinces of Guangdong and Annam. For example, over 5,000 blue and green IPBs were found in a single tomb in Annam (Janse 1947:51).

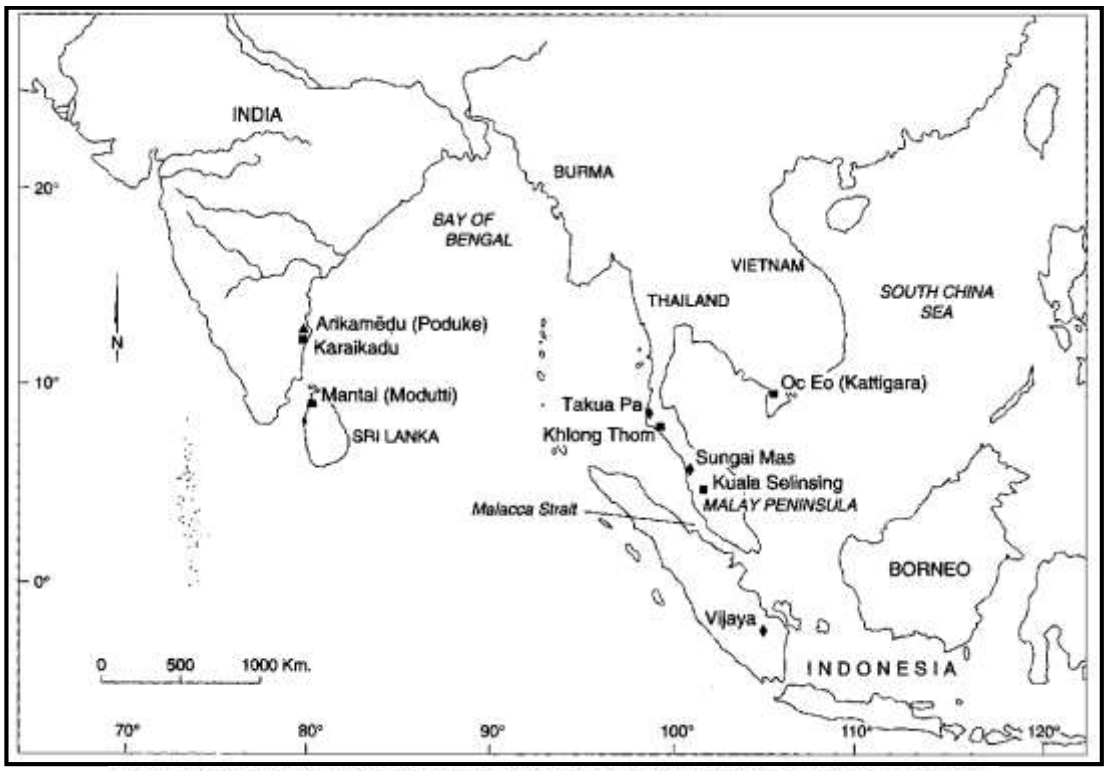


Figure 6.12: Distribution of Indo-Pacific beads in South Asia and Southeast Asia (Francis 2002:32; Fig. 4.1)

The provenance of Chinese and Far-Eastern beads has been attributed to India (Gupta 1999:13). Most of the IPBs in China are recorded from southern Chinese provinces, such as Guangdong, which may suggest their arrival by sea. Sri Lanka is one potential source of these beads, because it maintained close cultural contacts with southern China, as demonstrated by the large quantities of ceramics from the southern Chinese provinces found at Mantai (Chapters 5.3.3.8 and 7.3.4).

Western Indian Ocean region

Evidence for the circulation of IPBs in the western territories of the Indian Ocean is limited. The Roman port of Myos Hormos (Quseir al-Qadim) in Egypt (Whitcomb and Johnson 1979; 1980; 1981; Sidebotham 1991:22–35) has IPBs. Nevertheless, the largest finds of IPBs from

the Roman-controlled west were recorded at Berenike, on the Red Sea coast. IPBs accounted for only 4% of beads in the Early Roman levels, but this percentage increased dramatically to 41.4% (369) from the 4th to the 6th century (Sidebotham 1991:22–35). Based on bead colours, Francis (2001; 2002:48) provenanced these beads to Mantai, while Sidebotham (2011:238) suggested that more than half of the Late Roman Period beads found at Berenike were imported from Sri Lanka. The vast majority of Late Roman coins found in Sri Lanka are also dated to this period (see Bopearachch 1990, 1999, Weerakkody 1997), illustrating the trade relations that likely existed between the Red Sea and the island.

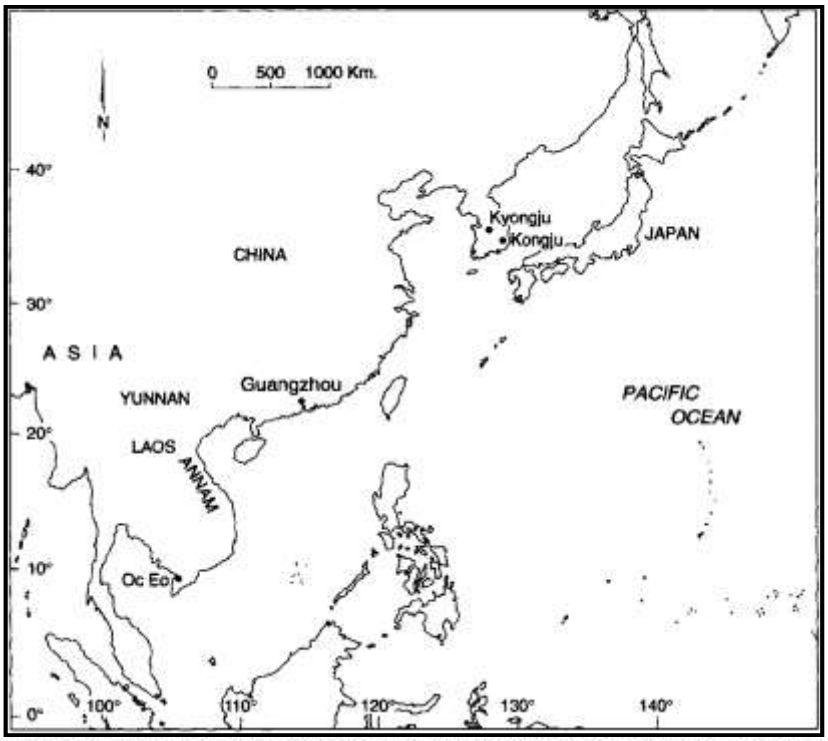


Figure 6.13: Distribution of Indo-Pacific beads in (part of) Southeast Asia and South China Sea (Francis 2002:47; Fig. 5.3)

The strongest IPB presence recorded in the Western Indian Ocean region is found at Islamic port sites. At Siraf 40% of glass beads and over 18% of all beads were IPBs. 46 IPBs[113] reported from Siraf were identified as having been made at Mantai by Francis (2013a:368) who

[113] Not the total number of IPBs excavated, but the amount Francis studied.

suggested that Siraf re-exported Mantai's IPBs. Francis (Ibid.) further argued that the early IPBs found in Eastern and Western Africa were probably also made at Mantai. IPBs reached West Africa by the 7th/8th centuries (Francis 2002:49), which is roughly the date they also reached East Africa.

LA-ICP-MS analysis addressed in Chapter 4.12 clearly indicated that the yellow drawn glass beads (IPB, sample UU249) from Unguja Ukuu in the Zanzibar Islands belong to the same m-Na-Al 1 glass group as beads from Mantai and Kirinda. Given that yellow IPBs were rare at Arikamedu (Francis 2013a:364), Mantai, where they are better represented, seems a likely source. Likewise, a segmented bead (SMA 014) from Mantai tested in this analysis belongs to the same soda plant ash beads as those from Unguja Ukuu. Similar segmented beads at Mantai are imports from Middle East. The idea that there is direct trade is possible, but not well backed up by empirical evidence. The more well-founded explanation at this point is that they arrived via the Middle East.

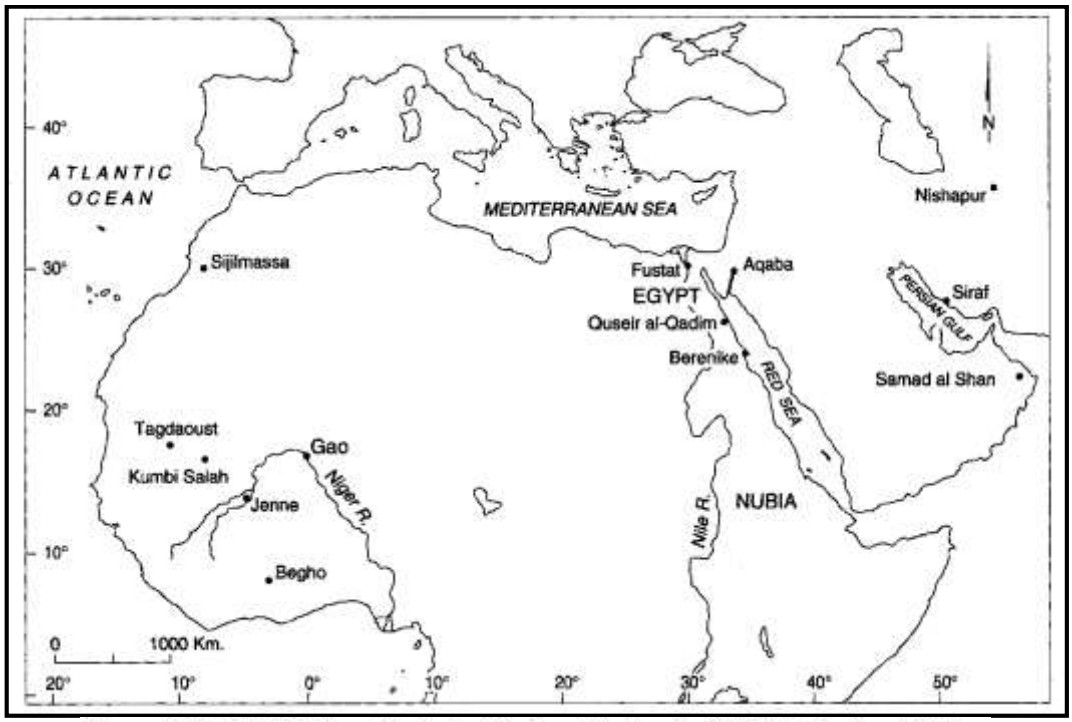


Figure 6.14: Distribution of Indo-Pacific beads in (part of) Middle-East and Africa (Francis 2002: 49; Fig. 5.4)

IPBs appear to have been the most widely dispersed type of bead in the Asian maritime trade for nearly 2000 years. Sri Lanka, and Mantai in particular, was a main contributor of IPBs to this trade from at least *ca.* 2nd century BC to *ca.* the 12th/13th century AD. Sri Lankan-made IPBs were distributed possibly as far east as China and certainly Southeast Asia, and as far west as the Persian Gulf, Red Sea and East Africa.

6.4.3.5 Other local glass beads

A few distinctive Sri Lankan-made glass bead types are found at many sites in Sri Lanka and in Southeast Asia. Of these, disc and *stupa* beads are significant for their volume and wide circulation over a long period of time and hence are discussed in order to establish maritime trade networks.

Disc Beads

Disc beads have been identified as being made in Sri Lanka, although similar finds are found elsewhere (Francis 2002:136–137; Hannibal-Deraniyagla 2001:208). They are one of the largest bead types, reported at virtually all historical sites excavated across Sri Lanka. Named as type 10b (i), disc beads account for 73.5% (297) of the TBA recovered from Gedige, they proliferated from 250 BC to AD 100 (Deraniyagala 1972:137; 2004:712). At ASW2, the pre-eminence of disc beads is reported from all phases. Discs (885) and spherical discs (3062) occur from Phases A to J and account for 80.6% of the TBA (Coningham 2006:353; 365–369; Tables 7.7 and 7.8).

At Tissamaharama, however, only 9% (of total 2,800) of the TBA are disc beads (Weisshaar and Wijeyapala 1993:160; Hanibal-Deraniyagla 2013:373). Francis (2002:138) analysed 253

disc beads from Tissamaharama and placed them between the 2nd century BC and the 5th/6th century AD.

In Jaffna (northern Sri Lanka), 'Red discs' (disc beads) were the most abundant in Pieris's (1921:64–65) investigation. He observed both unperforated and perforated glass beads, suggesting local production. Our Kantharodai bead assemblage contains 168 disc beads, which represents 76% of the TBA. They date between the mid-4th century BC and the early mid-1st century AD (Figure 6.6; Catalogue 7.1-Kantharodai). In contrast, Francis (2002:137) recorded a negligible occurrence of disc beads at Mantai, an observation supported by our work which only included 47 disc beads (3% of the TBA; C4.3.4), indicating that Mantai never specialized in the production of disc beads. Four disc beads were discovered at Kirinda (Phases IB to III) and date between the mid/late 4th to early 8th/9th century.

Francis (2013a:364) argued that disc beads were by-products of IPBs made only in Sri Lanka. At many of the sites mentioned above, however, disc beads were the dominant glass bead type before IPB became widespread. The occurrence of much higher percentage (91%) of disc beads in the GBA and the near absence of IPB at Kantharodai challenges Francis's claim. Similarly, if discs were by-products of IPB production, they would be prevalent at major IPB production sites such as Mantai. Therefore, discs are independently made and possibly predate IPB, at least in some sites in Sri Lanka.

Disc beads are reported from Thailand in the east to Afghanistan in the west. Francis (1989c; 2002:137 and note 31) reports a single find of a disc bead from the surface at Karaikadu in South India and assumed them to be widespread in other South Indian sites such as

Kodumanal and Alagankulam. Gunasena (pers.comm. 2016) confirms the presence of a large number of disc beads at Alagankulam, but refutes such occurrence at Kodumanal. Beads resembling Sri Lankan disc beads are found at Ban Chiang, Thailand and sold in the antiquities markets of Thailand and Afghanistan (Francis 2002:137, 243).

Disc beads are widely distributed in Sri Lanka, although the scale of production varied across sites. An interesting pattern emerges from the occurrence of disc beads and IPBs at Mantai and Kantharodai. Production in Kantharodai had declined by the time the earliest IPBs appeared at Mantai. While the latter specialized in IPBs (76% of GBA), disc beads only accounted for 4% of its GBA. In contrast, at Kantharodai, disc beads accounted for 94% of the GBA, while IPBs were confined to a single suspected item from the disturbed upper levels. This reinforces my claim that these two industries had an independent existence, even if they were made in the same locality. Furthermore, disc beads pre-date IPBs at many Sri Lankan sites and hence could not have been a by-product of IPB as Francis (2013a:364) suggested. Disc beads also appear to have been produced in small quantities for both local consumption and for export.

Stupa beads

Various terms were used to describe *stupa* beads before Francis (1991:98, 2002:137–138) named them so due to their resemblance to Buddhist *stupas*. Hannibal-Deraniyagala (2001: 209, 212, 221), for example, categorized them as Type XI-C.1 collar beads.

Our investigation at Mantai recorded only two *Stupa* beads dated to between *ca.* the early/mid-8th century and late 9th century (C4.3.15b). The collars of one them are broken,

probably during perforation, which may indicate on-site production. Francis (2002:138, 2013a:361) reported two *stupa* beads from contexts dated to the 1st and 8th centuries at Mantai. No *stupa* beads were found at Kantharodai and Kirinda.

Stupa beads are found from Anuradhapura and Tissamaharama, with nine from Akurugoda and the Court Gardens at Tissamaharama, which date from the early 4th to the 6th/7th century (Hannibal-Deraniyagala 2001:221, 2013:372). At Anuradhapura, *Stupa* beads made of semi-precious stones are reported from Jetavana *stupa* (Ueyama and Nozaki 1993:71, fig 32, 6 f, 83, while a copper bead is reported from the Mahabodhi ground (Hannibal-Deraniyagala 2001:221). *Stupa* beads are also found in Abhayagiriya, where they date to the 7th century (Bouzek, 1993: 80ff, 106,118, 120f).

Stupa beads are also reported from Southeast Asia. While only a single *stupa* bead is reported from Sungai Mas in Malaysia, they are common finds at Dvaravati sites (e.g., U Thong) in Thailand, where they are dated from the 7th to the 9th/10th centuries (Francis 2002:237–238; 2013a:361). Francis earlier (1991:111) dated them to the 9th/10th century. Interestingly, no stupa beads have been identified from India (Hannibal-Deraniyagala 2013:372), supporting the claim that these were made in Sri Lanka.

The occurrence of *stupa* beads across all sites, is dated from first two centuries BC to the 10th century AD by Francis (2002:138; 2013a:361). In light of our Mantai dates, the latest date for *stupa* beads can be pushed forward into the 11th century, with the highest concentration from *ca.* the 4th to the 8th/9th century.

Considering the high concentration of *stupa* beads in Sri Lanka and Thailand, Francis (2002:138) assigned them a Sri Lankan or Dvaravati (Thailand) origin. The known dates of Southeast Asian *stupa* beads, however, are much younger than those of Sri Lanka suggesting that they were more likely to be made in Sri Lanka (Hannibal-Deraniyagala 2013:372). Furthermore, since their highest concentration is in southern Sri Lanka, they were probably made there. Epigraphic evidence illustrates strong Buddhist relations between Sri Lanka and Southeast Asia at least from the Middle Historic period (Chapter 7.3.4). These Buddhist religious networks could have been partly responsible for the distribution of beads, especially the *Stupa* variety as a Buddhist symbol

6.4.3.6 Local glass bead summary

The locally made bead assemblage is dominated by glass beads, of which 74% are IPBs, with lower concentrations of *stupa* and disc beads, which were nevertheless important parts of the assemblage. The IPBs were made from *ca.* the 2nd century BC to the 12th/13th century AD and their production clearly indicates craft specialization. They were mass-produced most likely for maritime trade across the Indian Ocean, reaching from Southeast Asia, possibly as far as China, in the east to East Africa, the Red Sea and the Persian Gulf in the west. Disc beads date from *ca.* the mid-4th century BC to post 9th century AD, while the date range for *stupa* beads is from *ca.* the 2nd century BC to the 9th/10th century AD. Both of these varieties are widely distributed in Sri Lanka, with their export being mainly to Southeast Asia.

6.4.4 Imported glass bead assemblage

Sri Lanka was at the geographic centre of maritime trade in the Indian Ocean and a key contributor to its bead trade. It was a producer and an exporter rather than a consumer of

imported beads, with 3.7% of the GTBA[114] being imports. Only 42 imported glass beads were recovered from the three sites, 2.4% of the TGBA[115], of which 34 come from Mantai, two from Kantharodai and six from Kirinda (Table 6.5).[116]

Despite the difficulties involved in provenancing beads, the imported GBA from all sites is examined below to examine external trade-exchange networks. Only significant bead types are discussed in detail.

6.4.4.1 Indian glass bead assemblage

Considering the geographical proximity and close cultural connections with India, a strong presence of Indian beads was expected. While they are certainly the largest category of imported beads (45%), they only amount to 36 items from all three sites studied. Of these, 12 are glass beads, six of which come from Mantai. Nine out of these 12 glass beads recovered from Mantai are collar beads, which date from the mid-3rd century to the 12th/13th century. The other Indian glass beads are single examples of barrel, hexagonal bicone and cylinder beads.

Collar beads are identified as Indian made since their first discovery at Arikamedu, where they are dated to the Early Historic period (Wheeler et al. 1946; Francis 2002, 2013a:353), although the possibility of our material being made in Sri Lanka cannot be ruled out. They are comparatively widely distributed. Francis (2013a:353) records three from the Early Historic to

[114] Grand Total Bead Assemblage
[115] Total Glass Bead Assemblage
[116] Excluding four 'Imported.Unknown' beads recorded from Mantai and Kirinda- two from each site (Chapters 4 and 6)

Early Medieval periods at Mantai, while Hannibal-Deraniyagala (2013:371) identified four groove-collar beads from the same assemblage.

Hannibal-Deraniyagala (2001:209–210, 219–221) categorized collar beads at Tissamaharama into three main groups, consisting of groove-collar, lug-collar and *stupa* beads, each having various sub-types. They first occur around the 1st century and became more common by the 2nd/3rd century, while some varieties continued to the 4th century. Although the majority are made of glass, a few are also produced from semi-precious stones and terracotta. Collar beads are reported in large quantities from the Jetavana *stupa* at Anuradhapura (Hannibal-Deraniyagala (2001:209–210, 219–221) and from at ASW2 (Coningham 2006:353–356; 380).

Francis (2013a:353) identified two other glass beads, which he suggested were made at Arikamedu, from Mantai. One is a 'short square translucent green cube' for which parallels have been found at Oc Eo (Marlleret 1962:257). The second is an 'opaque red collar bead' similar to the lug-collar variety of Wheeler (1946:97–98). Francis (2013a:353) found parallels to this bead type at a number of SEA sites. He also reports a glass oblate of green glass over a yellow core from Mantai and notes similar finds from a number of Indian sites, Nishapur and Sungai Mas (ibid. 2013:337).

Of the three sites studied by me, a limited number of Indian glass beads are found only at Mantai. They date from the mid-3rd century to the 12th/13th century and have parallel occurrences in the Persian Gulf and Southeast Asia, indicating their significance in maritime trade.

6.4.4.2 Middle Eastern bead assemblage

Only eight beads (0.5% of the TBA) were identified as being from the Middle East; all come from Mantai (Chapter 4.10.3.2). They date from *ca.* the 7th century to the 12th/13th century, when Indian Ocean maritime trade was at its peak. Selected beads, which are of historical significance and are paralleled elsewhere are discussed below.

Segmented beads

Segmented beads are the most important Middle Eastern beads found in our assemblage, as their identification is certain. Two of these are found from the 'Disturbed'. Francis (2013a:355–356) also recorded four varieties of Middle Eastern segmented beads from the Early Medieval and disturbed upper levels at Mantai. Segmented beads are also found from a number of sites, including Tissamaharama and Anuradhapura.[117] At Court Gardens, Tissamaharama, two segmented beads were found from layers dated between the 2nd/3rd and 7th/8th centuries (Hannibal-Deraniyagala 2013:372; 2001:224).

Segmented beads are a key type of Middle Eastern bead from *ca*. the 3rd century BC, and are widely distributed on archaeological sites across the Middle East (Francis 2013a:355–356). Parallel finds in South and Southeast Asia indicate their significance in the maritime bead trade. The three segmented bead types that Francis recorded from Mantai are also found at Oc-Eo in Vietnam (Malleret 1962:249–269), supporting the historical connections between Southeast Asia and Sri Lanka (Chapter 7.3.4).

[117] At Gedige, Anuradhapura 12C seem to be segmented as well (Deraniyagala 1972:135),

Melon beads

Melon beads are another Middle Eastern bead type found in South Asia (e.g., Basa 1992:92; Sankalia and Dikshit 1952:32), including Sri Lanka. Our Mantai assemblage contains only a single glass melon bead from Phase VII (early/mid-8th century - late 9th century). While Francis (2013a:356) reports a melon bead, Hannibal-Deraniyagala (2013:373) also identified only a single bead (Type XIII-1) from Mantai, reflecting that only a limited number reached this port. Melon (Type XIII) beads are also found from the Court Gardens at Tissamaharama, where they date from the mid-5th to the 7th century (Hannibal-Deraniyagala 2001:224).

Mosaic cane beads

While Francis (2002:94) assigned mosaic cane beads a Middle Eastern origin, Dubin (1995:22) argued that they were made using techniques initially used for glass making during the Hellenistic and Roman periods (300 BC and AD 400). They have a wide distribution, which includes South Asia and Southeast Asia where they are found in small quantities. They are found in the contemporary trading ports of Arikamedu, Mantai, Khlong Thom and Oc Eo from *ca.* the 1st century onwards (Francis 2002:94).

Only two suspected mosaic cane beads were recorded from the 'Surface' at Mantai. Since Francis (2002:94) also reported mosaic cane beads from Mantai, they seem to have been imported to Sri Lanka in small quantities.

The Middle Eastern beads in Sri Lanka are limited and confined to key ports and urban centres. Nevertheless, they represent the Middle Eastern bead package that were circulated through

maritime trade and should be understood to have arrived alongside other Middle Eastern imports, including ceramics.

6.4.4.3 Southeast Asian beads

Only a single type of bead in my assemblage, the cornaline d'Aleppo, originated in Southeast Asia (cf. Francis 1991a:108; Hannibal-Deraniyagala 2001:221–222; Basa 1991).[118] With 20 examples (47.6% of the total imported GBA) these are the most numerous imported bead type. Fourteen were recovered from Mantai, where they represent 41% of the imported GBA. They date from *ca.* the early/mid-8th century to the 12th/13th century (C4.3.25).[119] Chronologically, they tally with Southeast Asian ceramic finds at Mantai and were likely to have been shipped alongside other Southeast Asian imports.

The remaining six cornaline d'Aleppo beads were recovered from Kirinda, where they are the only imported glass bead found. They are all from Phase II (C6.1.7c) and date from the mid/late 6th to the mid-7th century. Interestingly, the examples from Kirinda are older than those from Mantai, which generally displays the widest range of external interactions. The finding of cornaline d'Aleppo beads from Kirinda is not surprising given that 19 beads of this type were also found from nearby Tissamaharama, where they date from the early 4th to the 7th/8th century (Hannibal-Deraniyagla 2001:224).

[118] Francis (1991:108) termed them as 'tube with a dark centre and orange coat', and origin is assigned to Sungai Mas. He found one from Mantai.

[119] Dubin (1995:79) mentions that in early sites in South-East Asia are found beads of precious and semi-precious stone found in India and Sri Lanka.

Similar beads are found from Bhokardan and Brahmapuri in South India (Sankalia and Dikshit 1952:108ff). At Bhokardan they occur from the 2nd century BC to *ca.* the 5th century AD (e.g., Deo and Gupte 1974:128). They seem to have been in circulation in South Asia from the 2nd century BC onwards, arriving in Sri Lanka in the early 4th century at the earliest. These Southeast Asia beads supplement the meagre material evidence (ceramics—Chapter 3 and 5) for interaction between Southeast Asia and Sri Lanka. With the exception of the epigraphic and iconographic evidence (Chapter 7.3.4), local chronicles are largely silent about such connections until very late. Therefore, beads are rare evidence that can be used to fill gaps in historical records and material remains.

6.4.4.4 Roman/ Mediterranean beads

Only a few authentic beads of Roman origin have been found in the whole of Asia. They are found at a small number of sites such as Mantai, Arikamedu, and Oc Eo (Vietnam), where they are mostly single finds (Francis 1990:9, 16). Two suspected inlay beads from the 'Disturbed' at Mantai are the only Roman/Mediterranean glass beads in the assemblage (C4.3.22a&b). If these beads are Roman, they are likely to be residual by this time as the Roman Empire had long declined.[120] Both are made of glass and their finishing is unknown. Although inlay beads that have their decorations carved first, which are then filled with other material are considered as being Roman-made (Beck 1928:56), the identification of our inlay beads is tentative.

[120] Although the Byzantine Empire still existed at this date, it would not have been conducting maritime trade with the Indian Ocean. Any Byzantine beads entering the Indian Ocean would most likely have arrived via Islamic traders.



Figure 6.15: Red coral beads from Kirinda (Courtesy Southern Sri Lanka Ports Project)

6.4.5 Glass bead assemblage summary

Glass beads are the dominant type found across the Indian Ocean. South Asia provides strong evidence from the Early Historic Period onwards where the largest glass bead production sites in India mostly manufactured IPBs (Abraham 2013:247). Glass beads are also the largest category of beads in Sri Lanka, of which the IPB comprised the vast majority. They seem to date from around 400 BC at ASW2 (Coningham 2006), although my assemblage dates from *ca.* the 2nd century BC but continued to *ca.* the 12th/13th centuries AD.

With a South Asian origin—Arikamedu and Mantai being the main IPB production centres—they are distributed from South Africa in the west to Japan and Korea in the east, although their highest concentration is in South Asia. Besides Mantai, there were other IPB producing sites such as Anuradhapura in Sri Lanka, where the industry lasted until *ca*. the 11th century.

Disc and *stupa* beads are the only other significant local glass beads. Of these, the *Stupa* bead was comparatively widely distributed in Southeast Asia during the Early and Middle historic periods. Buddhist religious networks, along with trade, were the likely mechanisms behind their circulation.

Sri Lanka occupied an important position in bead making in the ancient world, perhaps due to its strategic location where east–west maritime trade took place (e.g., Procopius I.20.9–13 and Cosmas II and XI). Beads, among other things, linked Sri Lanka with various markets around the Indian Ocean. While imported glass beads are limited, they include examples originating from the Mediterranean, Middle East, South Asia and Southeast Asia. These luxury items were probably intended for the use of elites in urban centres, including religious places. Ports such as Mantai were, naturally, the places where such beads first landed from which they were then redistributed to urban centres such as Anuradhapura and Tissamaharama. The recovery of a large quantity of beads of all varieties from the Jetavana *stupa* and ASW2 at Anuradhapura, for example, support this claim. Kantharodai predates the CE and collapsed before the beginning of the extensive foreign trade, resulting in the recovery of a limited range of imported material.

The GBA from Mantai, Kantharodai and Kirinda—along with those reported from various urban centres—represent a cross section of the Indian Ocean maritime bead trade for nearly two millennia. The small quantities of imported glass beads derived from a vast geographical region and are testimony to both the self-sufficiency of local glass bead production and the island's far-reaching external interactions.

6.5 Stone beads and connections

In the context of the Asian maritime bead trade, stone beads have a low profile. While they are reported from numerous sites across the Indian Ocean, compared to glass beads they are numerically marginal, and the evidence for production workshops is less convincing. Francis (2002:241–250), however, identified a group of workshops that are connected to the IPB

producing centres in South Asia and Southeast Asia. Since IPBs are the main local type in my assemblage, and also formed a significant part of the trade in beads in Asia, I discuss Stone Bead Assemblage (StBA)[121] in relation to the workshops mentioned by Francis (Ibid.).

The scale of the stone bead production in IPB centres cited above varied greatly between sites. Arikamedu possessed the largest stone bead industry, which worked various raw materials including carnelian, amethyst, agate garnet and the industry flourished throughout its occupation (Wheeler et al. 1946; Francis 2002:141). Karaikadu, a minor workshop connected to Arikamedu, had a similar, albeit smaller stone bead industry, although, garnet was not worked there (Raman 1975; 1991:128–129; Francis 2002:241).



Figure 6.16: Half-processed carnelian beads, flake and a core from Kantharodai

Oc Eo and Vijaya in Southeast Asia (Figure 6.12) also have evidence for stone bead production (Marllet 1962). Oc Eo was contemporary to both Arikamedu and Karaikadu and its stone bead industry is similar to the latter site. The stone bead industry at Vijaya began around the 7th/8th century, and polished its carnelian beads (Francis 2002:142). Although Kuala Selinsing, another IPB production site, also had a stone bead industry, it did not use agate or carnelian (Evans 1932:90–91 cited in Francis 2002:142) as Mantai and Arikamedu did.

[121] Includes both rock and minerals

6.5.1 Stone bead assemblage (StBA)

Our StBA from the three sites comprises 270 beads, the majority of which (238) come from Mantai (C6.1.1 and Table 6.6). The small numbers of stone beads, particularly from Kirinda, accords with the general pattern observed at other Sri Lankan, South and Southeast Asian sites.

Table 6.6: Stone beads from all three sites % from TBA of each site

Sites	Mantai	Kantharodai	Kirinda
Stone beads	238	28	4
%	15.06	12.73	0.89
TBA	1580	220	447
%	100	100	100

The Mantai StBA is not only numerically larger than those of Kantharodi and Kirinda, but it is also more varied in terms of bead typology and the variety of raw materials used. It comprises beads made from 10 minerals, including lapis lazuli and carnelian, which come from various foreign sources (discussed below). At Mantai, stone beads occur from Phase III to the 'Surface'(late 1st century-12th/13th century). More importantly, 97% of the StBA are wasters and half-processed material, indicating on-site production. Even the beads made from imported raw materials, such as carnelian, were produced at the site. Stone beads were made throughout the occupation of Mantai, though certainly this work was subordinate to the glass bead production. Nevertheless, this challenges Francis's (2002:142) claim that stone bead production at Mantai was not only the least impressive of all early Indo-Pacific bead-working sites, but also that it did not begin until the 7th/8th century. Francis (2013a:365–366) reports 107 stone beads from Mantai, in which rock-crystals and carnelian were the main raw materials worked. He notes that the stone bead production technology used was similar to that of India (ibid.:366). Gwinnett and Gorelick (1986) suggest that Mantai stone beads were drilled using a bit on which two small diamonds were mounted. Whether the beads were

drilled from one side or from both depended on the type of material worked. Crystalline quartz (e.g., carnelian) beads, for example, were drilled from only one side, as seen by the large cavity in the drilled end. Our assemblage, however, provides an example of a bead drilled from both ends, and another that was dimpled at one end, with the other end broken off while drilling (Figure 6.16).



Figure 6.17: Carnelian beads and ring fragment

The StBA at Kantharodai comprises 28 beads (12.7% of the TBA), which date from the mid-4th/late 3rd century to the early/mid-1st century BC (Figure 6.18). These were made from six different raw materials, of which the most common was carnelian (35.7%; Figure 6.17), with agate (14.2%), amethyst (10.7%), garnet and suspected garnet (collectively 10.7%) being the other main minerals used. Interestingly, imported raw material (carnelian) and more valuable semi-precious stones (amethyst) seem to have been the preferred raw materials for bead making at Kantharodai, where the entire imported StBA (15 items) comprises Indian beads[122], 27% of which are collar beads. Together with the evidence from the ceramics, beads illustrate Kantharodai's close cultural connections with India. The lack of imports from elsewhere during this period suggests a limited amount interaction beyond India.

[122] Finished beads made of imported raw materials without production debris are considered as being imported.

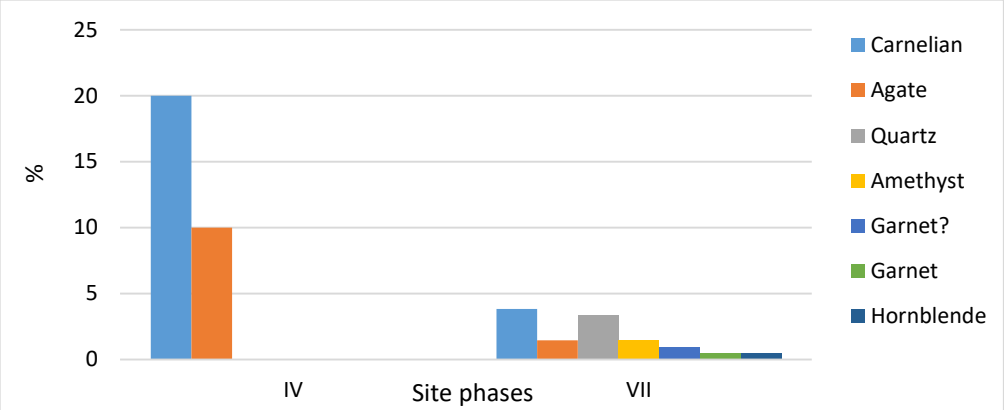


Figure 6.18: Stone beads across phases at Kantharodai; % from TBA phase total; Based on Catalogue 6.1.6a; Note the diversification of the stone bead assemblage towards the beginning of the CE.

Kirinda has the smallest StBA of the three sites, with only one quartz, one amethyst, and two carnelian beads. These date from the late 4th to the early 8th century (Figure 6.19). Of these, amethyst and carnelian beads are identified as being of Indian origin due to a lack of evidence for on-site production.

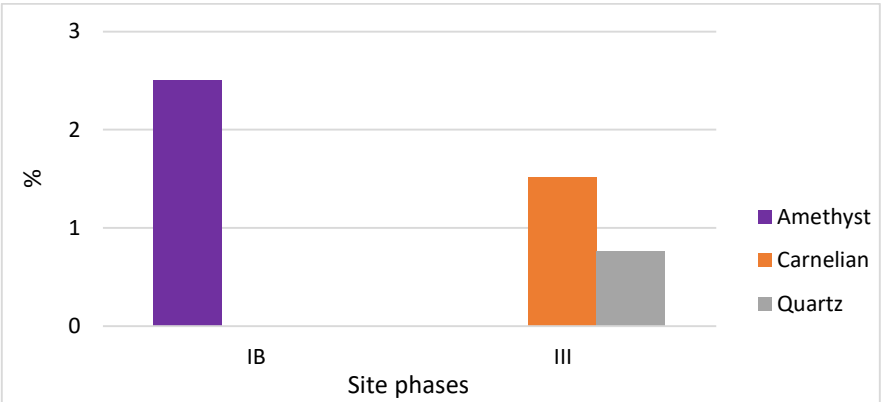


Figure 6.19: Stone beads across Phases at Kirinda; % from TBA phase total; Based on Catalogue 6.1.6b

Imported, rare and more valuable semi-precious stones seem to have been the most sought after raw materials at each of the three sites. The StBA is discussed further (below) in relation to raw materials used, in order to establish the provenance of beads and reconstruct bead networks.

6.5.1.1 Carnelian in Sri Lanka

In our assemblage, carnelian accounts for 152 items (6.8% of the GTBA), of which 140 (59% of the site's StBA) beads/items of debris come from Mantai. They date from the late 1st century to the 12th/13th century. Francis (2013a:366) also reported 19 carnelian beads/debris, making carnelian the second most frequently used stone. These beads/debris come from layers dated to the Middle Historic period.

The Kantharodai assemblage comprises of 10 carnelian beads (35.7% of StBA) and dates from the mid-4th/late 3rd century to the early mid-1st century BC (C6.1.6a). Only two of these beads come from contexts datable to between the late 4th and early 8th century, reconfirming Kirinda's limited external connections.

At Gedige, Deraniyagala (1972:139) reports carnelian, although the precise statistics are not clear. As his finds consisted of only bead cores and flakes, Deraniyagala suggests that the carnelian beads were produced at the site. He correlated his material with similar finds from India where the use of carnelian dates back to at least 800–100 BC. Coningham et al. (2006:380) reported I02 carnelian beads/debitage and 13 rings from ASW2 and dated them from 510 cal. BC to AD 1100. The majority of the items are production debris, providing the evidence for carnelian bead manufacture at Anuradhapura.

Seventeen of the 47 semi-specious stones found at Tissamaharama are carnelian, although no evidence for on-site manufacture was found (Hannibal-Deraniyagala 2001:207). At Ridiyagama, however, Bopearachchi (1995:383–384) reports evidence for carnelian working.

Almost all of these sites have evidence for the local production of carnelian beads, despite the stone not naturally occurring on the island (Parker 1885:83). Carnelian is found comparatively widely across archaeological sites in Sri Lanka from at least the middle of the first millennium BC. The identification of possible sources of carnelian, therefore, may shed light on Sri Lanka's early external connections.

Sources of carnelian and connections

Carnelian found in Sri Lanka is considered to have been imported from India (Deraniyagala 1972b:139), particularly from Gujarat, where it was extensively quarried (Wheeler 1946:123) or from South India (Francis (2002:244). Gujarat as a possible source appears to be justified by the existence of an ancient carnelian bead working tradition there (Kenoyer et al. 1991:50; Hannibal-Deraniyagala 2005:22). Nevertheless, tests carried out on carnelian beads from Anuradhapura (Theunissen 2003:98, 100; Hanibal-Deraniyagala 2005:22–23) found them to closely match beads recovered from different sites in Thailand, indicating another source of imported carnelian.

Similarly, among the approximately one million beads recovered from the Jetavana *Stupa* at Anuradhapura (Ratnayake 2003:37–52; Jayasinghe 2011) were carnelian beads and pendants in the shape of lions, tortoises and fish, which are similar to those reported from Taxila, Pakistan (Hanibal-Deraniyagala 2005:23; 2013:372). This may reflect connections with southern and western ports of India. Taxila, as a centre of Buddhism, maintained close connections with Buddhist centres in Anuradhapura. All of the beads recovered at Jetavana served as offerings and it is possible that some of these came from various sources, including the Taxila region.

Evidence for the local production of carnelian beads exists on many sites in Sri Lanka, including Mantai and Anuradhapura, suggesting that the raw material was imported from a number of sources in India and Southeast Asia, while the beads were made in Sri Lanka. Some already manufactured examples might also have reached Sri Lanka in the form of offerings and as traded items. A similar pattern is observed at Shanga in East Africa. While the carnelian beads found here are generally sourced to Cambay, Gujarat (Arkell 1936), the presence of many unfinished beads prompted Horton (1996:332–333) to conclude that at least some of the items were made at the site.

6.5.1.2 Lapis lazuli

Lapis lazuli does not occur naturally in Sri Lanka, or India (Coningham et al. 2006:377; Deo 2000:35), although small quantities are found in archaeological contexts in both countries. Our lapis lazuli assemblage is limited to just two items from Mantai, which postdate the 9th century. Francis (2013a:355), meanwhile recorded four items of lapis lazuli from Mantai, from contexts dated to the Medieval period. At Anuradhapura suspected lapis lazuli items occur at Gedige, although further details are not available (Deraniyagala 1972:134). Coningham et al. (2006:377)report five lapis lazuli beads at ASW2, from periods dated from 360 cal. BC to AD 600.

Lapis lazuli beads do not seem to have been made in Sri Lanka. The main source of lapis lazuli in South Asia in antiquity was Badakhshan in northern Afghanistan (Francis 2013a:355; Roberts et al. 1974:349) and Baluchistan (Lahiri 1992:22). The lapis lazuli beads could have reached the island from the Middle East either directly through Persian/Muslim traders, or indirectly from India (Figure 6.20).

6.5.1.3 Garnet assemblage

The garnet bead assemblage from Mantai and Kantharodai comprises of 59 beads/items. Of these, 56 garnet beads/items of debris come from Mantai, making garnet the second largest category of stone beads at the site. They are found consistently from Phase III to the 'Disturbed', though their highest occurrence is in Phases VII and the 'Disturbed' (Table 6.7). With the exception of a single finished bead, all of the garnets at Mantai consist of production debris, indicating on-site working. This is important, as there is a lack of evidence for garnet working in Sri Lanka despite the widespread availability of the mineral on the island (see Hannibal-Deraniyagala 2001; 2013:372).

Table 6.7: Mantai Garnet beads across phases (% from TBA phase total)

Stone	V	VI	VII	'D'	'S'	Total
Garnet	2	3	24	27		56
%	8.33	10.34	6.94	3.64		3.54
TBA	**24**	**29**	**346**	**741**	**46**	**1580**
	100	100	100	100	100	100

The excavations at Kantharodai produced only a single garnet bead and two suspected ones (all from Phase VII; C6.1.6a), which date from the early to mid-1st century BC. Deraniyagala (1972:134–135) reports suspected garnets at Gedige, but quantitative details are unavailable. Coningham et al. (2006:386) report 81 pieces of garnet found from contexts dated to between 510 cal. BC to AD 1100 at ASW2. The majority of pieces are debitage from a limited range of shapes, which suggests a specialization in garnet bead production on the site (Coningham et al. 2006:386-390). Thirteen garnet items, including pieces of raw material apparently used for bead making, occur at Tissamaharama (Hannibal-Deraniyagala 2001:207; Schussler et al. 2001:227). Considering the close proximity of Tissamaharama to the largest garnet-producing area in Sri Lanka, a more significant presence of garnet beads/debitage should be expected from the site.

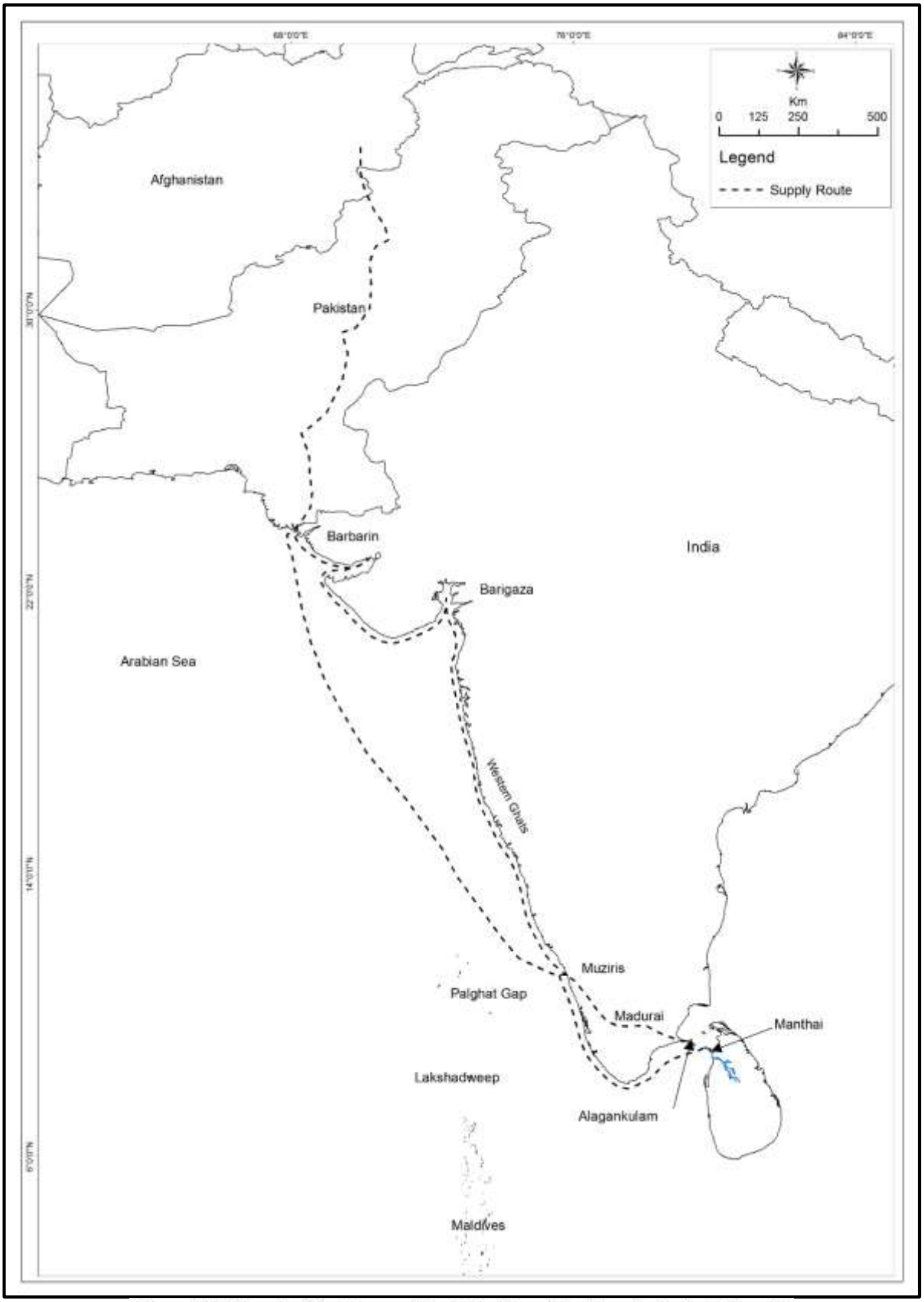


Figure 6.20: Route of exchange of South Indian etched beads for Lapis Lazuli (modified after Francis 2002: 149; Fig. 14.1)

Six varieties of garnet are found widely across Sri Lanka (Cooray 1984:241–242, Table II; Dissanayake et al. 2000:14, Table 1). Garnets from Tissamaharama, Godavaya and the Anuradhapura citadel excavations were analysed by Schussler et al. (2001:225–241), using Electron Microprobe analysis and X-ray diffraction analysis. The majority of the tested garnets belonged to the almandine-pyrope garnet group, which are widely found in Sri Lanka in areas such as Rathnapura, Embilipitya and Ambalantota (Figure 6.21).

Almandine-pyrope garnet beads are found at Somad culture sites (300 BC– AD 800) in Oman. Since no garnets of this chemical composition occur naturally in Oman, their source is considered to be Sri Lankan. This may reveal the export of Sri Lankan garnets to the Arabian Gulf (Schussler et al. 2001:240–241; Rosch et al. 1997), indicating that the island was a source of garnets for the western world during the Early Medieval Period (Hanibal-Deraniyagala 2013:372).

The Early Iron Age (500 BC–AD 500) glass beads from Ankor Borei in Cambodia have also been compositionally linked to a possible production centre at Giribawa, Sri Lanka (Dussibieux 2001). Carter (2012) considers Sri Lanka as an important trading partner of Angkor and a possible source location for the garnet beads found there, which date from between 200 BC and AD 200. These early historic connections between Sri Lanka and Southeast Asia are not evident from texts but explicit from the epigraphic and iconographic sources (Chapter 7.3.4).

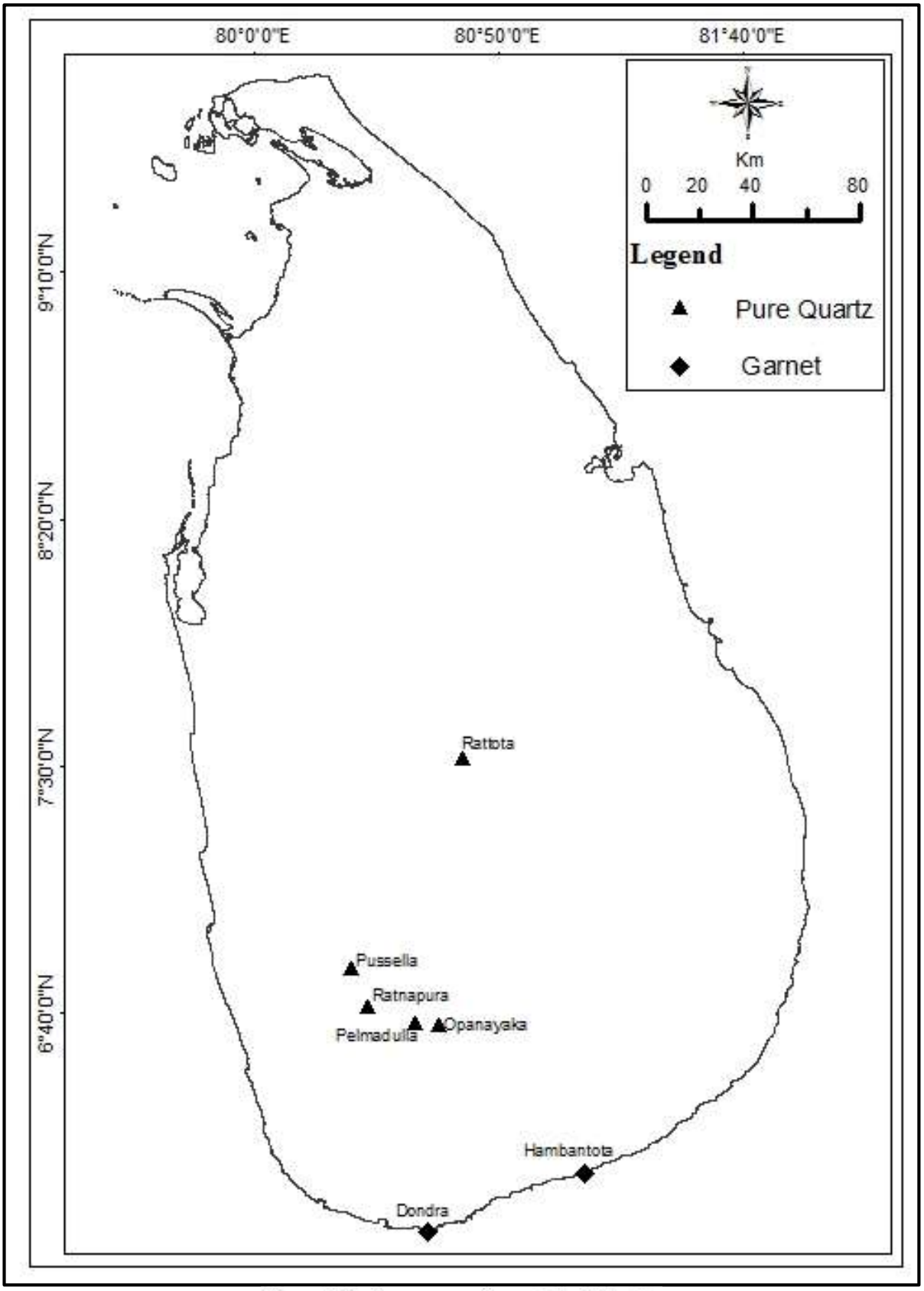


Figure 6.21: Occurrence of garnets in Sri Lanka

6.5.1.4 Amethyst

Our amethyst assemblage at Mantai is confined to two beads/items of debris and postdates the early/mid-8th century (C4.3.11a). Francis (2013a:365–366) records only four amethyst items from Mantai. Three amethyst beads come from Kantharodai, which dates from the early to mid-1st century BC. Only a single amethyst bead is found from Phase IB at Kirinda, dating to between the late 4th and mid-7th century.

Although amethyst is also reported from Gedige (Deraniyagala 1972:134) and Jetavana, (Jayasingha 2011), statistical details are unavailable. At ASW2, 91 amethyst objects are reported from periods dated between 360 cal. BC to AD 1100, which is the largest known archaeological sample of amethyst in Sri Lanka. Amethyst (six items) is also reported from Tissamaharama (Hannibal-Deraniyagla 2001:207).

Amethyst occurs comparatively widely in Sri Lanka (Cooray 1984) and it was used for various ornamental purposes since at least the Early Historic period. Amethyst was probably exported as both a raw material and finished products to west (*Geograph*ia 4.1). Its occurrence across the island indicates well-established internal procurement-distribution networks.

6.5.1.5 Stone bead summary and discussion

Although numerically limited, stone beads provide an excellent opportunity to link cultures across oceans. Lapis lazuli and carnelian were probably imported from distant locations including Thailand, India and Afghanistan/Baluchistan, which reflect the existence of extensive maritime networks. The stone bead industries, particularly at Mantai, are closely related to the IPB production centres in South Asia and Southeast Asia. Thus, glass and stone bead

networks seem to have been inter-connected, perhaps contributing to each other by way of distribution of raw materials and finished products.

As at many other sites in South and Southeast Asia, the number of stones/mineral beads in Sri Lanka is limited; nevertheless, a range of raw materials were used. A similar situation is reported by Kelly (2012:4) at Kadebakele, South India, where stone beads from various raw materials are found, but represented by only one or two examples. Kelley interpreted this as evidence for a wide range of contacts and trade, which were neither systematic nor regular.

While the wide range of raw materials found at Mantai demonstrates the far-reaching contacts, the limited number of stone beads may reflect the transient nature of ports, goods passing though rather than staying at the site. Since Mantai was primarily a port and a production centre, its consumers were located at some distance across the ocean, or in local urban centres such as Anuradhapura, which has produced comparatively large quantities of stone beads, supporting this claim.

As a minor local port, Kirinda does not seem to have developed any substantial production industries and its imported material could have been drawn from the nearby urban centre of Tissamaharama. Kantharodai, meanwhile, was an urban centre situated around 10 km inland from its main seaport, *Jambukolapatthana*. The smaller number of stone beads recovered from Kantharodai may be partly due to the site's early date when compared to the other two sites. Similarly, due to the location of *Jambukolapatthana* and Kantharodai to the north-east of Adams Bridge, Kantharodai's interactions were mainly restricted to the Bay of Bengal region. The absence of lapis lazuli may be a result of this geographic location respective to

Adam's Bridge, which prevented direct communication with the western Indian Ocean, where the sources of lapis lazuli were located.

6.6 Other Commodities in trade and exchange

In Chapter 4, I demonstrated that Mantai was both an international trading port and a production centre. Alongside beads various other industries existed including bangle production and metalworking. These are discussed below with Chapter 7 detailing the historical evidence for trade-exchange networks and external connections.

6.6.1 Bangle assemblage

The bangle assemblage from our excavation at Mantai comprises of 50 fragments (Table 6.8; Table 4.4). Carswell et al. (Francis 2013c:381–384) report 921 glass bangles, nine rings, 267 shell artefacts and 35 shell objects. Their assemblage dates from the 1st to 6th and the 8th to the 11th centuries. In our assemblage, 33 (66%) bangles are made of glass, while the rest are of organic material. Of the organic materials, more than 76% are shell and suspected shell, indicating the exploitation of easily available sources of chank in the Mannar Gulf. Our bangle assemblage dates from the late 1st century to the 12th/13th century, with most items having been produced after the 8th/9th century. Both assemblages collectively illustrate the scale and duration of bangle production, which seems to have been a parallel industry to that of bead production.

Our Kantharodai assemblage contains no bangles. This could, however, have resulted from the sampling strategy adopted. Only six bangle fragments were found at Kirinda, four of which are shell bangles dating from the late 3rd to the mid-7th century (Table 6.9). The other two are

black glass bangle fragments dated to the early 8th century. The bangles found at Kirinda were probably derived from Tissamaharama. Of the three sites, Mantai appears to be the only one where bangles were actually produced. Bangles have not received the same interest as their closely related bead assemblages although they have been recovered from many sites. At ASW2, for example, Coningham (2006:349–352) recorded three categories of glass bangles—plain, twisted and decorated—throughout the sequence.

Table 6.8: Bangle assemblage from all the three sites; % from GTBaA

	Mantai	Kirinda	GTBaA
Bangles	50	6	56
%	89.29	10.71	100

Table 6.9: KR3 Bangle material (% from TBaA phase total)

Material	IA	IC	II	III	Total
Shell	1	1	2		4
	100	100	100		66.67
Glass				2	2
				100	33.33
Total	**1**	**1**	**2**	**2**	**6**
	100	100	100	100	100

With the exception of three fragments identified as imports, the entire bangle assemblage at Mantai appears to be locally produced (Chapter 4.12). Francis (2013c:384) also reached the same conclusion about his assemblage. Bangle production has a history stretching from *ca.* 1000 BC in South Asia, although the industry did not become widespread in India until almost the 14th century (Dikshit 1969:47; Francis 2013c:384). The significance of the Mantai bangle assemblage is that it seems to predate the widespread bangle industry in India (Chapter 4.12.3). The presence of Persian/Muslim traders could have been the inspiration for the early emergence of the bangle industry at Mantai (Francis 2013c:384).

Although Sri Lankan-made bangles are yet to be found overseas, it is almost certain that the bangles were exported along with beads, possibly to the same international markets. Mantai-made IPBs have been identified at Siraf, which is credited as having been Mantai's trading partner (Tampoe 2003), and is a potential site to look for Mantai-made bangles. In light of the

strong trade relations between Siraf and Mantai and between Sri Lanka and the Middle East in general, as exemplified by the ceramic assemblage (Chapters 3.3.9&5.3.3.6), such mutual trade-exchange is more than likely.

6.6.2 Metal-working

Sri Lanka had a reputation for high quality iron/steel production from the first millennium BC (Juleff 1996, 1998, 2009, 2013:308) through to the 19th century (Davy 1983; Ondaatje 1854; Hadfield 1912; Coomaraswamy 1956:189–192). The occurrence of iron slag throughout the island attests to the widespread occurrence of iron production. For example, 20 iron production sites have been found in the Kirioya basin (Figure 6.22) alone, and the excavation at Dehi-ela-kanda in Sigiriya revealed a series of furnaces for the production of iron (Forenius and Solangaarachchi 1994; Solangaarachchi 1997:31). Juleff's (1998; 2009) pioneering work at Samanala Wewa revealed a series of wind-powered furnaces used for the production of high quality steel from the 7th to the 11th centuries, while Forenius and Solangaarachchi (1994), Thantilage (2008; Thanthilage and Vithanage 2015) and Solangaarachchi (2011) have provided further evidence for early metal working in Sri Lanka.

Considerable evidence for metalworking exists at Mantai. Iron slag and ore occur on the surface and throughout the excavated sequence. Graham (2013g:273–276) reported the same situation from Carswell's excavations with metalworking present from the 2nd century through to the 5th/6th century. Metalworking remains were also recorded from the 'Developed Mound'. Juleff (2013:277–310) conclusively demonstrates copper/iron production, including a small hearth, pre-dating AD 200 (Ibid.:278, 307). She identified Seruvila on the eastern coast

as a possible source of copper ore (magnetite/chalcopyrite). The transport of this ore to Mantai illustrates the internal trade-exchange networks in/ around the island.

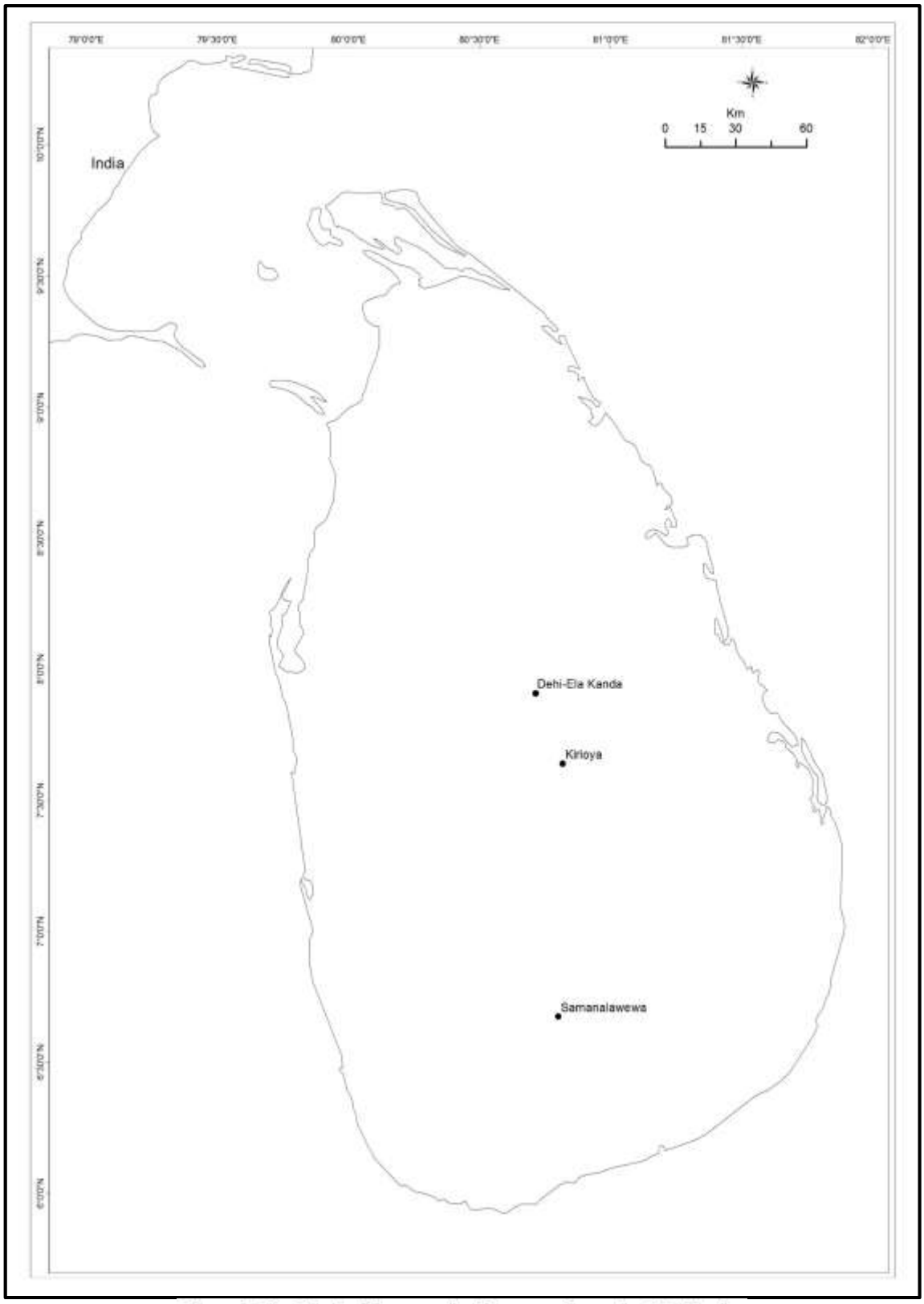


Figure 6.22: Selected iron production areas in ancient Sri Lanka

Evidence for metalworking is lacking at Kantharodai. The presence of slag and ore at Kirinda, however, would suggest a limited amount of iron production in the vicinity. Thantilage (pers.comm. 2014) who conducted a preliminary study of glass slags from Kirinda suggests the possibility of glass production in the vicinity of the site.

The transfer of metallurgical technology has been identified as one of the earliest pieces of archaeological evidence for interaction between Sri Lanka and Southeast Asia. Juleff (2009:557–577) describes a "metallurgical tradition of linear configuration iron-smelting furnaces", the origin of which is traced to a series of Sri Lankan furnaces dating from the 4th century BC to the 11th century AD. Parallel finds from Burma, Cambodia, Sarawak and Japan indicate the transfer of Sri Lanka's metallurgical technology to Southeast Asia (Ibid.:570; Juleff 1995:908, Figures 6.20 and 6.21), which pre-dates the historically documented connections that took place around the 11th/12th century. Buddhist religious connections between Sri Lanka and Southeast Asia could have facilitated the exchange of ideas and technologies. In this regard, two inscriptions are extremely important. The Perimiyankulam inscription (of Vasabha (66–110) describes a mariner named Ayi Sayi, who was of Southeast Asian origin (Paranavitana 1983:66). Similarly, the Mottayakallu inscription refers to a certain *Javaka naya* (*nayaka*), leader of the *Javaka*s. It is possible that Ayi Sayi and the Javakas belong to a group of traders from the Malay Peninsula who migrated to Sri Lanka in the 1st millennium BC (Somadeva 2006:57). Thus, the transfer of Sri Lankan iron technology might be associated with trade and religious relations (Chapter 7.3.4).

Similarly, the export of Sri Lankan steel to the Middle East may be inferred based on references to the high-quality of '*Sarandibi*' (Sri Lankan) steel by the 9th century Islamic writer al-Kindi

(Hoyland and Gilmour 2006). Juleff (2009:562–563) suggests that these references coincide with the large-scale production of high-quality steel at Samanalawewa, which were probably exported to the Middle East. Sri Lankan-made steel was possibly the source of the legendary Damascus swords.

Juleff (2009:574) argues that incipient linear furnace technology was widespread in Sri Lanka from at least the 4th century BC. Although only a few sites with furnaces have so far been found on the island, textual and epigraphic evidence demonstrates the existence of metalworking from pre-Christian times. The early *Brahmi* inscriptions refer to craftsmen working on different kinds of metal, *viz*. *Kabara* (ironsmith), *Tabakara* (coppersmith) and *Topasa* (tinsmith) (Paranavitana 1970). The epigraphic evidence suggests that the *Kammaceri* (blacksmiths) had a separate quarter at Mantai (Chapter 2.3.1.6). Solangaarachchi (1997:37) estimates that more than 10,000 tons of iron could have been produced from the furnaces excavated at Alakolawewa alone. The total output of the furnaces at Samanalawewa reached 3,500 tons, with an annual average of around 350 tons (Juleff 1996:61). Such large-scale production possibly led to iron being one of Sri Lanka's main exports, as attested to by al-Kindi and by Claudius Ptolemy's (*Geographia* 4.1) reference to metal as one the exports of Taprobane. Siriweera (1994:114) also suggested that iron from Alakolawewa may have been exported. The production and export of high-quality iron and steel is considered to be one of the causal factors for the emergence of early urbanism (900–800 BC) at Anuradhapura (Deraniyagala 2004:714).

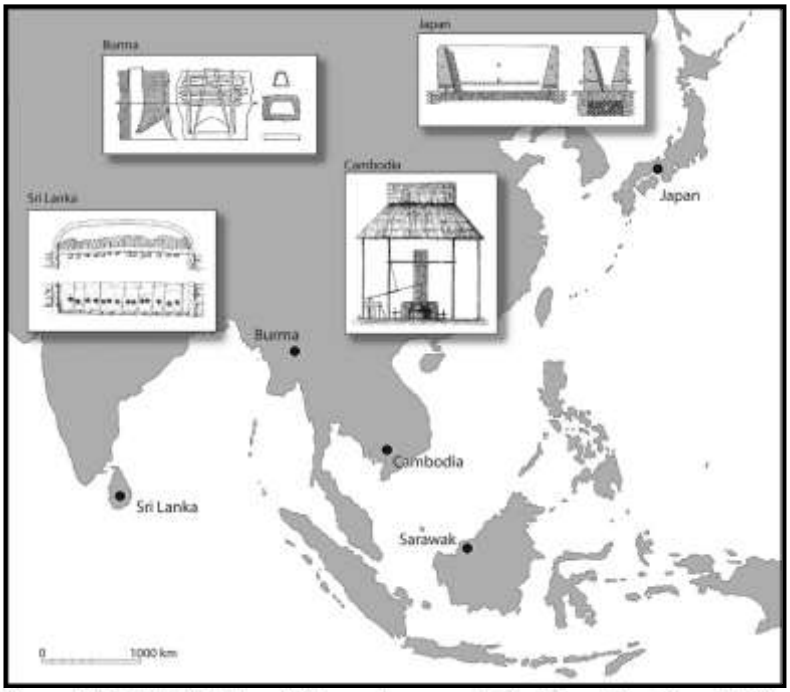


Figure 6.23: Distribution of linear furnaces in South and Southeast Asia (Juleff 2009: 574; Fig.9)

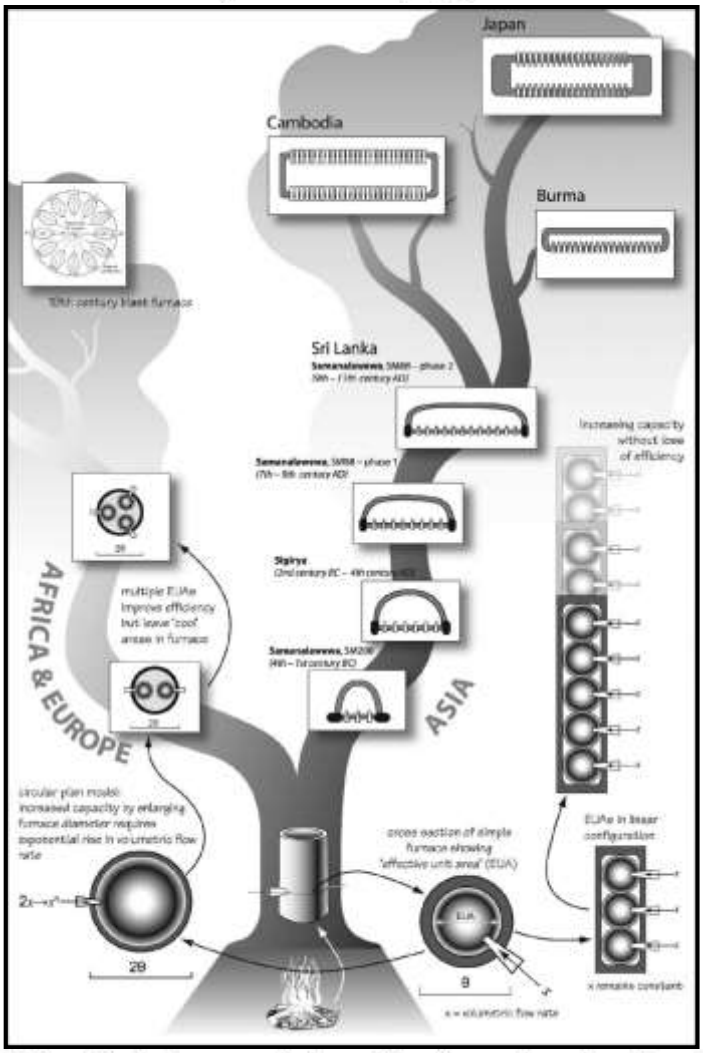


Figure 6.24: Juleff's hypothetical representation of the divergent east-west evolution of furnace (Juleff 2009: 568; Fig. 5)

6.6.3 Archaeobotanical remains, agriculture and trade-exchange networks

Although not discussed in this thesis, the archaeobotanical and starch analyses conducted at Mantai provide important evidence for both local agricultural practices and for the transhipment of crops from various regions in the Indian Ocean (Kingwell-Banham pers.comm. 2014; Catalogue 6.2; Crowther pers.comm. 2014; Catalogue 6.3).[123] Rice, the staple food of the island, is the most common plant find from *ca.* the 2nd century BC to the 12th/13th century AD. The other Sri Lankan/Indian crop was black pepper corn, which occur from *ca.* early/mid-7th century. Of the Indian imports, naked wheat is the most important and occurs increasingly from *ca.* the 8th/9th century. Similarly, several Indian pulses such as moth bean, probable mung bean and probable urd bean, as well as small millets are also found from *ca.* the late 2nd century to *ca.* the late 3rd century.

Lentil (*Lens culinaris* sp.) occurs from *ca.* the early/mid-1st century and its provenance could be either India or the Middle East. Definitive archaeobotanical evidence for Middle Eastern contact comes from the discovery of grape, which dates from *ca.* the early/mid-7th century to the early 8th century. This evidence supplements the higher proportion of Middle Eastern ceramic finds from Mantai (Chapter 3.3.9). Archaeobotanical evidence for interaction with Southeast Asia is represented by only a single clove, which post-dates the 8th/ 9th century. The significance of this find lies in the fact that material evidence for Sri Lanka's contact with Southeast Asia is very meagre.

[123] I am thankful to both Ellenore Kingwell-Banham and Alison Crowther for providing their reports to draw from them for my thesis. The dates assigned to these finds, particularly for phases after Phase VI, are based on dates obtained for the stratigraphy by the author.

6.6.4 Pearl and coral trade-exchange networks

Both pearl and coral were regular trade-exchange items in pre-modern Sri Lanka. Sri Lankan pearls were highly valued and sought-after items in both the east and west alike. Pearls formed an integral part of royal gifts sent by Sri Lankan kings to foreign courts (*Mv.*7:72–74). Similarly, red coral had religious value, with contemporary chronicles describing its association with significant religious events. Pearl and red coral were exchanged for one another in India (Warmington 1928:263–264) and probably in Sri Lanka. These two items are only occasionally found in archaeological contexts. Pearls and red coral have a considerable historical significance with regards to Sri Lanka's early contacts with the Mediterranean region, South Asia and Southeast Asia. While a discussion on the historical context of red coral and pearl trade takes place in Chapter 7.2.2.1.&7.2.3.1, the archaeological occurrence of these items across different sites is discussed below.

6.6.4.1 Pearl

In our Mantai excavation, three unperforated pearls were recovered, all postdating the mid-8th/late 9th century (C4.3.10a). The Carswell et al. (2013) excavation recovered seven pearls, of which three were unperforated. One of these pearls was found in an Early Historic level. Based on these finds and on historical sources, Francis (2013a:367–368) concluded that pearls were processed at Mantai. As it is situated close to the famous Mannar pearl banks, it is likely that pearl fishing and its related industry made a significant contribution to Mantai's development as an international trading port. The importance of pearls is corroborated by the historical records, particularly those from the colonial period.

6.6.4.2 Red Coral

Since at least the 2nd century BC, red coral was a prized item used for decorating royal courts and places of worship in Sri Lanka. Only three pieces of coral were recovered in our Mantai excavation, all of which post-date the mid-8th century.

Fourteen pieces of red coral polyps were recovered from the Kirinda excavations (Figure 6.15), which date from the late 4th to the early 8th century (C7.2.3.2&3). Manamendrarachchi (pers.comm.2015) suggests that the corals in our Mantai and Kirinda assemblages appear to be imports from the Mediterranean region. It is known from historical sources that Sri Lankan kings made special efforts to obtain red corals from the Roman world (Chapter 7.2.3.1). Although our sample is limited, it demonstrates strong connections between southern Sri Lanka and the Roman/Mediterranean world, which is supported by the discovery of late Roman coins along the southern coast (Bopearachchi 1998; Prickett-Fernando 2003a).

The Carswell et al. (2013) excavation recovered two coral beads, including one precious coral (*Corallium rubrum*), from levels dating to between the 1st/2nd century and the 5th/6th century (Francis 2013a:353). This type of precious coral is not found in the Gulf of Mannar, but was imported from the Mediterranean. As such, Francis (Ibid.) identified these coral beads as clear evidence for Early Historic contact with the western world and the Roman Empire. At ASW2, Coningham et al. (2006) report seven pieces of coral contexts dating from 200 BC to AD 1100.[124]

[124] The earlier period in this timeframe seems to coincide with the Roman trade while the later part would be trade with the Persian Gulf and the Middle East following the Muslim conquest of Egypt in 639.

6.7 Chapter summary and discussion

Having established individual biographies for various categories of artefacts across the sites, this section aims to identify the overarching makeup of internal networks and external connections.

6.7.1 Glass bead networks and connections

In my assemblage, beads are made from glass, stone and organic materials. Notably, nearly 80% of the GTBA is made of glass, of which nearly 93% are locally made. Other than beads, 62.5% of the bangles are also glass. A large number of glass beads and bangles also are recorded from other sites, such as Anuradhapura and Tissamaharama. This required an enormous quantity of glass; however, furnaces for glass production have only been reported from Giribawa. Indirect evidence suggests that there was glass production at Mantai and possibly at Anuradhapura and Kirinda. The glass required for making beads and other items probably exceeded the production capacity of these sites. The import of raw glass from India is inferred from the discovery of glass ingots on the Godawaya shipwreck, dated to the 2nd century BC. Similarly, reworking of scrap glass imported from the Middle East is inferred from the quantity of broken glass found at Mantai (section 6.4.1).

The finished beads were traded across the country while others were dispatched to ports for export. An extensive network of communication appears to have existed linking production centres, settlements and major ports in pre-modern Sri Lanka.

6.7.2 Local glass beads: internal networks and external connections

While various types of glass bead were made locally, more than 80% of the local GBA in my sites is comprised of IPB (68.6%), discs (12.2%) and *stupa* (0.1%) beads. The composition of the GBA, however, is not homogenous across sites. IPBs account for nearly 60% of the TBA at

Mantai and Kirinda while they are nearly absent at Kantharodai. In contrast, the occurrence of disc beads is negligible at Mantai and Kirinda, while 76.4% of the Kantharodai beads are discs. Gedige and ASW2, Tissamaharama and previous work in Jaffna/Kantharodai have reported almost equal proportions of disc beads to our Kantharodai assemblage. The preference for the production of particular bead types seem to have varied across sites and through time; it partly depended on intended consumers. The Mantai bead assemblage was tailor-made for maritime trade and is thus dominated by the IPBs, which were in great demand internationally. This is attested by the distribution of Sri Lankan-made IPBs from China and Southeast Asia in the east to East Africa, the Red Sea and the Persian Gulf in the west. Sri Lanka was a chief supplier of IPBs to the maritime bead trade at least from the 2nd century BC to the 12th/13th century AD. For example, more than 50% of the IPBs recovered at Berenike during the late Roman period, as well as those found at Siraf, are identified as being Mantai-made (section 6.4.3.4). Considering the frequent epigraphic and textual references to Sri Lankan mariners/traders travelling to regions in the western Indian Ocean (Chapter 7.3.5), they could certainly have been laded on vessels from the island.

Disc beads were primarily made for local consumption, before the widespread occurrence of IPB. *Stupa* beads, probably produced in southern Sri Lanka, seem to have had religious significance and are found in Buddhist regions of Southeast Asia. The main agents for the distribution of these items would have been religious networks, as well as traders.

6.7.2.1 Local glass bead production and craft specialization

Our glass bead analysis clearly shows evidence for on-site production with a high proportion of production debris. Evidence for bead making is also found from Anuradhapura and

Tissamaharama. This cannot, however, be generalized across the sites examined here, as 98% of glass beads at Kantharodai are finished products. Kantharodai appears to be primarily a consumer rather than a glass bead producer. This is in sharp contrast to Mantai and Kirinda, where more than half of the GBA comprises production debris, which is a strong indication of on-site production. Of these, Mantai was the main producer and specialized in the production of a select few glass bead types of limited colours. While the Kirinda assemblage shows clear evidence for specialization, it was less technologically advanced than Mantai and displays different patterns with regard to the composition of bead type and colour. This may indicate that it catered to a regional clientele rather than the wider markets of the Indian Ocean. It is possible that Kirinda mediated the supply of local products such as garnets and gems to the international market as it is located close to the source of these natural products, however, it never developed into a major production centre and remained a regional port with limited maritime trade.

6.7.2.2 The imported bead assemblage

Despite being small (80 items[125], 3.6% of the GTBA), our imported bead assemblage contains beads from India, Southeast Asia, the Middle East, Rome and other unknown overseas regions. The limited number of beads from such a large geographical region, spanning a long chronological period, indicates the low frequency at which foreign beads were imported. Sri Lanka was primarily a producer for its local market, as well as an exporter of glass beads rather than a consumer of foreign-made beads. Nevertheless, the range and the volume of imported beads are excellent indicators of the relative scale and intensity of external connectivity at each site.

[125] 84 including 'Imp.Unk' 3.7%.

6.7.3 Glass beads: internal networks and external connections

With the widest range and highest proportion of imported glass beads, Mantai displays extensive evidence of maritime trade and cultural contacts when compared with Kantharodai and Kirinda. This conforms to historical and other material culture evidence from Mantai (Chapter 2.3&2.7).

Mantai's external bead networks show a different pattern from those observable from the ceramics. While the Indian-made beads are the largest group of imports in our assemblage, they are, however, limited to five bead types representing 17 items. They date from the mid-3rd century, much later arrival than Indian ceramics, but continued to the 12th/13th century. This pattern displays continued contact, as is made clear from texts and ceramics, but suggests that there was less interest in Indian beads.

Similarly, the Middle Eastern beads at Mantai are limited to eight items, which appear very late, compared to the Middle Eastern ceramics, in the sequence occurring around the 7th century. Three varieties of Middle Eastern segmented beads identified at Mantai are also found in Vietnam. Mosaic cane beads found at Mantai have parallels from Arikamedu, Khlong Thom and Oc Eo (Francis 2002:94) suggesting trading or cultural links between these regions.

Despite being limited to the cornaline d'Aleppo bead type, Southeast Asian beads account for 41% of the total imported GBA at Mantai and date from the early/mid-8th century. This is extremely significant, as material remains that demonstrate interaction between Sri Lanka and Southeast Asia are limited, while textual evidence typically dates from a later period.

Beads tentatively identified as being Roman/Mediterranean are limited to two at Mantai and are likely to be residual. They are most likely to have arrived via Arabian Gulf or through Persian traders.

Although Kantharodai was an urban centre contemporary with Anuradhapura and Tissamaharama, its imported GBA is confined to two 'Imported.Unknown' items—possibly of Indian origin. Despite being a regional port with minimal evidence for external interactions, Kirinda had a comparatively larger imported GBA than that of Kantharodai. Of additional interest is the fact that all of these (Cornaline d'Aleppo) beads are derived from Southeast Asia. They account for 26% of the imported assemblage, and date from the 6th to the mid-7th century. The largest number of these beads is found at Tissamaharama where they date from the early 4th to the 7th/8th century. The circulation of *stupa* beads, which are likely to have had a southern Sri Lankan origin, in Southeast Asia and the clear iconographic similarities between these two regions illustrate direct maritime connections from the early centuries of the CE.

The glass bead evidence both confirms and contrasts with other material and historical evidence. It confirms that Kantharodai's interactions were confined to India and possibly to the Bay of Bengal region and that Mantai's wider interactions encompassed the entire Indian Ocean littoral. The glass bead evidence, however, contrasts with Sri Lanka's limited and patchy relations with Southeast Asia known from texts (Chapter 7.3.4) by accounting for 25% the imported bead assemblage. The bead evidence suggests links between southern Sri Lanka and Southeast Asia that are also evident from iconography (Ibid.). The bead evidence meanwhile contrasts with the textual sources but confirms numismatic data in illustrating possible connections between southern Sri Lanka and the Red Sea/Roman world from the early

centuries. Nevertheless, caution is warranted in drawing conclusions from the small sample size investigated here.

6.7.4 Stone beads: internal networks and external connections

The stone beads analysed in this thesis provide vital insights into trade-exchange networks and Sri Lanka's external connectivity. Stone bead industries at a number of IPB-producing sites in India, Southeast Asia and Sri Lanka demonstrate striking similarities. This similarity, even possible transfer of bead technology, indicates closer interaction between these sites than may be observed when dealing with IPBs.

Of the three sites studied, Mantai has the largest, most varied and longest surviving stone bead industry (1st century -12th/13th century). This contrasts with Francis's (section 6.5.1) claim, that out of all of the IPB working sites in India and Southeast Asia, Mantai had the least impressive stone bead industry and that it began only as late as the mediaeval period. Francis (1990:6) assumed that the collapse of stone bead industries at Khlong Thom and Oc Eo (*ca*. 6th/early 7th century) coincided with the beginning of stone bead working at Mantai and that the stone bead workers of the former sites migrated to Mantai. The earliest stone beads in our assemblage, however, are several centuries older than the abandonment of these two sites. While such migration cannot be verified with our data, constant communication between IPB-working sites is apparent from typo-technological similarities and known historical relationships between sites across regions.

Among our sites, Kantharodai has the oldest StBA (mid-4th/late 3rd century BC - early/mid-1st century BC). While beads of six different stone types are found here, the majority are imported carnelian beads and beads made of high value local raw materials. This is perhaps because

Kantharodai, like Anuradhapura, was an urban centre that perhaps housed an elite class that demanded high-value commodities. It also existed before glass bead making became widespread in Sri Lanka. At Kantharodai, all (15) imported stone beads, alongside other elements of imported material culture, are of Indian origin, illustrating the relatively limited extent of its connections. The early date of the site and its geographic position relative to maritime trade routes is surely the factor behind the limited import of exotic beads.

At Kirinda, the StBA consisted of two carnelians, one quartz and one amethyst. It is not only the least impressive among our assemblages, but also the latest, dating between the 4th and early 8th centuries. This is likely because Kirinda was a regional port and did not have an elite class that sought luxury goods.

Our stone bead analysis challenges the traditional approach of assigning all beads made of raw materials unavailable in Sri Lanka as non-local. I considered production debris as primary evidence for on-site production and found that the majority of the StBA is comprised of production debris. 97% of the Mantai StBA, for example, consists of production debris. Even some beads made of imported raw materials, such as carnelian, seem to have been made locally. This is crucial in understanding Sri Lankan production and its external connections.

Perhaps the most striking feature of the StBA from all three sites is the preference shown for imported or rare and valuable local rocks and minerals. This may reflect the demands of the elite class and is likely related to issues of prestige and social ranking. Urban centres such as Mantai, Kantharodai, Anuradhapura and Tissamaharama, where an affluent class lived, contain a higher proportion of beads made of high-value local raw materials and a large

number of imported beads. Carter (2012) and Karunarathne (2010) argued that precious/semi-precious stones were used for reinforcing social ranking. While the majority of these luxury beads could have been items of prestige, some of them were religious offerings, as is clear from Jetavana *stupa* findings (Hannibal- Deraniyagala 2001).

I recorded the distribution of beads made of the most significant rocks and minerals from the main sites in Sri Lanka, in addition to my own, in order to delineate internal and external trade-exchange networks. It demonstrated the use of both imports and locally available rocks and minerals from across the country. This required well-coordinated networks to extract resources and to transport them to centres of bead production. Seneviratne (1996) argued that the control of mineral/rock resources during the Early Iron Age and Early Historic Period was key to the generation of power by chieftains, contributing to the establishment of local polities (Chapter 6.7.4).

Among the beads addressed here, those of lapis lazuli, carnelian and garnet best illustrate Sri Lanka's external connections. Lapis lazuli, of which the ancient source it is traced to Badakhshan in northern Afghanistan and Baluchistan, is rarely found in archaeological contexts in places such as Anuradhapura and Mantai, where they occur from *ca*. 360 cal. BC (ASW2) to the 12th/13th century (Mantai) (section 6.5.1.2). Thus, Lapis lazuli links Sri Lanka with north-western India and possibly with the Middle East from around the mid-first millennium BC, possibly through the agency of Middle Eastern traders.

Carnelian is one of the largest categories of imported beads/raw materials from my own sites as well as those from ASW2, Gedige and Ibbankatuwa and collectively date from *ca*. 800 BC to

AD 1100/1200 (section 6.5.1.1). The sources of carnelian in Sri Lanka have traditionally been assigned to Gujarat and South India, however, recent scientific and morphological analysis have traced sources of some from Anuradhapura to Thailand and Taxila, Pakistan (Ibid.). These potential sources are suggestive of links between Sri Lanka, Pakistan, western and southern India, and Southeast Asia from at least 800 BC.

Six varieties of garnets occur widely in Sri Lanka, however, concerns have been raised over the lack of evidence of their use for bead making on the island (Section 6.5.1.3). Our own and the ASW2 assemblages, however, provide clear evidence for on-site garnet bead production. For example, 55 out of 56 garnets from Mantai are production debris, indicating on-site production. Garnets from these sites collectively date from the middle of first millennium BC to the 12th/13th century AD (Ibid.).

Since garnet occurs widely in Sri Lanka, the garnets identified archaeologically could have come from a wide variety of sources. The lack of beads made of garnet in Sri Lanka might partly reflect limited local demand, given their ready availability and hence non-exoticness of the material on the island. The export of garnet beads can be inferred from the identification of Sri Lankan-made examples at Somad culture sites (300 BC– AD 800) in Oman and at Angkor (200 BC – AD 200) (Section 6.5.1.3). Thus, both raw garnet and finished garnet beads seem to have been exported to regions as distant as the Arabian Gulf and Southeast Asia from at least 300 BC.

Amethyst occurs comparatively widely in Sri Lanka and has been found in archaeological contexts dating from 300 BC to around the 12th century AD, as is evident from ASW2 (Section

6.5.1.4). Amethysts are also found in our own excavations at Mantai as well as at Anuradhapura and Tissamaharama, which also date to the time range of ASW2. Our assemblage shows evidence of on-site production. Amethyst could have come from any source in Sri Lanka and while none have been identified overseas they could certainly have been amongst the gems and semi-precious stones exported from the island.

The imported stone beads connect Sri Lanka with Afghanistan and various other regions in South and Southeast Asia from around the early/middle part of the first millennium BC. These links appear to have continued to almost the 12th/13th century. The exploitation of local rock and mineral resources seems to date from at least the beginning of the first millennium BC. The evidence for the procurement of resources, processing as finished products for both local use and export, and their distribution indicates well-coordinated internal networks. The kings reserved exclusive rights over high value products while permission to mine gems and engage in pearl fishing was given by his tax authority (Chapter 7.2.2.1). This would have generated income for the state through the king's control over resources. Although Seneviratne (1996) argues that the control of mineral resources by chieftains was a factor that contributed to the emergence of regional polities, I argue (Chapter 6.7.4) that the concentration of absolute power in the hands of kings never fully materialised during Sri Lanka's history.

6.7.5 Other commodities: internal networks and external connections

Archaeobotanical evidence for the cultivation of rice and the importation of a number of agricultural products was found at Mantai (section 6.6.3). The cultivation of rice is evident from the 2nd century BC to the 12th/13th century AD. Extensive physical remains of irrigation and historical evidence support this finding (e.g., Brohier 1934–35). Several Indian pulses and

small millets were imported by the late 2nd century and Indian naked wheat occurs in our assemblages from the 8th/9th century. Meanwhile, Indian or Middle Eastern-derived lentils are found from the early/mid-1st century, while the remains of grape dating from the early/mid-7th century onwards provide clear evidence for Middle Eastern contacts. Similarly, the recovery of cloves from levels post-dating the 8th/9th century offers rare material evidence for trade with Southeast Asia. Some of these materials, including grapes and Southeast Asian spices, could have been transhipped via Mantai, although some would undoubtedly have been consumed by local elites.

Bangles made of glass and organic materials were recovered from our excavations. While Mantai had the oldest and largest bangle industry (late 1st century–12th/13th century), the small Kirinda assemblage (late 3rd–mid-7th century) was probably derived from Tissamaharama. Glass bangles/rings are reported from other sites, such as ASW2 (Coningham 2006:349–352). At Mantai, organic bangle workers made optimal use of the available resources of the Mannar Gulf, while the glass bangle industry seems to have been linked to the bead industry. Interestingly, the Mantai bangle industry predates that of India, perhaps reflecting inspiration from Middle Eastern traders. Bangle production could have been for both local consumption and export probably alongside beads to the same markets, such as to Siraf.

Metalworking was one of the largest industries in ancient Sri Lanka, with considerable evidence from the sites analysed in this thesis, particularly Mantai, dating back to the middle of the first millennium BC. Clear evidence for high quality iron and steel production, including furnaces, is recorded from sites such as Samanalawewa and Dehi-ela Kanda (section 6.6.2).

Their production exceeded the needs of local consumption and it is thought that steel was exported. References to high quality 'Sarandibi' steel in Arabic literature are interpreted as evidence of the export of Sri Lankan steel to the Middle East (Hoyland and Gilmour 2006). More importantly, the transfer of Sri Lankan linear furnace technology, dating from the 4th century BC to the 11th century AD, to Southeast Asia is also suggested (Juleff 2009:557–577). This evidence supplements other evidence for Southeast Asian trade links, including the recovery of a Southeast Asian beads as well as iconographic and epigraphic evidence (Chapter 6.4.4.3).

Both archaeological and historical evidence exists for the existence of pearl and red coral trade–exchange networks between Sri Lanka and the Roman world as well as between Sri Lanka and India and China (Chapter 7.2.2.1&7.2.3.1). Pearl was one of main attractions for international traders visiting Mantai, where our limited pearl finds date from the mid-8th/late 9th century upwards. Similarly, limited red coral finds were recovered from Mantai and Kirinda. The Mantai material post-dates the early 8th century and while Kirinda corals are from the late 4th to the early 8th century. Francis reported coral beads from the 1st/2nd century to the 5th/6th century from Mantai, however, ASW2 demonstrates the earliest and longest time range for the import of corals from 200 BC to AD 1100 (Coningham et al. 2006). The provenance of Mantai and Kirinda corals has been traced to the Mediterranean. Historical sources clearly indicate the import of coral from the Mediterranean for religious use, while Sri Lankan pearls were amongst the gifts typically sent to various royal courts and a highly sought after commodity from the time of *Arthashastra* (2.11.2) and Pliny (*NH*.6.24.81).

Significantly, 88% of the total number of red coral finds in our assemblage are from Kirinda. The recovery of the largest quantity of late Roman coins from the southern and Southeastern regions of Sri Lanka – where Kirinda is located – suggest the presence of strong contacts with the western world that are not addressed in historical texts. This may suggest a direct maritime link between the Red Sea and southern Sri Lanka, or at least the presence of Red Sea ships circumnavigating the island and stopping at southern Sri Lankan ports for repairs, re-provisioning and trade.

Archaeological evidence clearly indicates Sri Lanka's far-flung trade–exchange networks across the entire Indian Ocean littoral and interior urban centres from China in the east to the Mediterranean and Africa in the west. Such extensive trade–exchange requires advanced organisation, a well-developed legal system and various stakeholders both at local and international levels. While the archaeological evidence does not warrant the identification of such institutions, agents and legal framework, adequate insights can be gained from historical sources. That discussion takes place in Chapter 7.

CHAPTER 7

INTERNAL NETWORKS AND EXTERNAL CONNECTIONS:

A HISTORICAL APPRAISAL

7.1 Introduction

Having discussed the material evidence for internal networks and external connectivity of Sri Lanka, this chapter considers the historical evidence. It does not aim, however, to provide a comprehensive analysis or even a summary of the array of historical sources available, as it is beyond the scope of the present work. Sri Lanka's historical interactions with various regions on traditional themes such as political, religious, commercial and cultural interactions have been sufficiently discussed elsewhere (Table 7.1).

Table 7.1 Previous studies on Sri Lanka's external interactions by region

Region	Selected references
India	Bandaranayake (1991), Perera (1952:192–203); Nicholas (2003b:263–267); Bopearachchi (2008:1–32); Pathmanadan (1984:15–30); Indrapala (2003:153–160)
China	Werake (1978, 2003:213–223), Bastiampillai (1990:1–17), Weerasinghe (1995)
Southeast Asia (SEA)	Paranavitana (1966:205–212); Gunawardana (1967); Wickramasinghe (1960), Casparis (1961:241–243); Chandra (1979:267–285), Dupont (1959:631–636 cited in Casparis 1990); D'Ancona (1952); Rohanadheera (2000); Dias (2002:170–183)
Middle-East (ME)	Kiribamune (2003:171–182), Imam (2003:165–170), Dewaraja (2003a:183–190)
Roman world	Weerakkody (1997), Bopearachchi (2006:181–200); Abeydeera (2009:145–165)

In contrast, this chapter focuses on commodities that can be identified from historical sources and archaeological findings that were traded/exchanged for the reconstruction of Sri Lanka's external connections. The approach I adopted throughout this thesis was to identify key artefacts, build their biographies and then reconstruct possible connections. While identified commodities are tabulated under imported, exported and imported categories (Tables 7.2 and

7.3), the historical context of selected objects is reconstructed to determine their geographical and temporal distribution as well as agents involved. The discussions on imports, exports and transhipping trade are based on above tables, which include the necessary references.

Historical sources provide limited but valuable insights into the identity of stakeholders and how they were organized. Identifying these stakeholders and their organization facilitates reconstructing internal and trade-exchange networks. Therefore, key issues relating to the organization of internal trade, including internal networks linking market places, production centres, resources bases, ports as well as the rules and regulations adopted, agents of internal and external trade and Buddhist networks that facilitated establishing external links are discussed.

7.2 Commodities in trade and exchange

Demand for eastern luxuries were the main driving force behind the expansion of western maritime trade into South and East Asia (cf. Gibbon 1993:64; Tomber 2008:16). These commodities included both natural products and man-made luxury items. The eastern states in turn longed for western products, most of which were consumed by elites or used for religious purposes.

Sri Lanka was at the centre of this trans-oceanic trade, and its ports, such as Mantai, acted as entrepôts, deriving material from both ends of the Indian Ocean, and from mainland South Asia. The island also exported its own products, as numerous local and foreign accounts, such

as Cosmas (XI.16), testify[126] Tables 7.2 and 7.3 provide a summary of the items exported and imported, along with their possible provenance, and the date of the transaction. They illustrate the range of commodities traded/exchanged, the island's internal networks and its far-flung external connections. Given the exigencies of space, only selected commodities are discussed in order to observe the nature of these exchanges, and the geographical regions involved.

7.2.1 Categories of commodities

This chapter focuses on key commodities that are mentioned in historical sources as being traded/exchanged belonging to three categories *viz*. exported, imported, imported and transhipped.[127]

The first two categories include objects that are always referred to as being imported and or exported in texts. The objects in the third category, however, have been mentioned as imported in some sources while exported in others. I argue that these items represent transhipping trade as the objects and animals cited are non-native to the island. Sri Lanka was a terminus for traders coming from both the eastern and western parts of the Indian Ocean (cf. Comas II and IX; Procopius I.20.9–13), providing the island the role of a middleman in east–west maritime trade (Prickett-Fernando 1994).

[126] "....As its position is central, the island is a great resort of ships from all parts of India, and from Persia and Ethiopia, and in the like manner it dispatches many of its own to foreign ports……" (Cosmos XI.16).

[127] Wheeler's (1951:352-4) 'Transit trade' may come closer to my third category, though lack of western commodities is not a criterion in my category.

Some commodities, such as pearl and red coral, seem to have been traded or exchanged for each other. Since every region has its own natural and manufactured objects, it is likely that they were traded and exchanged as a 'package'. While archaeological material rarely represents all that was traded/exchanged, the ceramic assemblage clearly represents the ceramic package that was imported from the Middle East and Far-East. In Chapter 6, I argued that beads and bangles were probably included in the Sri Lankan export package and traded to the same international markets. The Sri Lankan compendium of esteemed items, which were sent to many royal courts as gifts/tributaries, can be traced from historical sources. This compendium mostly included high value natural products (*Mv.*7:50).

7.2.2 Exported commodities

Amongst the wider range of local natural and man-made products exported, the most desired items were precious stones and pearls. They were traded, exchanged or sent as gifts to India, Middle East, China, Egypt, Rome and Persia at least since the 6th century BC (Table 7.2, below).

7.2.2.1 Historical evidence for pearl fishery and maritime networks

In Chapters 4 and 6, I discussed the archaeological occurrence of pearl at Mantai, which is situated in the proximity of famous pearl banks. The pearl fishing/industry made an enormous contribution to Mantai's development as an international port (Figure 7.1).

The Persian Gulf and the Gulf of Mannar were renowned for their pearl oysters *(Pinctada radiata)* and chanks *(Xancus pyrum)* in the ancient word (Streeter 1986:210). In the latter, the pearl banks were located on either side boarding the Thinnavelly coast of South India and on the north-western coast of Sri Lanka (cf. Streeter 1886:210; Cooray 1967:73; Ray 1993:25).

Korkai, the capital of the Sangam Pandyas (McCrindle 1984:140; Sastri 1972:31) on India and Mantai on Sri Lanka were the main international ports, which were involved in pearl trade in this region. In Sri Lanka, the pearl fishery had taken place at small ports such as Arippo, Candotchy and Pomparripo several miles south of Mantai (Percival 1803:86–87). Mantai seems to have acted mainly as a pearl processing and distribution centre.

Historical sources are explicit about the pearl fishery in the Gulf of Mannar and the demand for its pearl, in both western markets and the Asian royal courts (Vincent 1807; Percival 1803; Casson 1960:8, 178, 224, 231). The Indian works, *Mahabharatha* (4th century BC) and *Arthashastra* (2.11.2; 4th/3rd century), state that Sri Lanka was a source of pearls. The latter mentions Kula (*Kala Oya*) of the north-western coast as the source of Sri Lankan pearls. A number of *Sangam* works such as *Kalitokai* (131:22) *and Akananuru* (350:10–11) refer to the pearl fishery in the Gulf of Mannar and a pearl fishing community named Paratavar at Korkai (Rajayyan 1995:29). The same Paratavar community is known as 'Barata' in Sri Lanka (Seneviratne 1985b:49–56; Rajan 2011:183). This may indicate that they moved between the two countries for pearl fishery related activities and later settled down in Sri Lanka.

Mahavamsa makes many references to pearls from the time of the island's first historical king, Vijaya (*ca*. 500BC) who sent envoys with gifts including pearls to Pandya king seeking consorts (*Mv.*7:50). King Devanpiyatissa (250 - 210 BC) also sent eight kinds of pearls as gifts to Emperor Asoka (*Mv.*11:13–25). Similarly, King Agrabodhi VI (733–772) despatched four embassies (in 742, 746, 750 and 762) to China (Werake 2003:213–223) and sent pearls as gifts every time, indicating the reputation of Sri Lanka's pearls in China and the significance of pearl industry at that time.

The import of pearls to Rome from Persia, India and Sri Lanka appears to have begun after Alexander the Great's expedition to India (Ogden 1996: 37; cf. *Schörle* 2014). Megasthenese (McCrindle 1972:62) mentions Sri Lankan pearls as being larger than those of India. This is also reported by Ptolemy (VII,89), Periplus (61) and Pliny (IX, 58). Pliny cites pearls of the Gulf of Mannar as the most productive of pearls from all parts of the world (Hornell 1922:6). Sri Lankan pearls are whiter colour than those found in the "gulph of Ormus, on the Arabian coast" and were more esteemed in Europe (Percival 1803:97).

Colonial records provide invaluable information about the pearl fishery in the Mannar Gulf and Palk Bay, since Sri Lanka's pearl fishery was conducted during the colonial period "in much the same way as was practiced some 2000 to 3000 years ago" (Turner 1922:89 and also Maharoof, 1992:109–114). Vincent (1807) records that 'around fifty to sixty thousand people consisting of merchants, tradesman, mariners, divers etc. assembled at the pearl fishing sites of Kondaichchi, Silavatturai and Arippu' during the pearl fishing season'(Percival 1803:86–87; see also Percival (1803:86)). Only few natives, however, were engaged in the pearl fishery despite being carried out on their island (Percival 1803:103).

Thus, Sri Lanka has been truly an international centre for the pearl trade during pre-modern times. Divers, merchants and jewellers from around the Indian Ocean flocked to the north-western coast where Mantai was the main international sea port. While Indian divers seem to have outnumbered natives, Arabs from the Persian Gulf, where pearl fishery had a long history, appear to have played an extremely important role both in the pearl fishery and trade, particularly during the peak of Islamic trade (*ca.* 7th–13th century). The competition in the industry could have created a competitive market for pearls**.** These pearl banks in the north-

western coast of Sri Lanka were one of the major attractions for the maritime traders of the Indian Ocean. Therefore, the pearl trade may be considered as one of the catalysts for Sri Lanka's external trade.



Figure 7.1: Pearl recovered in the Mantai excavation (2009/10) (Bohingamuwa 2016) They date from early/mid-8th century to 12th/13th century

Table 7.2: Exported Sri Lankan commodities			
Commodity	**Exported to**	**Time period**	**Selected references**
Pearls	India, ME, China, Egypt, Persia	From ca. 3rd C. BC	*Arthasatra*; MV.7:72–74; PME 59 and 61; NH 6.24.81; Sidebotham 2011:237; al-Beruni
Sapphires	Egypt, Berenike	Late Roman Period	Sidebotham 2011:237; Perera 1952
Spices	Unspecified foreign countries	?	Perera 1952; Prickett-Fernando 1990, 2003a
Rice	Kaveripattanam	From ca. 1st C. BC	Pattinappalai; Geography 4.1
Beads; Indo-Pacific beads	South East Asia, Africa, Egypt (Berenike)	Late Roman Berenike	Sidebotham 2011:237; Francis 2000:221–223; Francis 2004:450–504, 525–530
Gems & minerals	Rome	ca. 1st C. BC	Perera 1952; PME 61
Garnet	Oman	Mid- 9th C. AD	Schussler *et al*. 2001:240–241; Rosch *et al*. 1997
Hyacinth stone		1st to 6th C. AD	NH 7.4.1; Cosmas XI
Quartz	ME; Persia	ca. 10th C. AD	al-Beruni (d. after 1058); Ibn Sina; Imam 2003:166
Carnelian beads	Berenike	Late Roman	Sidebotham 2011:237
Cotton/muslin garments		From ca. 1st C. AD	PME 59 and 61
Turtle shells,	Unspecified foreign countries	From ca. 1st C. AD	PME 59 and 61; NH 6.24.91
Beryl, Ginger, Honey, Amethysts, metals	Unspecified foreign countries	From ca. 1st to 9th C. AD	Geography 4.1
Elephants and tiger	Persia (to King Anusharwan) and other places	From ca. 1st C. to 9th C. AD	Geography 4.1; al-Beruni; Imam 2003:165
Teakwood, 7 Pearl Divers		ca. 10th C. AD	al-Beruni; Imam 2003:165
Cloves	?Persia		Ibn Shahryar's Kitab fi Tahqiqi Ma Li'l Hind; Imam 2003:166
Ruby; Precious stones	Persia	ca. 9th/ 10th C. AD (Persia)	al-Ishkhri (d. 951); al-Beruni (d. after 1058); Ibn Sina; Imam 2003:166; Kiribamune 1990:175
Herbs & spices	Persia	ca. 10th C. AD	al-Ishkhri (d. 951); al-Beruni (d. after 1058); Imam 2003: 166
'*Dooshab*' (*Kitul* Treacle)	Persia	ca. 10th C. AD	al-Ishkhri (d. 951); Imam 2003:166, 1965:10
Aloes woods	Persia/ Arabia	ca. 10th C. AD	al-Ishkhri (d. 951); Kiribamune 1990:176
Ivory, Ivory Carvings	Exported	3rd C. AD	Perera 1952, Prickett-Fernando 2003a:76
Shell Bangles	Export		Prickett-Fernando 2003a:76
Iron/Steel	Arabia (Yemen), Persia Gulf	9th C.AD	al-Kindi; Prickett-Fernando 2003a:76; Juleff 2009: 562–563
Elephants	India	3rd C. BC	McCrindle
Camphor and Sandalwood	Cambodia	AD 1055–1110	Kiribamune 1989:69
(Coconut) Coir, Coconut trunks	Oman and Yemen	12th C. AD	Siriweera 1994:215; Gunawardana (2003:23, 1990:31- based on Idrisi)
Muslin	Rome	ca. 1st C. AD	PME 61

Table 7.3: Imported commodities			
Commodity	**Origin**	**Time period**	**Reference**
Textiles	India; Persian Gulf	12th/13th C. AD	*Rajatarangani; Guttila Kavya*: v.233
Silk	China	2nd to 8th C. AD	Sigiri Graffiti & Paintings (Paranavitana 1956, 1971); Kotavehera findings (Colombo Page 2011); Chulavamsa Mv.76:34)
Karshapana	Northern & N.W. India	3rd C. BC	Paranavitana 1970 number 791; Codrington 1924:16; Paranavitana 1970 number 1205); Bopearachchi 1997:277
Punch-marked coins	North India	ca. 6th to 2nd C. BC	Codrington 1924; Bopearachchi 1997:278
Perfume, Carpets	Persian and Arabian Gulf?	??	Prickett-Fernando 2003a:53
Horse	Persia; Sind; Oman	600 BC onwards	Prickett-Fernando 2003a:76; Cosmas Indicopleustes (Christian Topography) ed. F.O. Winstedt (1909:322); Kiribamune 1990:172
Red coral	Mediterranean	ca. 1st C. BC onwards	De Romanis 1997:189–191); Sidebotham 2011:237; NH 32.11.21 and 32.11.23; Vamsattappakasini XXXIV:74
Carnelian	Gujarat; Thailand	5th C. BC to 18th C.AD	Bopearachchi 1997:XIV, Bopearachchi and Weerakkody 1998:134
Carnelian Seals	Gujarat, Deccan, India	ca. 5th C. AD to 3rd C. AD	Prickett-Fernando 2003a:76
Glass/ glass vessels	Rome, Persia, Syria, Egypt	ca. 3rd C. BC onwards	Prickett-Fernando 2003a:76; Coningham 2006:356
Glass vessels and objects	Egypt, Syria and Persia		
Lapis lazuli	Afghanistan; Badakhshan, N. Afghanistan; Aravalli Range	From ca. mid- 1st Millennium BC	Bopearachchi 1997:XV, 2002:107–108; Bopearachchi and Weerakkody 1998:145; Coningham 2002:104; Kenoyer 1998
Amaravati Marble	South India/Sri Lanka	1st C. AD onwards	Prickett-Fernando 2003a:76
Nestorian crosses			Prickett-Fernando 2003a:76
Intaglio seals	India, Rome, Persia, Sri Lanka	3rd C. BC- 3rd C. AD	Prickett-Fernando 2003a:76
Glass; Kohl sticks	Egyptian & Persian	9th to 13th C. AD	Coningham 2002:99
Sherds of glass	Eastern Mediterranean	1st C. BC to 1st C. AD	Coningham 2002:101
Colourless & coloured, grooved bowls	Egypt, Syria and Persia	Late Hellenistic & Early Roman	Coningham 2002:101
Iron tweezers; Saw blades	Graeco-Roman affinities	?	Coningham 2002:102, 2004; Stern *et al.* 2008:412
Axumite coins	? Ethiopia	?	Tomber 2008:147; Walburg 2008:54
Nestorian Cross	Persia	ca. 6th C. AD	Christian Topography 3.65, 11.14
Silver Larins of Fish-hook coins of Persia	Persia	?	Nicholas and Paranavitana 1961:163; Imam 2003:165
Arab Coins	Arabia	?	Codrington 1924:158
Chinese coins	China	?	ASCAR 1911-12:64, 1930-31:8, 1950:23
Ivory Carvings	India?	?4th/6th C. AD	Prickett-Fernando 2003a:76
24 imported ceramic type	India, Rome, Middle East, China	Before 600 AD	Prickett-Fernando 2003a:55

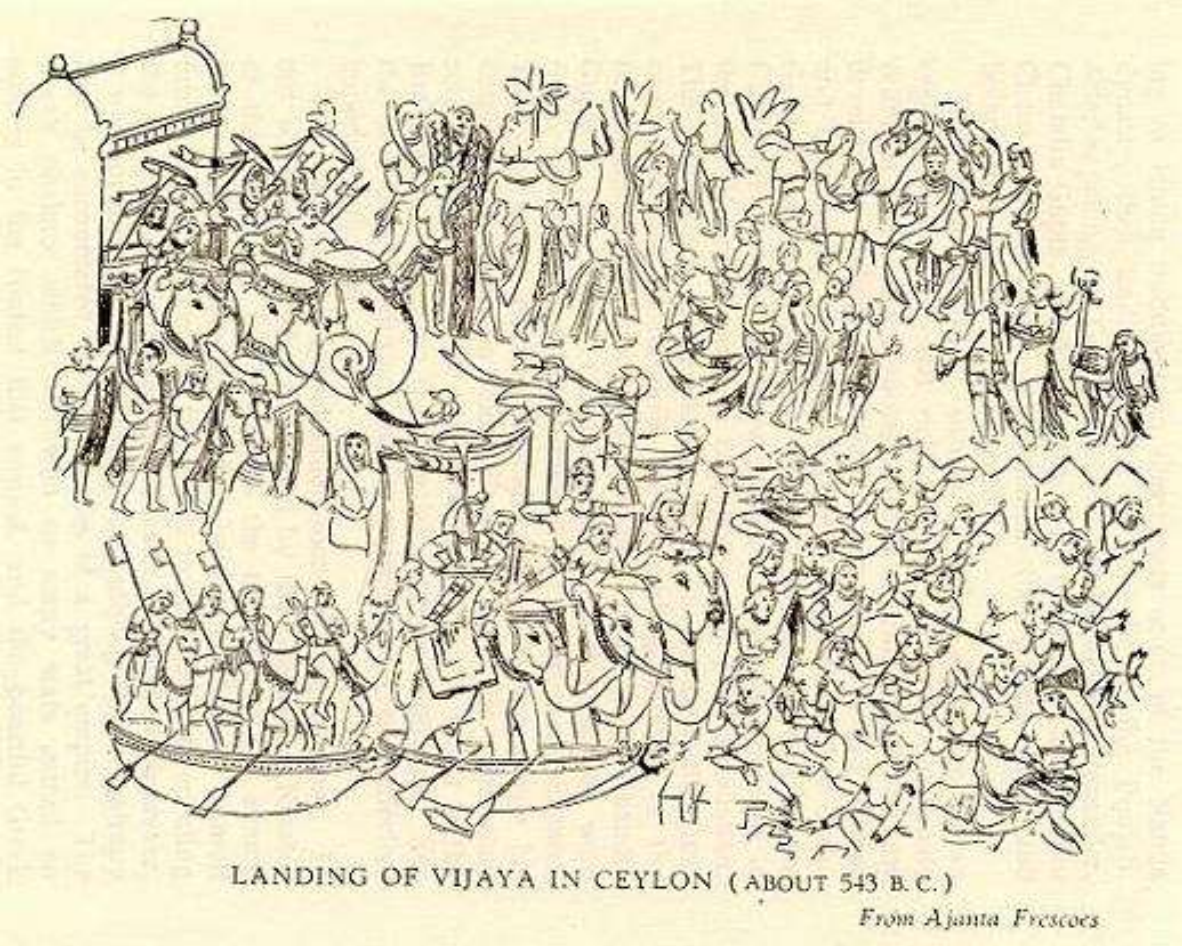


Figure 7.2: Landing of Prince Vijaya and his companions in the island as depicted in the Ajanta caves (Panikkar 1947), Cave number 17

The island's best-known natural commodities were, however, precious stones. Indian texts refer to the island as *Rathnadvipa* (Manimekhalai Canto XI, V. 21–26), while it was also called as Jerizat-*al-Yequt* (Hitti 1924:215–216) in Arabic and *Pao-Chu* (Beal 1884:236) in Chinese sources. The meaning of all these terms is the land of gems. The *Arthashastra* (Shamasastry 1919:83) mentions Sri Lanka as a source of gems, which were among the gifts sent to royal courts cited earlier.

A range of semiprecious stones are recorded from our Mantai, Kantharodai and Kirinda excavations, as well as from many other excavations carried out on the island. Gemstones were used for personal ornaments, as demonstrated by the discovery of an earring at Sigiriya

(Figure 7.3). Archaeologically, two Sri Lankan sapphires have been found from late Roman contexts at Berenike and at Shenshef (Sidebotham 2011:237), which had been cut and fitted into jewellery. Sidebotham (2011:192; see also Harrell (1999:114) is certain about the Sri Lankan origin of these stones. Sidebotham (2011:237) notes that "Sri Lanka was especially active in trade with Berenike in the late Roman time", as is clear from the presence of Sri Lankan beads at the site. The discovery of a large quantity of late Roman coins in Sri Lanka attests to this claim (Figure 7.4). The Periplus (59 and 61) also mentions Taprobane as a source for gemstones. Similarly, both al-Ishtakhri (951) and al-Beruni (after AD 1058) record precious stones, herbs and spices as the main exports from Sri Lanka to Iran, with rubies the most frequently listed gem (Imam 2003:166). Thus, precious stones were an important component of Sri Lanka's export trade, and by extension they formed one of largest sources of income for the state. Mining was a royal monopoly, though non-state mining was permitted for a fee. The king, however, reserved his prescriptive right over all gems above a certain weight (Perera 1952:15).

Thus, the exported commodities, as reflected in the historical sources, provide clearer information about the geographical regions and period of the transactions, agents and the mechanisms through which they were traded/exchanged. The historical account of the Mannar pearl fishery gives a vivid picture of the international market that Sri Lanka seems to have been part of.



Figure 7.3: Gold earring fitted with a gem (Amethyst?) stone recovered from Sigiriya (6th-8th century) (Provenance ?Sigiriya (*ca.* 5th century)

7.2.3 The imported commodities

The commodities discussed in this section (based on Table 7.2), in addition to those mentioned in the literature, include selected archaeological finds. Even with these, the range of imported commodities are limited in comparison to those being exported. In terms of volume, however, the amount of ceramics and coins from my excavations and Sri Lanka in general (Weisshaair 2001; Coningham 2006; Carswell et al. 2013) certainly exceed any other material.

The vast majority of imported commodities, excluding ceramics, are coins (Bopearachchi 1998; Figure 7.4), from around the Indian Ocean, most of which could be related to commercial transactions. Others include luxury commodities such as items of personal beautification, general household decorations, luxury items such as glass and ceramics, iron, gold and silver objects. Imports also included items used for the decoration of religious and royal places (silk, red corals), as well as objects that are symbols of religions and authority (e.g., Prickett-Fernando 2003a).

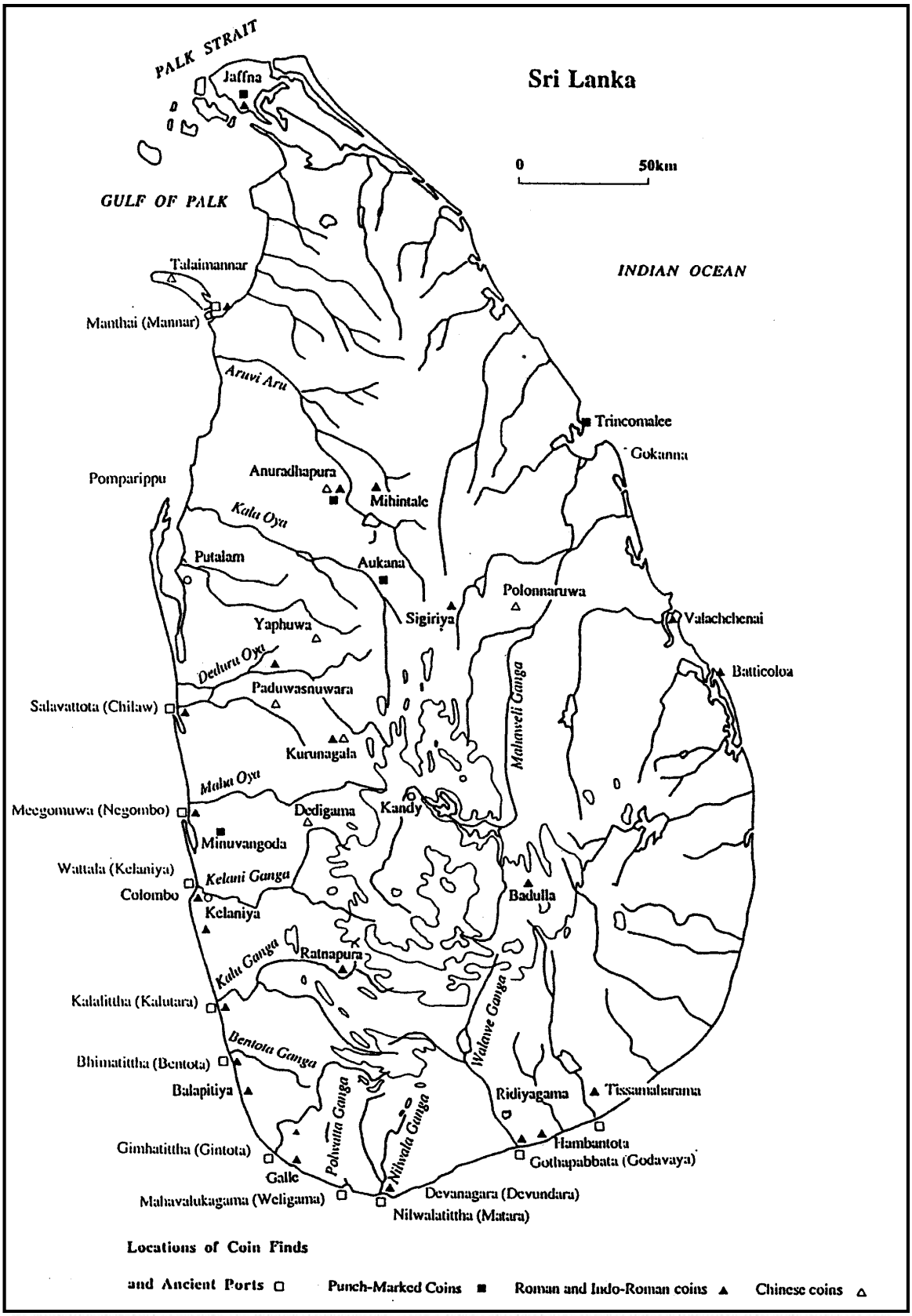


Figure 7.4: Find spots of coins and ancient sea ports in Sri Lanka (Bopearachchi 1998:175; Map no. 1)

The foodstuffs imported were wine and wheat, grapes and cloves. Horses and elephants are the exotic animals imported, that could have been exclusively used by royals/elites.

The limited range of imported material seems to have been primarily used by elites and for religious purposes. The provenance of these materials indicates Sri Lanka's interaction with Rome, Egypt, the Persian Gulf, South Asia, and the Far-East (Table 7.2) from the beginning of the first millennium BC (e.g., Indian fine ware ceramics) to the modern period; the earliest contacts likely being with Southern India. Thus, imported commodities illustrate Sri Lanka's far-flung interactions with various regions from across the Indian Ocean at least since the beginning of the first millennium BC, which can further be explained by placing selected items in their historical contexts.

7.2.3.1 Historical context of red coral trade and maritime networks

In ancient Sri Lanka, red coral was one of the most popular items used for decorating royal courts and places of worship. They are recorded from Mantai, Kirinda (Chapters 4.10.3.3 and 6.4.4.4; Figure 7.5) and ASW2 (Conningham 2006) in small quantities, indicating the use of coral since at least 200 BC. Most items from our Mantai and Kirinda excavations, however, date from *ca.* the 8th century. Red coral is important material to demonstrate the island's maritime trade with the west as the source of red corals in South Asia is generally assigned to the western Mediterranean (*NH.*32.11.21). Red Sea ports such as Berenike seem to have exported red corals (Periplus, 28, 39, 49, 56; Sidebotham 2011) to South Asia as well. The *Arthashastra* (2.11.42) mentions the import of red corals from the Mediterranean, which appear to have come via Alexandria (Ray 1986:131; Sidebotham 2011).

With regards to corals in ancient Sri Lanka, the *Vamsattappakasini* (*Vp.*:630) mentions that King Bhatikabhaya (AD 35–63) sent an envoy to Rome for obtaining red coral to adorn *Mahathupa* in Anuradhapura. The *Mahavamsa* (*Mv.*34:47–48) refers to the same king decorating *Mahathupa* with nets made of beads (*pabaludel)* and pearls *(mutudel*). Even in India, coral was most often associated with caskets in Buddhist *stupas* such as Boria, Piprahwa, Nagarjunakonda, Bhattiprolum and Taxila, and with the plastering of *Vajrasana* (seat of gem)*,* at *Mahabodhi* in northern India (Deo 2000:21).

As mentioned by Warmington (1928:263–264), pearls were probably exchanged for corals in ancient Sri Lanka. Mantai is situated near famous pearl banks, and would have been the best positioned port for such an exchange trade. The discovery of beads made from corals at Kirinda (Chapter 7.2.3.1) demonstrates their appeal as personal adornments.



Figure 7.5: Red corals recovered from Mantai excavation 2009/10 (Bohingamuwa 2016)

7.2.3.2 Horses

Horses were high-valued imports that were exempt from taxes as a means of encouraging their trade in Sri Lanka (Cosmas XI.23; McCrindle 1877:165). Horse traders were a powerful social group who could even overthrow kings, for example, Sena and Guttika (177–155 BC) were such South Indian horse sellers who overthrew King Suratissa (247–237 BC) and ruled

from Anuradhapura for 22 years (*Mv.*21:10). These horse traders were intimately connected with the royal courts and, having access to inside details, acted as informers to *Chola* kings about opportune moments to mount attacks on Sri Lanka, as happened during the reign of Mahinda V (981–1019) (*Mv.*55:10). Horses were imported from both Persia and the Indus Valley/Sindu, through South Indians who appear to have acted as intermediaries.

7.2.4 Imported and transhipped

The fact that some exotic animals that are not native to Sri Lanka and materials such as silk that were not produced on the island have been mentioned in various foreign historical sources such as Ptolemy's *Geographia* (4.1) *Rajatarangani* (:294–297) as being imports from Sri Lanka indicates that these items were transhipped via island ports. Meanwhile some of these items are also listed as imports to the island in some foreign and local sources (JRASCB Vol. XXIV, No 68:97ff; JRASCB Vol. XXVII, No 73:31; *Mv.*76:34). Therefore, it is possible that some of these items were traded and exchanged by local/non-local marine traders at Sri Lankan ports or the island imported them and then re-exported to foreign markets. Either way Sri Lanka acting as a hinge between two sides of the Indian Ocean could have made a huge profit out of this transhipping trade. The regions and the period of these transactions can be illustrated by placing selected items in their historical contexts.

7.2.4.1 Elephants

Elephants are perhaps the only type of animal to have been exported from Sri Lanka. Sri Lankan elephants were considered to be larger, more powerful and intelligent than those of India (McCrindle 1877:173–175). Sri Lankan kings are said to have sent elephants to the king of Kalinga (Ibid.). Elephants and horses, however, are depicted in a ship in Ajanta in India,

being exported to Sri Lanka (Figure 7.6). Evidence above suggests both import and export of elephants.

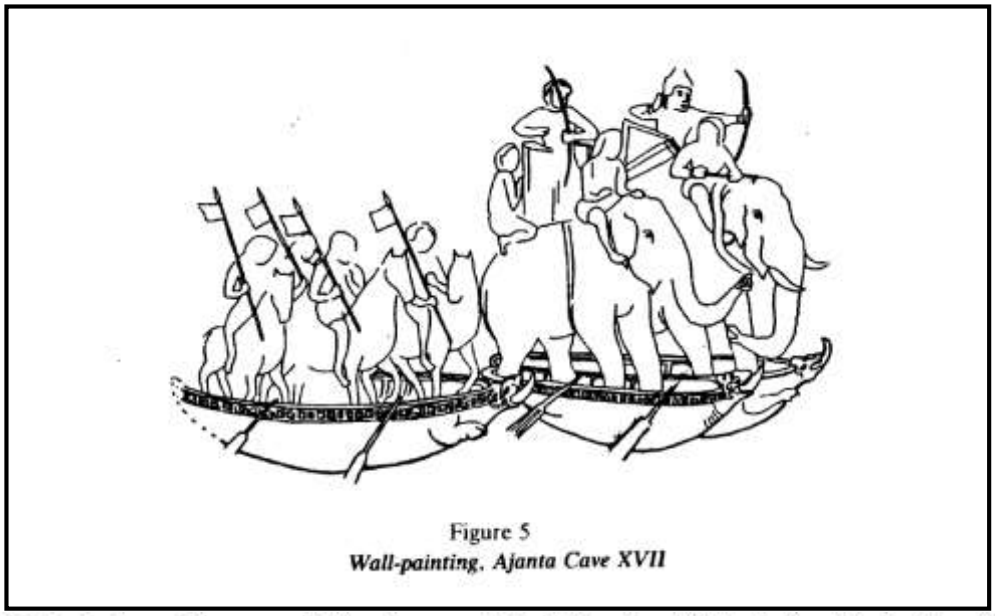


Figure 5
Wall-painting, Ajanta Cave XVII

Figure 7.6: Elephants and horses are being transported to Sri Lanka—Wall-painting, Ajanta Cave XVII, India (Ray 1990: Figure 5)

7.2.4.2 Textiles

Textiles were imported to Sri Lanka from both India and China. The earliest reference to Chinese silk is found in Sigiriya, where the *Apsaras* depicted in the painting are described in graffiti as wearing Chinese silk (Paranavitana 1956; Figure 7.7). The *Mahavamsa* (*Mv.*76:34) mentions that King Parakramabahu (1153–1186) adorned *Sarasvatimandapa* with Chinese textiles and other material – no doubt a reference to Chinese silk. Chinese sources also confirm the export of Chinese textiles to Sri Lanka (J.R.A.S. (C.B) Vol. XXIV, No. 68, p.97), while according to Procopius (I.20.9–13), the Romans purchased Chinese silk through Persians who bought them in Sri Lanka. Archaeologically, a piece of Chinese silk has been found at Kotavehera Buddhist *stupa* Deliwala, which is dated to the 2nd century (ColomboPage 2011). Kashi shawls are one of the most prestigious textiles mentioned in the Guttila Kavya (Batuvantudava (ed.) 1950:V.233). The *Mahavamsa* (*Mv.*41:38) refers to the return of a merchant from a business trip to Kashi in northern India, perhaps bringing with him textiles.

There are also reference to the export of textiles from the island in the Periplus (Schoff (1912) 1974:17) and Rajatarangani (:294–297). This could be a reference to Chinese silk, perhaps bought at Sri Lankan ports, or the island redistributing them.

7.2.5 Commodities summary

An array of materials was traded/exchanged since at least the beginning of the first millennium BC. Sri Lanka's earliest exchanges were with Southern India, which were extended to eastern and northern regions and then to all parts of India by the middle of the 1st millennium BC. During the final centuries BC and certainly from the beginning of the CE, these trade and diplomatic relations stretched over the western Indian Ocean as far as the Mediterranean and East Africa. The earliest interaction with SEA and China seem to have been begun somewhat later, from *ca.* the 1st century.

The commodities mentioned in the historical sources include those imported, exported, and those which could be interpreted as being imported and then re-transported. The latter category indicates Sri Lanka's role as a middleman in east–west maritime trade and that its ports such as Mantai, served as entrepôts. No one is clearer on this point than Cosmas (XI.15–16), and to lesser degree Procopius (I.20.9–13); both lived in the 6th century (below).

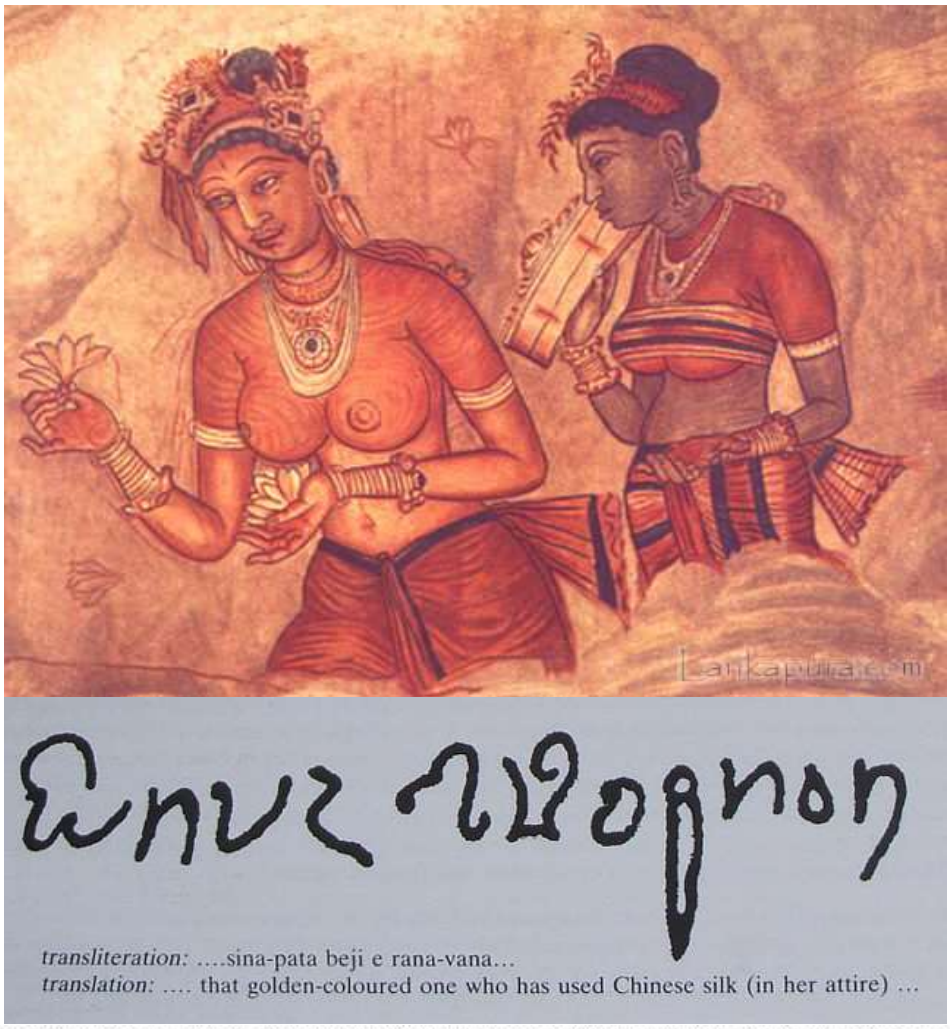


Figure 7.7: Sigiriya 'Apsaras' (celestial nymphs) (above) are referred to in the Sigiri graffiti (below) as being wearing Chinese silk (Paranavitana 1970)

The commodities mentioned in the texts—as well as those excavated—could have been transported by a few mechanisms (cf. Stern *et al*. 2008:415). Certainly, the majority of them were traded. Some of these materials, however, were part of gift exchanges. Emperor Asoka (*Mv.*11:27–33), for example, sent a convoy with various gifts to King Devanampiyatissa (250–210 BC) (*Mv.*11:19–21), as a gesture of gratitude for the gifts that he himself had sent to the former. Similarly, as one of the most acclaimed centres for Theravada Buddhist learning, and having some the most venerated sacred relics of Buddha, Sri Lanka attracted pilgrims from India, China and other Buddhist countries in SEA. Numerous local (e.g., *Mahavamsa*) and foreign records (e.g., Beal 1884; Legge 1886) testify to the regular visit of pilgrims such as Fa-

Xian (411–412), and Gunavarman (early 5th century) (see figures 7.10 and 7.11). They made various offerings to sacred tooth relic and *stupas*. Fa-Xian records a Chinese pilgrim offering a fan to *Mahathupa* in Anuradhapura (Beal 1884). Clearly then, some of these luxury foreign items are, in fact, examples of offerings, and therefore do not reflect trade and commerce.

Thus, the objects discussed here signify both formalized trade and other forms of exchanges. Irrespective of the mechanism through which they were circulated, they certainly indicate Sri Lanka's interaction with various regions across the Indian Ocean. To procure and distribute these materials across great distances, as they have been, required a high–level of networking both internally and across the Indian Ocean.

7.3 Internal networks

Internal trade required a system of communication connecting all parts of the island (Dias 2008:80). The historical evidence clearly indicates the existence of a road network connecting main urban centres (Vidanapatirana 2012:220–229), ports and resources areas (Figures 2.5; 2.6).

7.3.1 The agents of the trade

Trade and commerce involve many stakeholders, including producers, collectors, transporters, mariners, traders and consumers. It also involves rulers, institutions, policies and goods. The success of trade depends on the cooperation and the collective efforts of all stakeholders involved. Moreover, the effective operation of trade and commerce, whether inland or overseas, requires an efficient legal and bureaucratic system. While such arrangements give authorities control over trade and commerce, and an efficient mechanism

to collect revenue for the state, it also provides a supportive system, legal and protection for other stakeholders too. It is necessary, therefore, to understand the agents, institutions and mechanisms of trade for comprehending the dynamics of trade and its impact on the society.

From around 250 BC, a series of inscriptions provide valuable clues to the economic history of Sri Lanka, including the operation of the island's internal and external trade. '*Vanija*' ('*vinica')* mentioned in early *Brahmi* inscriptions such as Bambaragastawa and Kuduvil, and Perimiyankulama (Figure 7.8) were the main actors involved in the trade (Paranavitana 1970:37–40, 44–45, 28).

From *ca*. the 3rd century BC, South Indian traders – particularly *Dameda*– are referred to in the inscriptions. The earliest of these were Sena and Guttika '*assanavika*', or the marine horse traders referred to in the *Mahavamsa* (*Mv.*21:10–12). The inscriptions at Periyaminikulam (Paranvitana 1970:356) and Kuduvil (ibid.:37, 40, 44–45; Siriweera 1994:112) mention a community of these *Dameda* traders who were organized as '*puga*' and '*pugiya*' or as corporations. These guilds of South Indian mercantile communities functioned as late as the 11th and 12th centuries (Pillay 1975:31–32). Some of these were economically extremely powerful, and maintained mercenaries such as *Valaikkara*. Epigraphic and numismatic evidence shows that South Indian traders/guilds were operating in various parts of Sri Lanka. They played a decisive role both in the economic and political history of the island (Sastri 1960; Paranavitana 1970; Indrapala 2003; Pathmanathan, 1976; 1984; 1990; 1994; Bopearachchi and Weerakkody 1998:155).

Similarly, Sri Lankan coins and inscriptions are recovered at several South-Indian sites such as Arikamedu, Alagankulam, Kodumanal and Karur (e.g., Bopearchachi 2002, 2008; Mahadevan 1996a&b; Bopearachchi and Rajan 2002:97–105.) demonstrating Sri Lankan traders/trade items reaching South India as indicated in Pattinapallai (Pillay 1975:31).

Equally important were the *Kabojas*, a series of trading communities, mentioned frequently in Sri Lankan inscriptions that appear to have been organised as corporations (Boperarachchi 1997:281). *Brahmi* inscriptions from Bowattegala (Paranavitana 1970, No. 553) and Kaduruweva (Paranavitana 1970; No. 990) mention corporations of *Kabojas*. Paranavitana (*EZ*.II:74) identified *Kaboja* as communities of the north-western part of India. *Sihalavattu* (4th century) speaks of *Kamboja*s in Southern Sri Lanka, and often mentions them along with other communities, such as *Yona*s, *Gandhara*s and *Saka*s (Boperarachchi 1997:281; Bopearachchi and Weerakkody 1998:146). These appear to be communities of traders who organised themselves as guilds.

Meanwhile, groups of foreign merchants organized together to form *Nanadesi*, powerful and autonomous corporations that existed in both India and Sri Lanka (Pillay 1975:31–32; Sastri 1960:597). Outside of southern India, the highest number of *Nanadesi* inscriptions are found in Sri Lanka, and date from the 11th century (Pathmanathan 1990:145). An inscription in a seal found at Ridiyagama refers to '*Nanadesi Sakai*', or the allies/companions of the *Nanadesis* (Pathmanathan 1984:126). This seal appears to have been used to endorse toll payments (Bopearachchi 2002:103).

Somadeva (2006) suggests that there were colonies of foreign merchants in most of the ports and in the capital. Pandukabhaya (437–367 BC) set apart a quarter for the *Yonas* (*Mv.*10:90) who are variously identified as Arabians (Perera 1952:192; CHJ, Vol. I, No. 3:192.), Ionian or West Asian traders (Deraniyagala 2004:711). Their presence in the capital Anuradhapura is significant by itself, as it implies that there was trade and diplomatic contacts with these regions from an early period. McCrindle (1897:365–367), based on Cosmas, mentions a colony of Nestorian Persians in Sri Lanka during the 6th century. Similarly, the Arabs, known in Sinhalese as *Marakkalaya*s ('people of the ships') because of their connections with maritime trade (Pillay 1975:31–32), were extremely active in Sri Lanka ports from *ca.* the 7th century (Kiribamune 2003:174, Imam 2003, Gunawardena 2003, Tampoe 2003).

Furthermore, there are references to the presence of trade guilds organised according to the type of products they produced. An inscription at Veherakema mentions a trade guild of weavers (Somadeva 2000:12), which could certainly have consisted of workers of various nationalities, including locals.

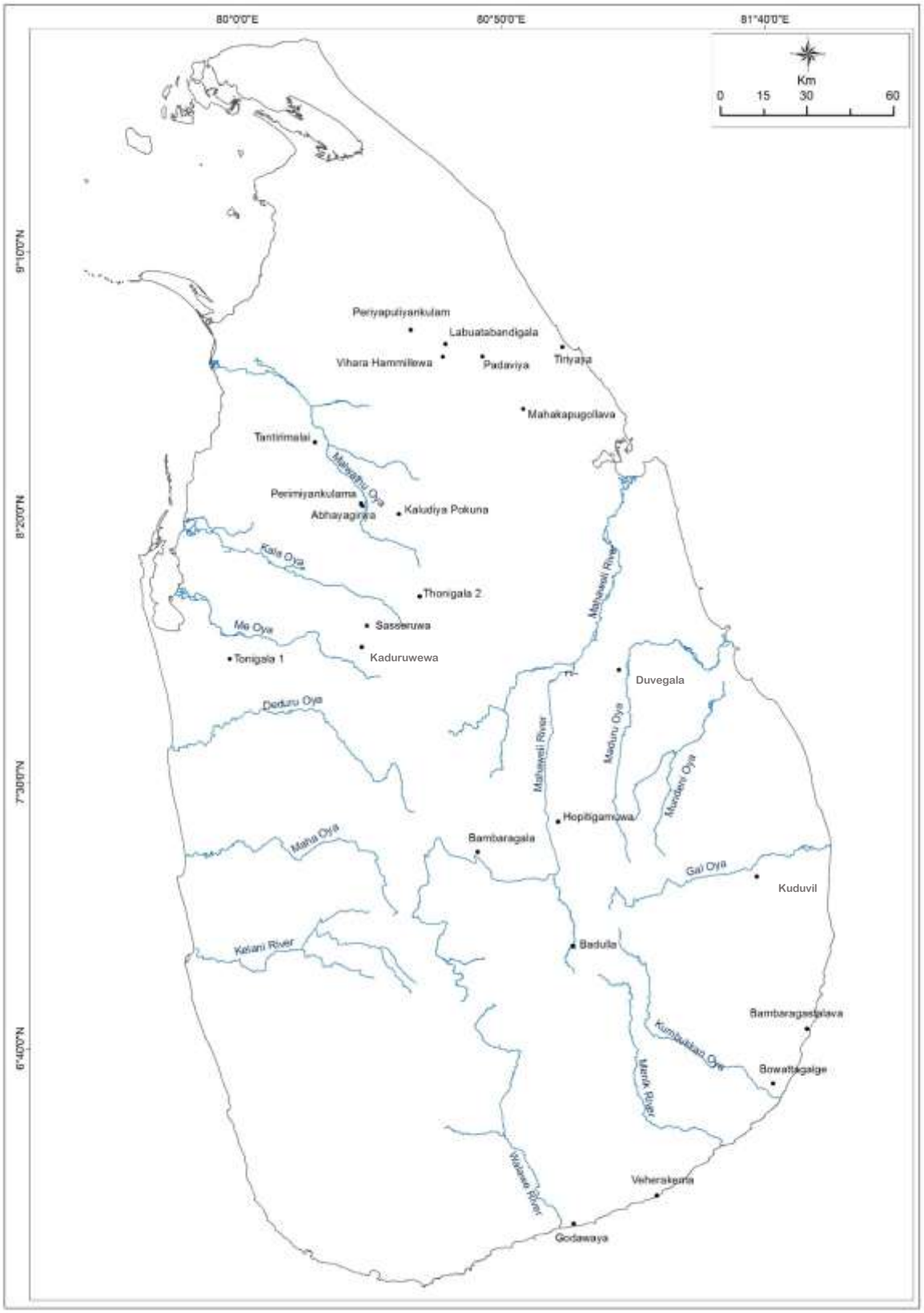


Figure 7.8: Archaeological sites mentioned in inscriptions referred to in this chapter

7.3.2 The role of Sri Lankans in the trade

From the forgoing discussion, it might be assumed that trade and commerce in ancient Sri Lanka were almost entirely controlled by foreigners. This, in fact, has been the traditional view held by many.

It is generally believed that both ancient and modern *Sinhalese* have shown disinterest in all matters of trade (Toussaint 1966:4–5; Tennent 1860:320; Appadorai 1936; cited in Perera 1952:313). While such uninformed views have been countered by some pioneering work on naval technology and sea faring (Gunawardana 2003:17–35; Devendra 2011:1–28; 2013:1; Kapitan 2009; Vitharana 1992), historical and archaeological scholarship persists that locals had a passive attitude towards trade (Perera 1952), and that long-distance trade was entirely controlled by foreigners, in particular by South Indians (e.g., Bopearachchi 2008:esp. 5) and the 'diaspora settlements' located along the coast (Somadeva 2006:12). Due to geographical proximity, closer interaction, including trade, with southern India undeniably existed since at least the beginning of the 1st millennium BC. Similarly, other foreign traders including Indians from western, eastern and northern India, were also actively involved in trade with Sri Lanka.

Nevertheless, Sri Lankan chronicles and inscriptions provide clear evidence for the involvement of kings, and local non-state actors, in external and internal trade. The involvement of kings is evident from the establishment of trade regulations, the levying and collection of taxes, arrangements to secure ports, regulating weights and measures, providing facilities for trade in cities, granting concessions to foreign traders as incentives, reserving rights over high value items of international demand, and sending envoys to foreign countries with invitations to establish trade relations. The very idea that a polity is conscious of its

authority over the territory it controls, indicates a sense of sovereignty of the state and rulers exercised their power to regulate both internal and external trade (below).

Foreign trade was not only one of main sources of revenue for kings, it was also a means of acquiring prestige goods. To safeguard their interests, kings secured both ports and the maritime waters around the country. King Moggallana I (495–512) established a "watch of the sea" (*Sagara Rakkham*) (*Mv.*39:57; Catalogue 1.1), while King Silakala (522–535) appointed his own son to protect the sea (*Mv.*40:35). By providing protection to mariners, kings attempted to attract the sea traffic to their ports (Gunawardana 2003:23–24). The Nainativu inscription of Parakramabahu I (1153–1186) laid down regulations relating to foreign vessels that became wrecked in Sri Lankan waters, and the share of a ship's cargo that could be claimed by the king following such an event (Indrapala 1963:86–92). Special arrangements were in place at the main ports, such as Mantai, where King Agrabodhi VII (778) fortified the port against possible attacks, and placed additional officers in charge, known as '*Mavutuladdan*' (Perera 1952:318).

Custom offices were established at ports and taxes were levied on all imported and exported commodities. The *Gothapabbata Vihara* inscription by King Gajabahu I (136–143) notes the tax to be paid by ships visiting the port (Paranavitana 1983:101, No.67), while the Badulla pillar inscription of King Udaya IV (946–954) laid down guidelines on weights and measures, as well as taxes and other regulations to be followed at the "Hopitigamuwa" trade city (*EZ*.V(Pt 2):171). Kings, however, relaxed taxes on the importation of horses to encourage horse traders. They reserved their rights over high valued items of international demand such as the mining of gems, the capture and the import of elephants, and the pearl fishery. In the 10th century, kings appointed observers to the gem mining industry (Renaudot 1833, cited in

Siriweera 2003:120) to ensure the strict implementation of the law. Non-state actors could undertake the restricted activities mentioned above with the permission of the king upon payment of a tax. A king's ability to enforce rules and levy taxes demonstrated his control over both internal and external trade. King Parakramabahu I (1153–1186), for example, reinforced his control by establishing a department of interior (*antaranagadhura*) to deal with commodities of international demand (Siriweera 1994:123; 2003:120). Parakramabahu I's military campaign against Burma is said to have been launched to protect Sri Lanka's elephant trade (Gunawardana 2003:28), for which Sri Lankans were acting as middlemen (Kiribamune 2003:171, 177).

The claim that the mercantile guilds were autonomous bodies (Sastri 1960:597) seems to be partly true only for the pre-Christian era, or the early centuries of the CE. By about the 4th/5th century AD, these guilds seem to have been regulated by the king, as evident from an inscription at Tonigala (De Zilva Wickremasinghe 1928: No. 17 and 26). By the 10th century, trade guilds were certainly regulated by the king. The *Vanigrama,* a mercantile corporation mentioned in the Badulla pillar inscription (Paranavitana and Godakumbure (eds.) 1963:171), for example, operated under direct state control. It is possible that these corporations, and even individual traders, might have become more independent during the reign of weaker rulers and during periods of political turmoil in areas which did not came under king's direct control.

Foreign trade is said to have been mainly controlled by the king, who sent envoys to foreign countries (Perera 1952:316). King Bhatikabhaya's embassy to the court of Claudius under Rakhia (*Vp*:630; Weerakkody 1997:51–63), and King Buvenekabahu I's (1272–1284) embassy

to the Sultan of Egypt (Codrington 1919:71), were both directly related to trade. The envoy to Egypt explains that his king refused an embassy seeking trade relations from the Prince of Yemen, as he was interested solely in pursuing relations with Egypt. He also elaborated about the facilities made available to foreign traders. Sri Lankan kings sent six embassies to China between the 7th and 8th centuries. For example, King Aggabodhi II (571–604) sent a delegation with a message containing an elaborate description of the commodities available in his kingdom (Werake 2003:213–224).

Pliny (VI.22 (24) mentions mariners and large ships (tonnage of these vessels is 3000 amphorae) of Taprobane. No record is more explicit than Cosmas (X.15–16) with regards to involvement of Sri Lankans in the foreign trade.

Trade was certainly not the monopoly of the state, and non-state actors—of whom many were natives—actively engaged both in internal and external trade. The *Mahavamsa* (*Mv.*7:12, 9; 6, 18.8) frequently refers to maritime trips made by Sri Lankans since pre-Christian times. The *Milindapanha* (1st century) illustrates how traders traversed ports from China to Alexandria).

The *Saddharmalankaraya* (:706) has several references to Sri Lankan traders leaving for overseas trade, one of whom was Nandi, a resident merchant from Mantai leaving on a three-year overseas trade trip (Ibid.:780; Chapter 2). Rachia, the chief envoy to the court of Claudius, describes his father's visit to the country of *Seres* (China). The Chinese priest Kien Tchen mentions that people of the Land of the Lion (Sri Lanka) were in the habit of coming to or stopping at Canton (Sastri 1939). Buddhamitra and Buddharakshita, two Sri Lankan siblings residing at the port of Bharoch, made an offering to a temple (*GBPP* XIV:177). Perera's

(1952:314–315) thinks that they might have been there for trade, as Bharoch was not a known pilgrimage site. Besides these references, many inscriptions mention *navika* (mariners) who travelled to various destinations overseas. The *Arittapatti* inscription in South India mentions wandering *sresthin*, or chiefs, of Sri Lankan traders camping at Arittapatti and building *Caitya-palika* (Buddhist relic/*Stupa*; Rao 1938:367–368). W The nearby Tirupparankunram inscription mentions the establishment of *Chaitya*s by dwellers of Sri Lanka (Rao 1938:367–368), indicating the regular presence/arrival of wealthy Sri Lankan traders, and even a settled community in the area. They were patrons of Buddhism. The discovery of Sri Lankan coins and *Sinhala Brahmi* inscriptions in the region (Rajavelu 1999:154; Mahadevan 1996a&b, 2000:147–156; Bopearachchi 2002) provide further evidence of the regular visits of Sri Lankan traders to South India.

Individuals taking to sea for trade is clear from several historical records. A man from *Gola* (Galle, Southern Sri Lanka) turns himself a mariner to bring foreign goods (*Sv*:166). Another peasant, who is also an ivory craftsman, becomes a trader and goes overseas for trade (Gunawardana 2003:26). Overseas trade seems to have been more attractive to these people and the latter craftsman might have taken his own craft products for sale.

These historical references provide clear evidence that Sri Lankans, including kings, were actively involved in internal and external trade thus challenging the passive role that has traditionally been assigned to them. The various initiatives undertaken, and the supportive system provided by kings, were among the main factors behind the rise of Sri Lanka as a major trading centre in the Indian Ocean. Sri Lankans themselves may therefore have been the carriers of some of the beads and sapphires found at Berenike (Sidebotham 2011), IPBs at Siraf

(Francis 2002) and garnets in Oman (Schussler *et al*. 2001:240–241; Rosch et al. 1997) and Cambodia (Carter 2012). Even if Sri Lankan goods were sold by South Indians to western traders, as suggested by many (e.g., Siriweera 2003:117–118), it may have been Sri Lankan traders who carried the goods on this first stage of their journey, as indicated by the Arittapatti inscription cited above.

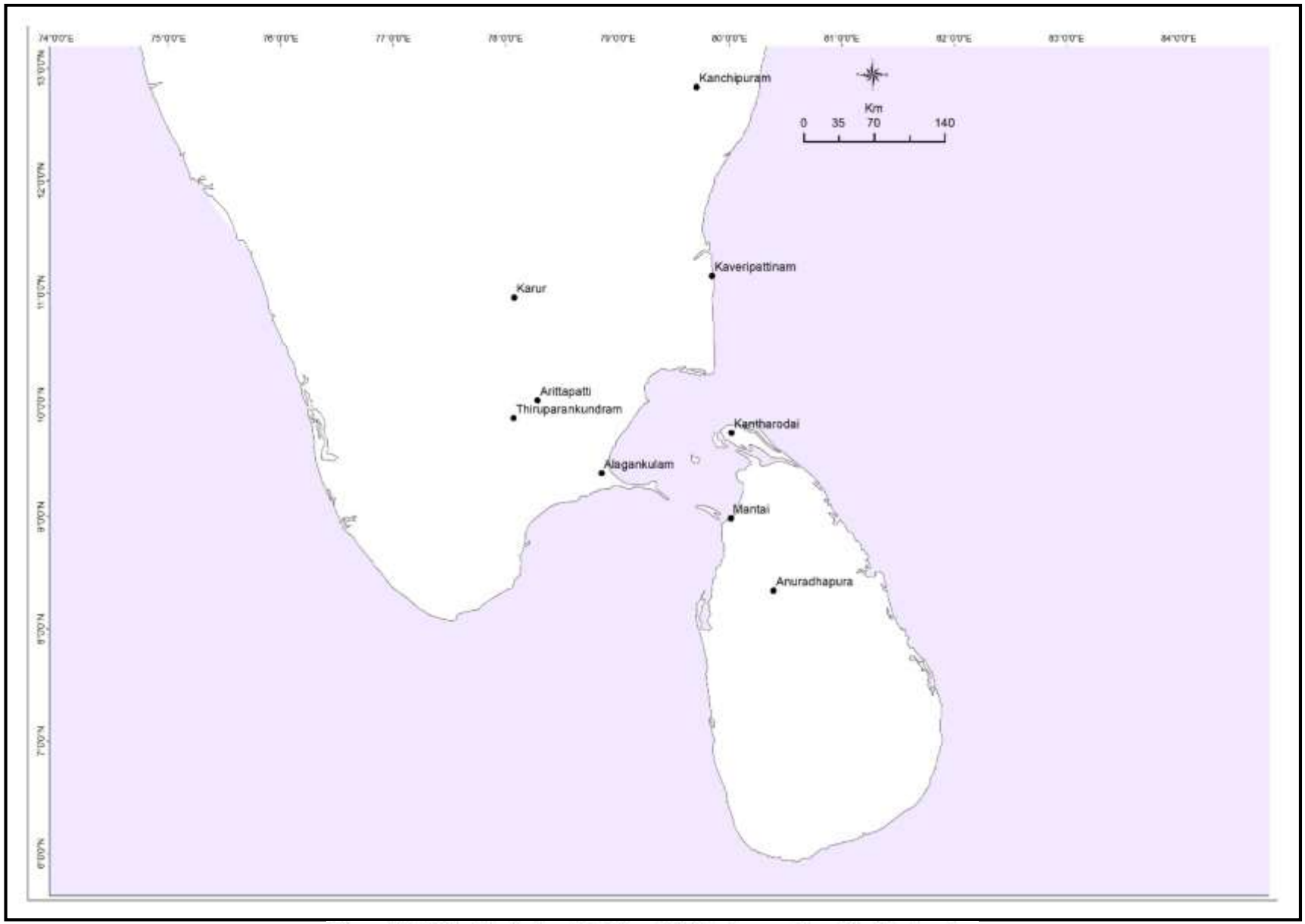


Figure 7.9: Main sites in South India and Sri Lanka, mentioned in the chapter

7.3.3 Internal trade centres

The success of international trade depends on the extent of the internal arrangements for the distribution of imports and the collection of locally available goods. This requires the involvement of local authorities, and the cooperation of local traders, collectors and producers. Textual and epigraphic evidence indicates the organization of trade at various levels in ancient Sri Lanka. Cities and ports were the main centres of trade, as urban populations who were the biggest consumers of imported luxuries lived. Consequently, traders, including foreign merchants, resided in these cities. Pandukabhaya's (437–367 BC) decision to assign a special quarter for *Yona*s indicates that special arrangements were in place for foreign traders (*Mv.*10:90). *Dipavamsa* refers to an inner market place, or '*antarapatana*', for traders at Upatissagama (*Dv*.9:36; Siriweera 1994:113). Epigraphic evidence illustrates that the port at Mantai had arrangements for various craftsmen and accommodation for traders during the Chola occupation (e.g., Indrapala 2013:61.72). It had an efficient administrative structure and facilities for foreign trade (Chapter 2.8).

In addition to port cities and capitals, there existed a series of market towns at major crossroads where comparatively large populations lived (on trade routes, see Vidanapatirana 2012). Two market towns mentioned in inscriptions were *Kalahumanaka* and *Mahatabaka* in the 4th and 5th centuries. Hopitigama, mentioned in the Badulu pillar inscription (Paranavitana and Godakumbure (eds.). 1963:171) was one of the well-regulated markets of the early mediaeval period. The inscription laid down regulations for the functioning of the market, including the scales to be used and banning the purchase of goods before they reached market (cf. Dias 2008:78–83; Siriweera 1994:117). Padaviya and Wahalkada, in the north central

plains, were other important markets during the Chola occupation of *Rajarata* (11th to 13th centuries) and seem to have been cosmopolitan cities. Padaviya '*nakaram*' (city) consisted of mercantile communities of *Cetti*s, *Nanadesis* and *Ainnuruvar* (Indrapala 1971:32–35; Velupillai (ed.) 1971:46–57; Siriweera 1994:117–118). Interestingly, the head of the Mantai boat corporation is mentioned as being among the gatherings. This indicates that traders from the port cities went to interior markets to secure goods for maritime trade. In addition to these larger markets, there were smaller markets, known as '*nigama*', '*niyangama*' (Velupillai (ed.) 1971:46–57; Siriweera 1994:116), which seem to have been more widespread in small and larger villages.

There existed guilds of traders at various places in ancient Sri Lanka. Inscriptions at Mahakapugollawa and Bovattegala mention such guilds which are called '*Pugiya*' or '*Puga*' (Paranavitana 1970: No 553). The high incidence of these inscriptions indicates that trade was not limited to urban centres, even during pre-Christian times. Well-coordinated networks connecting all parts of the island seem to have operated. Similarly, grain depositories were in operation, which seem to have functioned as banks. The Tonigala inscription of Kirti Sri Meghawarnabhaya (301–328) mentions one such bank named *Kalahumanaka,* and a merchant guild called *Kalahumanaka niyamatana* to which the bank apparently belonged (De Zilva Wickremasinghe 1928:No. 17 and 26). The inscriptions at Kaludiyapokuna and Labuatabedigala also mention banking practices in ancient Sri Lanka (Gunawardana 2011:51). Texts make references to wealthy and successful traders of high social ranking, known as *Settis*. By the 12th and 13th centuries the *Settis* had become heads of mercantile guilds and members of the royal council (Siriweera 1994:113). Thus, the internal trade was organized under various forms, and was widespread across the island.

7.3.4 Buddhist networks

Buddhist networks are amongst the earliest historically-known communication channels that linked Sri Lanka with the outside world. *Jataka* stories, chronicles (e.g., *Seehalavatthuppakarana*), and pilgrims' records (e.g., Fa-Xian (Beal 1884), reveal that these pilgrimages/communication channels linked Sri Lanka with India, SEA and China since at least the middle of first millennium BC. These Buddhist networks had a profound impact on Indian Ocean trade(Ray (1994; Chakrabarti (1995:185–202). Buddhism is considered to be the key factor behind the close economic and cultural relations between India and China during the first six centuries AD (Liu 1988). The decline of Buddhism in China after the 8th century had a profound impact on these relations (Sen 2003).

The introduction of Buddhism to Sri Lanka during the Mauryan period was the single biggest influence on the cultural development of the island, including its external interactions. The emergence and expansion of Buddhism also coincided with the development of trade and commerce, and the urbanization of various regions in both India (Ray 1994) and Sri Lanka. Buddhist monks provided spiritual protection and guidance to merchants at sea and on land. In return, the merchants extended their generous patronage to Buddhist monasteries and monks, including the provision of free transport for monks on their ships and caravans. Most of the Buddhist pilgrims who came to Sri Lanka, such as Fa-Xian and Gunavarman (Early 5th century) and Vajrabodhi (7th century), travelled in these merchants' vessels (see Colles 1969–70:17–38; Perera 1952:303; Gunawardana 2003:24).

Buddhism was the forerunner of Sri Lanka's interaction with SEA and China. The presence of an Anuradhapura Abhayagiri *Vihara* affiliated monastery in central Indonesia as mentioned in the 8th century Ratubuka inscription (Casparis 1961:241–243; Chandra 1979:267–285) and Sri Lanka's reputation as a seat of Buddhist learning and pilgrimage (Sirisena 1978), makes it highly likely that the Buddhist networks frequently operated between the two regions. The Buddhist relations between southern Sri Lanka and the Dvarawati region in particular has also been discussed (Guruge 2003:237–243). This is supported by the influence of Sri Lankan Buddhist statues in the SEA region (Dupont 1959:631–636 cited in Casparis 1990; D'Ancona 1952) and the strong similarities between the *Bodhisatva* statues in Southeastern Sri Lanka and the *Mahayana* Buddhist statues in SEA from around the 7th century (Ghosh 1937). Similarly, Sri Lanka–Malaya historical relations, established based on epigraphic evidence (Paranavitana 1960), created an interesting debate (Sastri 1962; Gunawardana 1967; Wickramasinghe 1960).

In the aftermath of the invasion of Burma by King Parakramabahu I (1153–1186), it was Buddhist monks who mediated for peace and the restoration of cordial relations between two countries (Guruge 2003). Similarly, Buddhist diplomacy was used by Sri Lankan kings in furthering diplomatic and commercial relations with China. Table 7.10 summarises the key interactions of Buddhist missions sent by kings to China from the 4th to 8th centuries. In Chapter 6, I argue that the *stupa* bead was such a Buddhist symbol used for maintaining cultural relations. The use of Buddhist diplomacy to maintain cultural-commercial relations with China continued even during later periods (Werake 2003:214). These relations reached their peak when the Mahayanism flourished in Sri Lanka and the Tang dynasty ruled China.

Although the number of Sri Lankan missions mentioned in the texts fell away after the 8th century, coinciding with the decline of Buddhism in China, commercial contacts between the two countries prevailed, as demonstrated by the continued discovery of Chinese ceramics in the country throughout this period (Chapter 5.3.3.8).

7.3.5 Trade and diplomatic relations with the west

Sri Lanka's interactions with the western Indian Ocean regions (the Persian and Arabian Gulfs, the Red Sea, East Africa and the Roman world,) seem to have been based primarily on diplomatic and commercial relations. The recovery of a large number of western coins (e.g., Late Roman coins; Bopearachchci 1996:59–77; Codrington 1924:32–33; Table 7.4) are clear evidence for either direct/indirect commercial interactions. The embassy of King Buvanekabahu, dispatched to the Sultan of Egypt, in the 13th century, made explicit reference to the commercial interests of the Sri Lankan king. Moreover, he refers to a similar embassy sent to Sri Lanka by the Prince of Yemen.

More interesting still is Pliny's (*NH*.VI.84–91) record of the arrival of ambassador Rachia, the chief of an embassy from Taprobane during the Principate of Claudius (41–54). Abeydeera (2009:145–165) finds convincing evidence that this visit took place through a reference found in the *Vamsatthappakasini*, along with inscriptions from Sasseruwa, south of Anuradhapura. Pliny's reference to the frequent missions of Rachia's father to the country of *Seres* (China) indicates that the embassy was part of island's regular trade and diplomatic missions sent to various foreign countries. This also indicates the existence of a long-standing diplomatic tradition in Sri Lanka.

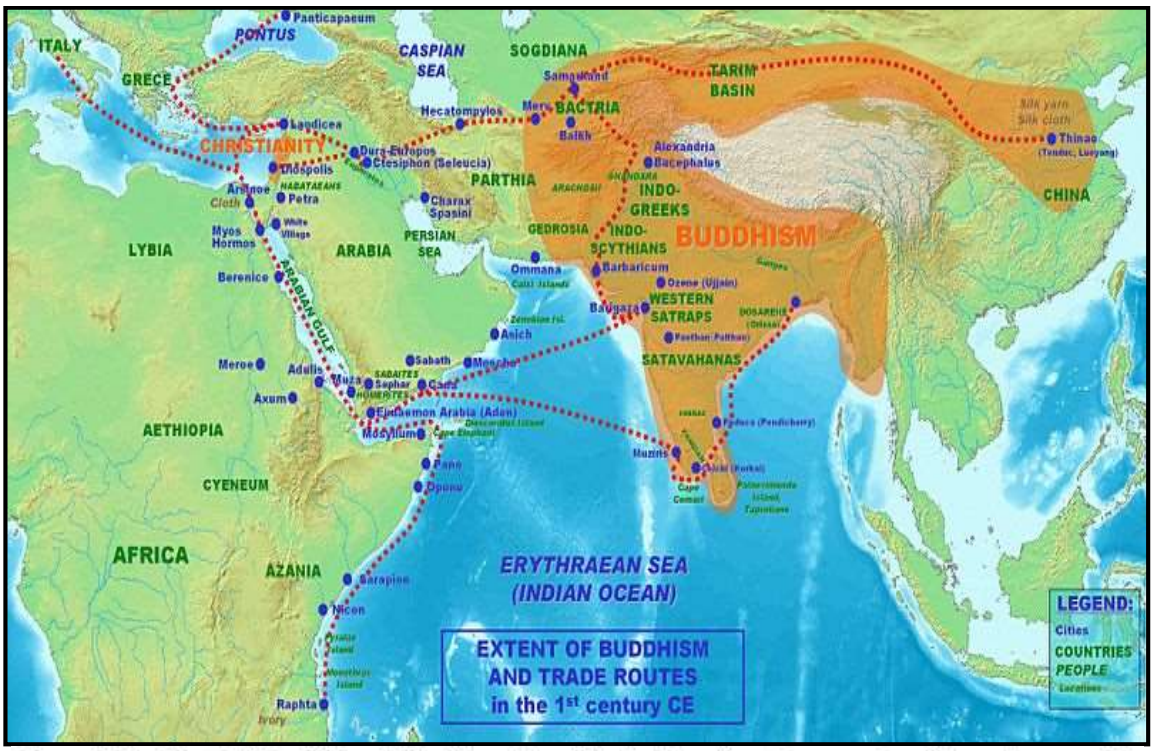


Figure 7.10: Extent of Buddhism in the 1st century AD; Section of modern version of Peryplus map 1st century, by Thomas Lessman

(Wikipedia 2007)

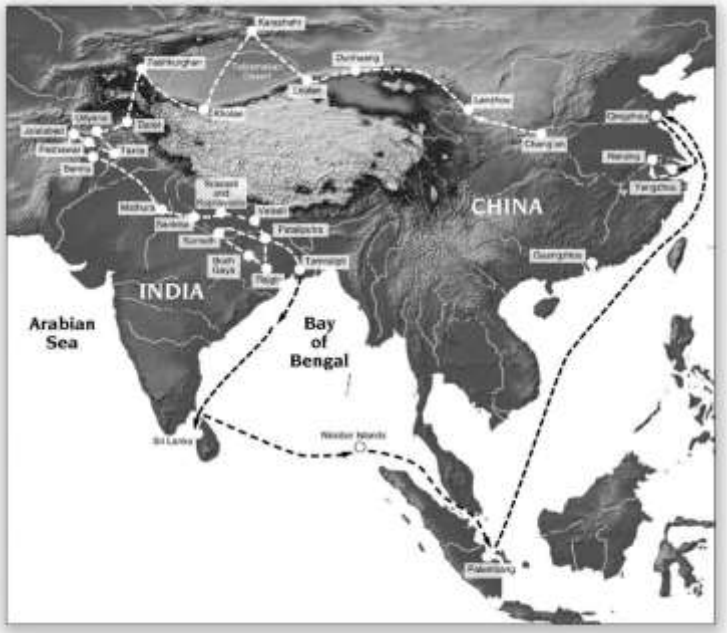




Figure 7.11: The route undertaken by Fa-Xian and depiction of the pilgrim monk
(Sen 2006:25; Map 1 and pp.26)

Table 7.4: Sino-Sri Lanka Relations (based on Werake 1978, 2003 and Weerasinghe 1995)	
Time (AD)	**Buddhist missionary and diplomacy**
386-535	Delegation of Sri Lankan monks including Yasagupta and Buddhanadi reached China with 3 Buddha statues
411	Fa-Xian's arrival to study Theravada Buddhism. Stayed 2 years and saw a Chinese merchant making an offering to stupa
Ca. 400	King Upatissa (368-410) sent monk Dhammapala with a Jade Buddha statue to Chinese emperor of Tsing dynasty
412	While Fa-Xian was in SL, monk Sanghavarman (from SL) reached China and helped establish Buddhist nunnery in China with the aid of SL nuns
	Indian monk Gunavarman went to China after staying at Abhayagiriya Vihara, Anuradhapura
410-432	King Mahanama (410-432) sent two missions to China: 4 monks carried a replica of Temple of Tooth and a letter to the Chinese Emperor. Letter explained close religious ties and regular contacts between the two countries
429&433	During King Mahanama's time, dispatched SL Buddhist nuns and established nunnery in China. Ship captain Nandi took two ship-loads of SL nuns to China
456	SL monk Nante, reputed sculptor, went to china and made Buddha statues
522-535	During King Silakala's (522-535) time, diplomatic/cultural relations grew due to the rise of Mahayanism in SL
5th–7th C.	Scores of Chinese monks visited SL
733-772	Agrabodhi VI (733-772) sent monk embassy with Amoghavajra as chief to Tang dynasty court, due to growth of Mahayanism in SL; peak of cultural relations during Agrabodhi's period
Post 8th C.	Cultural relations with China declined due to the decline of Buddhism in China

Thus, by the beginning of the CE, Sri Lankan kings were making deliberate efforts to link up with the centres of economic and political power in both the East (China) and the West (Mediterranean), alongside its already well-established links with India in the north.

7.4 Chapter summary and discussion

While it is difficult, archaeologically, to determine the formalised patterns of trade from other forms of exchanges, the historical sources help to resolve many of these issues. The commodities mentioned in the texts encompass both import and export trade and exchange, as well the transhipping trade. The range of imported items seem to have been relatively

limited when compared to exports, though the quantities of some imports (i.e., ceramics and coins), exceeded those of many exports. Pearls and gemstones accounted for some of the island's highly-priced products. Of the imports, horses, elephants, red coral and Chinese silk seem to have been the most valued commodities. Elephants and textiles appear to be among the transhipped commodities mentioned in the texts. All categories of evidence indicate interactions with both South Asia and the regions in the west since at least the middle of the first millennium BC, while the interactions with SEA and China beginning from around the beginning of the CE.

Nearly all imports are high value luxury items, which were undoubtedly consumed by the urban elite. Some of these items may have been used to acquire and reinforce social status and used for religious purposes. The range of exported items included both natural and locally-made products.

Issues related to the organization and the agency of trade, internal networks and external interactions are difficult to address through archaeological remains alone. While the presence of non-local commodities provides an insight into interactions with the external word, it says nothing about the mechanisms through which they were circulated. In contrast, historical evidence, and in particularly inscriptions that are contemporaneous of the events being described, are rich sources of information in this regard. The short donatory Early *Brahmi* inscriptions of the 3rd/2nd century BC are subsequently replaced by detailed inscriptions from around the beginning of the CE, which mention merchants and market places. Merchants were organized under trade guilds, which were comprised of local traders, together with

traders from various parts of India and other foreign countries, including '*Yonas*'. These corporations of merchants were strongly represented across various regions of the island. The epigraphic evidence is reflective of the changing socio-economic patterns and structural changes that were then taking place in society, primarily due to the influence of long-distance maritime trade.

The presence of communities of foreign traders and mercantile guilds in the country has led to a belief that external trade was handled exclusively by non-locals, and that Sri Lankans 'never took to seas', (Toussaint 1966:4–5) and instead maintained a passive attitude towards trade. I demonstrated that Sri Lankans, as individuals, as groups and as a state, were actively involved in both internal and overseas trade since last few centuries of BC. The state sent embassies to foreign courts to establish and enhance trade and commerce. It established rules and regulations for internal and external trade, reserving prescriptive rights over high values items. Certainly, by the beginning of the CE, internal trade was well-established and widely distributed. By the Middle Historic period, a range of internal markets places flourished and were linked to the port cities. Ship owners themselves were present in some of these markets, perhaps to gather goods for trade.

Foreign historical sources are explicit about the island's role in international trade, and by the time of Cosmas (II.45–46; III.65; XI.13–16; XI.22) it served as the main the entrepôt of the Indian Ocean's east–west maritime trade. I argue that this external trade largely depended on the existence of well-established internal trade networks. The supply of local products to foreign traders and the distribution of foreign objects brought to the island almost entirely

depended on the support system provided by rulers and local agents/traders. Even foreign mercantile guilds mentioned in this chapter could not operate without their support.

Sri Lanka's interactions with various regions in the Indian Ocean were based on specific historical realities, which were constantly redefined and reformulated in response to the changing dynamics in Sri Lanka, and across the region as a whole. The arrival of Vijaya (Figure 7.2), a merchant's son according to *Divyavadana* (*Div.*:523), could be interpreted as a result of growing maritime trade in the Bay of Bengal region and the realisation of the commercial significance of Sri Lanka. The introduction of Buddhism to the island by the Emperor Asoka could also be interpreted as the southward expansion of Mauryan influence.

While Buddhism was instrumental in establishing and maintaining relations with certain regions (i.e., South Asia, SEA, and China), diplomatic, commercial, and political alliances were important factors elsewhere (i.e., the western Indian Ocean region). In all cases, however, interactions were never simply confined to one factor alone, be it religious, cultural, political or commercial. Irrespective of the original factor that initiated contact, there were always various intended and unintended consequences, some of which had lasting impact on the island. Though not discussed in this thesis, Sri Lankan kings were often forced to switch alliances with regional powers, including rival south Indian polities, for various tactical reasons. These shifting alliances had a lasting impact on the island. Consequently, Sri Lanka's external connectivity should be discussed in the broader context of political, commercial and religious developments in the Indian Ocean.

CHAPTER 8

CONCLUSION

8.1 Introduction

Sri Lankan history is largely drawn from texts and mostly based on the urban/religious centres of the *Rajarata* civilization, which lasted until the middle of the 13th century. This stems from the strong influence of great chronicles, although these were written to record the history of Buddhism and not political and economic history. In essence, the history of the centre was extrapolated to the periphery. Until very recently, with notable exceptions (cf. Coningham & Gunawardhana (2013) Bandaranayake et al. (1990, 1994), Weisshaar et al. (2001) Somadeva (2006), Juleff (2009), the focus of archaeological research has also been largely confined to the urban centres and religious complexes.

This study adopted a different approach and focused on three ports and settlements—Mantai, Kantharodai[128] and Kirinda—which are interconnected with both major centres in the interior and networks across the Indian Ocean. As sites at the interface between external and internal networks they are well suited for studying Sri Lanka's connectivity. Situated in the centre of the Indian Ocean and in close proximity to mainland South Asia, the island was closely connected to the external world while remaining an independent geographical and cultural entity.

In Chapter 2, I established Mantai's stratigraphy and cultural sequence based upon our excavations. Twelve reliable radiocarbon dates and the analysis of the excavated material

[128] Urban religious centre connected to *Jambukolapatthana* port

culture clearly indicate the continuity of Mantai as an international port city up to *ca*. the 12th/13th century. This challenges the general view that Mantai lost its significance after the 7th century (Kiribamune 1991:189) and was completely destroyed as a result of the Chola attack in 993 (Carswell et al. 2013:11-12). Citing historical references for the frequent movement of the military via Mantai, Kiribamune (1991:189) questioned the suitability of the port for international trade. There are, however, no direct references to military activities at Mantai from *ca*. 200 to 700, during which time the highest number of references to international trade, pilgrimage, political and administrative activities are recorded (Chapter 2.3.1.1; Table 2.1). As per the Arabian source *Hudud Al Alam* (Minorsky 1970), Mantai was a flourishing trading centre even during the late 10th century. This is crucial for the present work.

Although not presented as case studies, the establishment of chronologies for Kantharodai and Kirinda (Catalogues 2.5, 7.1-Kantharodai & 2.6, 7.2-Kirinda3) are equally significant for understanding the general patterns of external interactions and internal developments. Kantharodai operated from *ca*. 500 BC to the beginning of the CE and its connections were largely confined to India and SEA, whereas Kirinda functioned from *ca*. the 4th to the 8th/9th centuries and remained a regional port with limited external connections. In Chapters 3 and 4, Mantai's ceramic and non-ceramic assemblages were analysed, which were then compared with those of Kantharodai and Kirinda in Chapters 5 and 6. These sites existed within networks of connections both to settlements inland as well as external maritime networks. Therefore, in Chapters 5 and 6, the findings from Mantai, Kantharodai and Kirinda were also compared with selected sites in Sri Lanka and elsewhere in the Indian Ocean in order to contextualize these connections. The historical contexts of the traded/exchanged commodities and the

mechanisms, agents as well as the institutions involved in these transactions were discussed in Chapter 7.

Certain factors, such as navigation, which were crucial to the island's maritime connectivity, and irrigation agriculture, which was the main livelihood for most islanders, were not adequately discussed due to the space available. Therefore, in this chapter I incorporate, some key themes relevant to the island's connectivity and internal developments. This chapter adopts a thematic approach to revisit the key research issues raised in Chapter 1 and to re-evaluate the role of internal developments and external influences on the cultural evolution of pre-modern Sri Lanka.

8.2 Internal developments and external connections through time

The establishment of stratigraphic sequences from Mantai, Kantharodai and Kirinda allows us to reconstruct a continuous cultural sequence across these sites; stretching from the Lower Early Historic Period to the Middle Historic Period as proposed by Deraniyagala (2004). Deraniyagala (Ibid.:713-14) was unable to break down his nearly one millennium-long Middle Historic Period of the Anuradhapura sequence due to the disturbances to its upper levels and hypothesised that the necessary evidence awaits Mantai.

The establishment of the Mantai sequence allows us to refine Deraniyagala's Middle Historic period based on radiocarbon dates, changes in material culture and historical records (Chapter 2.6.1; Table 2.3). This is one of the significant contributions of this research. The Middle Historic period marks a number of internal developments in irrigated agriculture, crafts, other industries and society in general as well as in external relations that left a lasting impact on

the island. In Table 8.1, an attempt is made to correlate the cultural periods identified in my investigations with those proposed by Deraniyagala (2004), the key sites discussed in this thesis as well as periods suggested by Bandaranayake (1974; 2012) and Gunawardana (2008). Neither site chronologies nor the material culture recovered tallies precisely and consequently only broad comparisons are possible. Due to the limitations in space, however, the detailed discussion on this refined periodization takes place elsewhere (Bohingamuwa in prep.) while the emphasis is placed here on re-visiting research questions raised in Chapter 1.

8.3 Revisiting research questions and broad conclusions

This thesis clearly illustrates Sri Lanka's external interactions from around the beginning of the first millennium BC, starting with South India and then expanding into eastern and northern regions by the 6th century BC. By the last centuries BC and certainly by the beginning of the CE, Sri Lanka's trade, diplomatic and religious relations had expanded to the western coast of India, the Middle East and the Mediterranean in the west and SEA and China in the east. Underpinning these are the internal developments in terms of irrigated agriculture, iron technology, crafts and industries, as well as the internal networks to procure natural and manmade products from across the island and to channel them into international trade, some of which was undertaken by the locals themselves. Sri Lanka's long-term cultural evolution, therefore, is the outcome of, and interplay between, external influences through cultural-commercial exchanges, which provided the impetus and acted upon internal dynamics within Sri Lankan society.

One of the objectives of this thesis is to explain the cultural exchanges (cf. Bellina 2003) and internal dynamics (cf. Bandaranayake 1978) that lead to social transformations. Until very recently such discussions in Sri Lanka have been dictated by historical narratives, based on major urban complexes and adopting a terrestrial perspective (Chapter 1.2.2.2). Having

analysed the material remains from three ports/urban centres and contextualising these results with key sites within and outside Sri Lanka, alongside historical narratives, it is now possible to reassess some of the traditional views pertaining to external influences and the cultural evolution of the island as well as to re-visit the research questions raised in this thesis.

8.3.1 The external stimuli

Being located at the proximity of a large subcontinent and astride a major transoceanic trade route, it was almost impossible for Sri Lanka to remain uninfluenced by the changing dynamics of both its nearest neighbour, India, and those of the Indian Ocean at large. The earliest and strongest influence on Sri Lanka naturally comes from India, although the extent of this I argue is overstated.

8.3.1.1 The 'Indianization' of the island culture

Due to the geographical proximity and shared cultural traits between Sri Lanka and India, a shared colonial historiography (Bandaranayake 2012:104), and the discussions on the 'Indianization of Southeast Asia' (e.g., Majumadar 1941), Sri Lankan culture was considered a mere 'transplantation' (Quaritch 1961:35) of that of India, which brought the island within its orbit (Maloney 1970:604). This over emphasis of Indian influence on Sri Lanka still persists. The earliest and strongest influence on most aspects of the island was undeniably derived from India. Textual evidence suggests northern India as the source of the earliest contacts. The material evidence in the Protohistoric Early Iron Age (*ca*. 1000–500 BC), however, illustrates a stronger link with southern India during this crucial period which saw the introduction of iron technology, plough-agriculture, burial practices and related ideology, and the production of ceramics (Seneviratne 1984). The migration of people at this time could

have changed the ethnic matrix of the country. The influence of north India is symbolized by Vijaya's arrival and led to strong changes in social institutions and the introduction of the *Brahm*i script. Vijaya immediately established political connections with south India through marriage, which was undoubtedly a strategic political move (Chapter 2.3.1.2). The strongest northern Indian influence came from the southward expansion of Mauryan hegemony through King Devanampiyatissa and Emperor Asoka's initiative to introduce Mauryan political and religious ideology (Buddhism), both of which had a lasting impact on Sri Lanka (Chapter 7.3.4). The Mauryan impact did not reach South India with the same intensity as did to other areas (Champakalakshmi 1996:92–93) and formal north Indian influence seems to have ceased soon after Devanampiyatissa (Perera 1952:302), although informal religious exchange continued. South Indian interactions, of which only military and political exchanges are recorded in texts, continued and had lasting impact, including reducing the significance of Mantai and the shifting of the capital from Anuradhapura.

Beyond these large-scale and state-mandated hostile interferences, there were many unrecorded mutual interactions between people. Our analysis of beads, bangles and ceramics, as well as the limited ethnographic studies, illustrates such interactions, migrations, transfers of technology and a strong shared culture between Sri Lanka and South India.

Table 8.1 Cultural Sequences across selected sites in Sri Lanka (Bohingamuwa 2016, updated from Bandaranayake 2012:141-142)

Anuradhapura Citadel (Deraniyagala 2004) **Period**	**Kantharodai** (Bohingamuwa 2016) **Phase**	**Mantai** (Bohingamuwa 2016) **Phase**	**Kirinda** (Bohingamuwa 2016) **Phase**	**Anuradhapura ASW2** (Coningham 2006) **Period**	**Tissamaharama** (Weisshaar et al. 2001:61 **Phase**	**Lower Kirindi Oya Basin (LKB)** (Somadeva 2006:96) **Phase**	Bandaranayake 1974:19–26; 2012:140–141) **Period**	Gunawardana (2008:20–65) **Period**
VIII: Middle Historic (*ca.* AD 300-1250)		'Disturbed' (VIII-XI): Late Middle Historic-(post 8th/9th-12th/13th C. AD)		B, C, D, E: (AD 750-1000)		VII: Urban decline (AD 1000-1400)	MHP 3 (11th/13th C. AD)	IV: Early medieval state
		VII: Mid-Middle historic (early/mid-8th-late 9th)	III: Mid-Middle historic (early/mid-8th-9th C. AD)		I (9th C. AD)	VI: Mature urban phase (latter quarter; AD 600-1000)	MHP 2 (7th/8th -10th C. AD)	III: Power sharing and hydraulic civilization (3rd-9th C. AD)
		V-VI: Early Middle Historic -II (early 7th- mid-8th C. AD)	IC-II: Early Middle Historic (Mid/late 7th – early/ mid-8th century)		H (7-8th C. AD)		MHP 1 (6-7/8th C. AD)	
		IV: Early Middle Historic-I (Mid-3rd-early 7th C. AD)	IA-IB: Basal Middle Historic (Late 3rd/late 4th-Mid 7th century)		F & G (300 -7th C. AD)	V: Mature urban phase (middle quarter; AD 350-600)		
				F: (AD 300-600)		IV: Mature urban phase (early quarter; 250 BC- AD 350)	EHP 3 (4th -5th C. AD	
VII: Upper Early Historic (*ca.* AD 100-300)		III: Upper Early Historic (Late 1st C. – late 2nd/Early 3rd C. AD)		G: (AD 100-300)	E (2nd/ 3rd C. AD)		EHP 2 (1 C. BC/AD-3rd C. AD)	II: Early State (1st C. BC-3rd C. AD)
VI: Mid-Early Historic (*ca.* AD 250 BC-100AD)	V & VII: Mid-Early Historic (V-Late 3rd C. BC - VII- Mid-1st C. BC)	II: Mid-Early Historic (2nd C. BC – mid 1st C. AD)		I-H: (360-190BC/ 200-130 BC)	C1-d (2nd C. BC – 1st/2nd C. AD)			I: Chiefdoms (3rd-1st BC)
							EHP 1 (3rd BC-1st BC/AC)	
V: Lower Early Historic (*ca.* 500-250 BC)	III: Lower Early Historic (*ca.* 5th C. BC) - IV: (Mid-4th-late 3rd C. BC)			J: (510-340 BC)	A-B (4th -3rd C. BC)	III: Early Urban Phase (250-350 BC)		
						II: Early agro - pastoral-early urban		

						transitive phase (500 -350 BC)		
IV- Basal Early Historic (*ca.* 600-500 BC)				K: 840-460 BC		I: Early agro-pastoral – village phases (900-500 BC)	Protohistoric-early historic transition	
III- Proto-historic/ Early Iron Age (*ca.* 900-600 BC)								
II, Mesolithic/Iron Age Transition (Undated)								
I- Mesolithic (*ca.* 43000 - 3900 BC)		I: (*ca.* 1600 BC)						

Ceramics, the largest category of Indian artefacts, best exhibits Indian influence. Historical (the arrival of potters from India with Vijaya's consort and Sangamitta), ethnographic (claiming of ancestry to south India by some present day potters) and common potting attributes show strong evidence for a shared ceramic tradition between Sri Lanka and India which makes it difficult to differentiate coarse wares. My creation of 'Ind/SL', acknowledges this shared tradition. The clearly identifiable Indian assemblage accounts for 4% of the GTCA, the majority of which belong to GWF wares including NPBW, GREW and Rouletted, indicating trade and cultural relations with northern/north-eastern and southern India from the 6th century BC. While REPO connects the island to western India from *ca.* the 1st century, the Rouletted maritime network opens up Sri Lanka to the wider Indian Ocean (Chapter 5.4.2).

Sri Lanka's external interactions and their influence on the island, however, were not confined to India. Both material and historical evidence clearly illustrate the island's far-flung interactions with the entire Indian Ocean. Although India provided the earliest *stimuli* for various crafts and introduced a political and religious ideology, what is more significant is how they were accepted and transformed to suit local conditions. Local creativity in some aspects of crafts (metallurgy) and technology (irrigation) surpassed their source of origin, while others such as Buddhism were preserved in their original form after it disappeared from India (see below).

The Indian influence on Sri Lanka, therefore, should not be overstated. This influence is somewhat similar to the concept of 'localization' of Wolters (1999:15–26). The introduction of *Theravada* and *Mahayana* Buddhist traditions from India to Sri Lanka and their acceptance and rejection illustrate the nature of Indian influence on Sri Lanka. While the art of *Mahayana*

was accepted and creatively furthered (e.g., *stupas*, and moonstone), its philosophy was more or less completely rejected. In contrast, *Theravada* Buddhism was embraced by the majority of the island and preserved in its original form even though it had totally disappeared in its land of origin.

8.3.1.2 Influence of the wider Indian Ocean

The material and textual evidence for Sri Lanka's wider Indian Ocean contacts stretches to East Africa, the Red Sea, the Mediterranean, the Middle East and the Far-East. The finding of horse remains and lapis lazuli in Protohistoric/Early Historic contexts and the presence of *Yavanas* at Anuradhapura (Chapter 7.3.1) indicate Sri Lanka's interaction with the Western Indian Ocean before the CE. The Sri Lankan mission to the court of Claudius marked the start of official contact with Rome (Pliny *N.H.* VI.84–91). By this time Sri Lanka had already established trade and diplomatic relations with China. Based on Ptolemy's *Geography* and archaeological finds at Mantai, Francis (2013b) suggested that a 'Roman colony' existed between 80 BC and AD 140, although this idea is similar to Wheeler et al.'s (1946) view of Arikamedu. This was surely a semi-permanent settlement for western traders who sailed to Mantai with the monsoon wind and then waited until the direction changed to return home. This would lead to a prolonged stay in the port making them multi-cultural melting pots. The finding of a Nestorian cross at Anuradhapura is interpreted as evidence for the presence of a Nestorian Christian community (Hocart 1924). The historical and material evidence presented in this thesis also indicates the role of Sassanians, Persians and Arabs in Sri Lankan trade. The Arab/Muslim traders introduced Islam to the island. All the communities and faiths cited above contributed to the island's multicultural character. This further reduces the speculated Indian influence on Sri Lanka.

Nearly 7% of the GTCA from all three sites are imported wares from China, SEA, the Middle East and from yet unidentified overseas regions ('Imp.Unk'). While 'Imp.Unk' ceramics occur from about the beginning of the CE, Middle Eastern wares appeared around the mid-3rd century at Mantai. The material evidence for Sri Lanka's relations with SEA and China is later than depictions in historical sources and appears from *ca*. the 5th century. The basis of this interaction was both religious (Buddhism) and commercial, although the former seems to have been the forerunner. While Sri Lankan Buddhist nuns established the *Bhikhuni* order in China in the 5th century, a branch of the Anuradhapura Abhayagiriya monastery existed in Indonesia in the 8th century. The influence of Sri Lankan Buddha statues is found in SEA, while in return the *Mahayana* influence from SEA is visible on Sri Lanka's eastern and southern coasts. The discovery of Sri Lankan made *stupa* beads and garnets in SEA and the Southeast Asian cornaline d'Aleppo in Sri Lanka illustrates cultural-commercial exchange between these two regions. My ceramic surface-treatment analysis (Chapter 3.3.13.1) and Juleff's (1998) suggested transfer of linear iron smelting technology from Sri Lanka to SEA are rare material evidence for the early interaction between the two regions. Thus, the long-term interaction with the wider Indian Ocean reduces India's influence on Sri Lanka. Based on the architectural similarities, Bandaranayake (2012:14) concluded that Sri Lanka has a South Asian location and a South-East Asian character, while Hoogerverst (2013) provides linguistic evidence for cultural exchange between Sri Lanka and SEA.

8.3.1.3 International trade and agency

In Chapter 7, I argued that even the earliest historically known north Indian colonization could have been inspired by increasing maritime trade in the Bay of Bengal and Sri Lanka. The arrival of Vijaya (north-western coast), Sangamitta (northern coast) and Tapassu-Bhalluka, the sibling

traders (eastern coast), indicates at least three different trade/maritime routes linking Sri Lanka with ports on the eastern coast of India, such as Tamralipti. The epigraphic references to various foreign trading communities (i.e., *Kabhojas*, *Yavanas*, *Damedas*) testify to the presence of traders from the southern and western regions of India as well as the Mediterranean from the last few centuries BC onwards. By the beginning of the CE, Sri Lanka was making deliberate efforts to establish trade and diplomatic relations with Rome in the west and China in the Far-East (*Vp*. XXXI:74). Eleven such Sri Lankan missions were sent to China before AD 600 (Werake 1978:23-36). Consequently, Sri Lanka played an important role in linking the civilizations in the East with those of the west.

Based on texts, I identified three different categories of commodities that were traded and exchanged by Sri Lankans since the 6th century BC: imported, exported and imported and re-exported/transhipping (Chapter 7.2.1). Pearls and gems topped the exported category. They were used as gifts to foreign royal courts, exchanged for red corals from the Mediterranean and trading to foreign merchants at local ports or overseas. Various floral (spices and herbs) and faunal (chanks, tortoise shells) materials as well as man-made products (see below) were also exported from Sri Lanka. Coins and ceramics were the most numerous imports and came from China, India, the Middle East, the Mediterranean and the Red Sea. Coins were often imported for metal rather than currency, with ceramics traded for both intrinsic value and content. Wines, perfumes, glass and ceramic wares, (Kashmiri and Chinese silk) textiles and horses, all of which seem to have been for the use of elites and for religious purposes, were among the other imported items. The transhipped items that are mentioned in the texts include Chinese silk and elephants. Such trade is identifiable from Procopius (1.20.9–13) and Cosmas (XI.15–16) who indicate the extent to which Sri Lanka was involved in maritime trade.

Parakramabahu I's (1153–1186) war against Burma was instigated to protect the profits from the elephant trade. In the Nainathiv inscription, he laid down rules to safeguard the state's share from the shipwrecks close to Sri Lankan coasts (Chapter 7.3.2).

In Chapters 3, 4, 5 and 6, I discussed the archaeological findings of ceramic and non-ceramic material of foreign origin. Albeit limited in size, the significance of our imported bead assemblage is that it provides evidence for trade with the Mediterranean, the Middle East, SEA and India. Ports were gateways through which imports were primarily dispersed internally. Consequently, limited finds at ports represent a small proportion of the total goods which passed through them. Over 11% of the ceramics from Mantai, Kantharodai and Kirinda are imported wares, the majority of which were no doubt traded, while a small quantity could have represented gifts and religious items. The largest non-Indian imported assemblage is 'Imp.Unk', followed by Middle Eastern, with small amounts of Chinese and SEA ceramics. A large quantity of these wares comprises storage/transport wares, which reached the island for their contents, such as grapes, cloves and wine, indicating the variety of traded items. There are also imported luxury wares from India, the Middle East, the Mediterranean and the Far-East. From the 6th century BC, ceramics and other material remains originating from southern and northern India are found in Sri Lanka. From the mid-3rd century, Middle Eastern ceramics occur at Mantai. Previous excavations at Mantai and sites in the interior have artefacts, particularly late Roman coins, from the Mediterranean (e.g., Prickett-Fernando 2003b). From *ca*. the late 7th/8th century, ceramics from the Middle and the Far-East increased in volume. The material and historical evidence strongly contradicts the traditional view that trade declined after the 7th century at Mantai and that was completely destroyed after 993. The 7th to the 11th centuries are the most prosperous period at Mantai—and of the island—

after which the volume of the Middle Eastern trade seems to have reduced while trade with SEA and China was increasing, reflecting a change in the pattern of Indian Ocean trade and in Sri Lanka's role within those networks.

The significance of Sri Lanka as a trading 'port' is amply demonstrated in the foreign literature of Kautilya, Ptolemy, Procopius, Cosmas, al-Beruni to Hudud Al Alam (Chapter 2.3). By the first century, Sri Lanka was a known trade emporium in the east and by the 4th/5th century *entrepôt* trade had shifted from south India to the island. By the 6th century Sri Lanka was at the centre of the east-west trade in the Indian Ocean (Cosmas XI.15–16). Considering the significance given to Sri Lanka by Cosmas, Wolters (1967:146–147) concluded that it was the terminus for western traders (cf. Francis 2013b), which is also clear from Procopius (I.20.9–13).

8.3.1.4 Agency

In traditional histories, Sri Lankans are considered to have been uninterested in trade and never to have taken to the seas (Chapters 1.5.4 and 7.3.2). The agency for trade in ancient Sri Lanka is, therefore, mostly assigned to foreigners. Strong epigraphic evidence exists for the presence of foreign traders and trade guilds in Sri Lanka (Paranavitana 1970; Indrapala 2003:153160; Pathmanathan 1990:139–150). The dominance of foreign divers, traders and jewellers such as Indian and Arabs over locals in the pearl fishery in the proximity of Mantai is recorded in the 19th century (Vincent 1807; Percival 1803). This over emphasis on foreign traders in ancient Sri Lanka seems to stem partly from colonial experiences, which have been extrapolated to the past (Chapter 7.2.2.1). However, professions such as pearl fishing are against Buddhism, the religion of the majority in the country, for which reason locals probably refrained from involvement in it. Similarly, pearl fishers were mere seasonal maritime workers

and not maritime traders. Such examples, therefore, should not be generalized to trade as a whole.

In Chapter 7, I discussed the historical evidence for internal networks, institutions and the agency involved in trade. Cosmas (XI.15–16) is explicit about Taprobane exporting its own products to various marts around the Indian Ocean. Sri Lanka sent trade and diplomatic missions to the court of Claudius and to China to promote diplomatic-commercial ties. Traders such as Nanti, a resident merchant at Mantai, went on years-long overseas trade trips (Chapter 2.3.1.4) and another reference to a business trip to Kashi, northern India. Significantly local craftsman is also noted as leaving their professions to take up maritime trade, perhaps indicating its profitability. Inscriptions refer to Sri Lankan pilots and seafarers as well as depicting naval crafts since pre-Christian times (Chapter 7.3.2). Ships of the lion's country (Sri Lanka) were in the habit of visiting Canton and were among the largest ships that visited their ports and could carry 3000 amphorae by the time of Ptolemy (*Geographia* 4.1). By laying down regulations for both internal and external trade in inscriptions such as Godavaya, Nainathiv and Budulla and levying taxes, kings regulated trade at least since the last centuries BC (Chapter 7.3.2). By the 5th century, the sea and ports such as Mantai were protected by kings to safeguard trade (Chapter 2.3.1.3). In sum, there is clear evidence for the active participation of the state, individuals and organized groups in local and foreign trade in pre-modern Sri Lanka. With its location at the crossroads of the east-west trade route of the Indian Ocean and an international trading hub, as well as producing numerous high-demand trade goods, the involvement of foreign traders in Sri Lanka is easily understood. They may even have outnumbered locals in certain areas, such as pearl fishing. This does not, however,

undermine the agency of locals in internal and external trade; which is further evident from the development of local crafts and their trade (see below).

8.3.2 Internal dynamism and connections

In the preceding chapters, I discussed internal dynamics in terms of the growth of various crafts and industries as well as internal procurement-production-distribution networks. It is the interaction between external forces and internal dynamics that leads to creativity and cultural transformations. The vast majority of the materials recovered from all three sites are local products, of which ceramics are the most numerous. Nevertheless, a range of craft products, along with evidence for irrigated agriculture, are found from our sites and elsewhere in Sri Lanka. Extensive remains of irrigation work and numerous textual and epigraphic references to them indicate the extent to which wet-rice cultivation was practiced in the past. While the importance of irrigated agriculture has been well recognized and projected as the basis of the *Rajarata* civilization, the significance of other crafts and industries have never been adequately assessed. Nevertheless, it was a combination of Sri Lanka's raw and manufactured products that attracted foreign traders. The identification of these craft products and locating them in their historical, temporal and spatial contexts was the methodology that I adopted throughout this thesis to reconstruct internal networks and external connections.

8.3.2.1 Local ceramics, internal networks and external connections

Sri Lanka owes its local ceramic tradition to India, who sent potters with many of its royal entourages to the island where they were duly recognized and allocated separate streets in cities (Chapter 2.3.1.6). The migration of potters from south India is also inferred both from

the Protohistoric Early Iron Age findings (cf. Seneviratne 1984) and from our limited ethnographic studies. Ceramic production was one of the most widely practiced crafts in ancient Sri Lanka as confirmed in our assemblage.

The largest quantities of ceramics (87% of the GTCA) found at Mantai, Kantharodai and Kirinda are locally made. PLRE and RESL are by far the largest wares, which occur from around the 5th century BC in my Kantharodai assemblage. Ceramic production/consumption seems to have progressively increased as is clear from the enormous quantities found in the upper levels at all three sites. Considerable variations observed in firing, fabric and inclusions are interpreted primarily as evidence for multiple sources of production at various regional-level workshops (Chapter 5.2.1). Despite these variations, their chronological and spatial distribution, rim types, vessel forms and decorations are nearly identical. Such similarities are observed in rim types and vessel forms in assemblages from Kirinda and Tissamaharama in the south to Mantai and Kantharodai in the north. This evidence may reflect trade and exchange across regions, which is also inferred from the occurrence of southern-region-specific wares (e.g., Graphite wares) at Mantai and Kantharodai. Our limited ethnographic studies, however, suggest that these similarities more likely resulted from the sharing of a common ceramic tradition among closely related potting communities, whose relationships are reinforced periodically through intermarriages. Some of them trace their ancestry and ceramic tradition to south India, which is perhaps reflected in our 'Ind/SL' origin group that displays potting attributes common to both local and Indian wares. These communities are stationed at socially and economically beneficial distances from each other. They rarely undertake long-distance trade in coarse wares due to risks of breakage and the uneconomical nature of transporting a low value good

over a long distance to markets already served with similar goods by a closer potting community.

The distribution and potting attributes of these origin groups, therefore, may illustrate internal networking for maintaining social relationships and transferring ceramic technology among potting communities, as well as limited trade and exchange in luxury/ritual wares and rarely in the transport of coarse wares as containers. They may also shed light on possible people to people relations in Sri Lanka and south India that are unrecorded in the texts. Although the export of these wares is unknown, some of the large vessels could have been used as containers to transport local products, such as the IPBs found at Siraf and Beranike (Chapter 6.4.3.4). The transport of beads in pots is reported from the Lena Shoal Shipwreck in Tao Maenam Noi in Palawan (Goddio et al. 2002:249–251). The similarities observed in the coarse wares of Tissamaharama and those of Sumhuram in Oman (Pavan and Schenk 2012) may support such thinking.

8.3.2.3 Craft specialization and connections

A range of crafts and industries were practiced in ancient Sri Lanka, which were crucial for the economy and external connectivity. Although some of these craft products were channelled to maritime trade, hitherto they have been inadequately assessed for interpreting connectivity. Each of the sites studied displays evidence for varying degrees of production depending on their location and time of existence. Kantharodai declined before the beginning of the CE and the peak of Indian Ocean trade and as a result its connectivity was largely confined to India and perhaps to SEA and to Anuradhapura internally. Kantharodai was primarily a consumer of craft goods rather than a producer. Kirinda operated during the peak

of Indian Ocean maritime trade, nevertheless, it was a regional fishing harbour that occasionally engaged in maritime trade and produced ceramics, glass beads and perhaps glass in its vicinity. Mantai had the best access to the wider Indian Ocean and was well connected to the capital Anuradhapura and other important settlements and resource bases in the interior. Consequently, Mantai was the main production centre and the premier seaport for over two millennia.

All crafts were not practiced to the same scale and intensity. Kantharodai, Mantai and Kirinda collectively provide evidence for the production of beads, bangles, metal and jewellery as well as pearl fishing. Local ceramics are the largest category of artefacts; however, no evidence of their production is found at these sites. While Anuradhapura had a separate street for potters, cumbersome industries such as pottery that need large amounts of space were probably located outside cities/ports. While many of the potting attributes of local wares greatly vary within and across sites, the surface treatment and decorations as well as certain rim types and vessel forms display close similarity, a high degree of standardization and thus craft specialization. The PI/ST decoration, of which the origin is generally traced to SEA, occurs in local ceramics centuries earlier than those on the Indian and SEA wares at Mantai. While such decorations are rare in India (Chapter 3.3.13), 83% of our local Mantai assemblage contains paddle impressed decorations, illustrating the local specialization of techniques even if they were introduced from outside. This could be a deliberate act to create/maintain a local identity/tradition.

8.3.2.3 Local craft and industries

A number of crafts/industries such as metallurgy, weaving and oil milling existed at Mantai (Chapter 2.3.1.6). While lapidary workers are referred to in epigraphs, bead and bangle making, for which extensive archaeological evidence is found, are unrecorded. Of all the crafts, bead production stands out at Mantai and Kirinda as well as at sites such as Anuradhapura (Deraniyagala 2004; Coningham 2006) and Tissamaharama (Hanibal-Deraniyagala 2001). Beads made of synthetic, stone and organic material are found in our assemblage. Over 80% belong to synthetic beads, of which 98% are glass. At Mantai, the majority seem to have been produced at the site or in the vicinity as a great deal of production debris (52% of GTBA) was recovered. Kantharodai offers a different picture, as here nearly 99% of the glass beads are finished products, suggesting it was only a consumer of beads.

8.3.2.4 Glass beads and IPB industries and connections

As elsewhere in the Indian Ocean, glass was the preferred material for bead making in these sites. Over 62% of the bangles are also made of glass. A similar situation is reported from Anuradhapura and Tissamaharama, indicating the enormous quantity of glass required for these industries. While the importation of glass and reheating of scrap glass was inferred, imported glass is unlikely to have satisfied the local demand. In addition to Giribawa, where there is some evidence for glass production, a number of other glass production sites such as ASW2 and Kirinda could have existed. Networking between glass and glass bead production sites, ports, urban and other settlement sites was likely to have existed since at least the last centuries BC.

The extent to which the local glass bead industry flourished in ancient Sri Lanka is clear from the fact that only 2% of the GTBA was imported and that over 90% of the glass beads were locally made. Two different patterns can be discerned. Kantharodai, which probably did not produce beads, had an assemblage predominantly (99% of the finished beads) of local disc beads. At Mantai (83%) and Kirinda (78%), where glass beads were made, the majority are IPBs. Taken as a whole, the local GBA is dominated (87% of the GTBA) by three main bead types, IPB, disc and *stupa* beads. This indicates the deliberate specialised production of a few bead types, which is evident from the IPB assemblage, aimed at overseas markets.

Drawn/IPB beads are the most numerous at many sites in Sri Lanka, although the terminology used to describe them differs. IPBs account for 1,215 items (69% the TGBA) from Mantai and Kirinda. Mantai, which has the largest IPB assemblage of our sites, produced few bead forms in limited colours with high quality surface lustre. With its inception from *ca.* the 2nd century BC, IPBs were standardized by the mid-3rd century AD and almost the same standards were maintained until the 12th/13th century. The standardization of a selected few artefacts and the maintenance of production quality over a long period of time reflects craft specialization. Control over production was perhaps required to maintain such standards for a long period of time and this desire could have been driven by market demand. Thus I argue that Mantai IPBs were primarily tailor-made for maritime trade.

The Kirinda IPB assemblage began around the late 3rd century when Mantai had standardized its production and its upper boundary (8th/9th centuries) coincides with the high mark of the Mantai IPB industry and the peak of maritime trade. While the Kirinda assemblage certainly illustrates selectiveness and the standardization of a few bead forms as well as high surface

lustre, technologically it is of lower quality compared to that of Mantai and displays a different pattern of preference over bead form and colour. Products from Kirinda are likely to have catered for a local clientele rather export markets. While craft specialization is evident in both assemblages, the differences in them reflect the targeted consumers and perhaps the level of technology.

Like Rouletted ware, IPB production and distribution illustrate an Indian Ocean-wide bead network in which Sri Lanka figured prominently. In comparison to Rouletted ware, IPBs seem to have a wider geographical distribution and chronological longevity. IPBs are produced at a number of sites in South Asia (India and Sri Lanka in particular) and SEA and are likely to date from *ca*. 400 BC thus predating known dates from Arikamedu (*ca.* 250 BC), which is credited as the first producer of IPBs (Chapter 8.4.2; Francis 1989b:2, 1990:5). Anuradhapura and Mantai are other potential sites for the early production of IPBs. They are distributed from South and East Africa, the Red Sea and the Middle East in the west to China and Japan in the east (Ibid.). Morphological and technological attributes of IPBs from across sites seem to indicate close interaction between lapidary workers who probably travelled or shared technology. Thus, IPB production/distribution illustrates terrestrial and maritime networks linking production sites, ports and urban centres across the Indian Ocean. In contrast to Carswell's (1983:35) conclusion, neither Mantai nor its IPB production collapse due to the Chola attack in 993 but continued up to the 12^{th}/13^{th} centuries.

The discovery of Sri Lankan/Mantai made IPBs at Siraf (Francis 2002:48), Berenike (Sidebotham 2011:238) and probably at Unguja Ukuu (Zanzibar Islands) suggests the major role of Mantai in maritime trade (Chapter 6.4.3.4). According to Francis (2013a:368) the IPBs

found in eastern and western Africa are also Sri Lankan made. Considering the close cultural-commercial contacts some of the IPBs found in SEA as well as those found in China, could also be Sri Lankan made. The postulated date of the collapse of the mechanism that circulated IPBs in SEA (Francis 2002:48) roughly coincides with the demise of Mantai. SEA was the main market for IPBs and when we also consider the export of Sri Lankan garnets to this region (Carter 2012) as well as *stupa* beads, they clearly demonstrate Sri Lanka's strong cultural relations with this area. *Stupa* beads are found at Sungai Mas and Dvaravati from around the 7th to the 8th/9th centuries (Chapter 8.5.2) when central Indonesia housed a branch of Anuradhapura Abhayagiri *Vihara*.

8.3.2.5 Stone bead industries and connections

The stone assemblage illustrates how external and internal demand for luxury items led to craft specialization, external commercial-cultural relations and the creation of specialized social classes. Although quantitatively limited, a range of high-value precious stones, presumably consumed by elites and used for ritual purposes, are found in my assemblage. By adopting evidence for on-site production as the main proof for the local manufacture of beads, I identified locally produced beads made from imported raw materials, whereas traditionally beads made of non-native raw materials are considered as imports. Sri Lanka's external trade and ancient connectivity become clearer when the stone bead industries are tied to IPB producing sites in South Asia (Arikamedu, Karaikadu) and SEA (Oc-Eo, Vijaya, Kula Selinsing, Khlong Thom) as well as with archaeological finding of Sri Lankan material from across the Indian Ocean. In contrast to Francis's (2002:48) conclusion that of all of the IPB working sites in South Asia and SEA, Mantai had the least impressive stone industry that began as late as

the 7th/8th century, my stone bead analysis illustrates that Mantai had a comparatively substantial industry beginning around the late 1st century (Chapter 6.7.5).

My analysis also reveals the import of raw materials as well as finished products of locally unavailable rocks and minerals. Lapis lazuli, a non-native material, was found in small quantities in previous excavations at Anuradhapura and Mantai from at least 360 cal. BC (Coningham et al. 2006:377). Two lapis lazuli items from our Mantai excavation postdate the 9th century. Baluchistan or Afghanistan is likely to have been the source of this material while Persian/Muslim traders could have been the agents of their trade.

Carnelian, another non-native material, seems to have been imported from Thailand and various sources in India (Chapter 6.5.1.1). They are found from many Sri Lankan sites such as Anuradhapura from *ca.* 800 BC (Deraniyagala 1972b:139) with evidence for on-site working. Carnelian finds, in addition to raw materials and beads, include carved animals such as fish, lions and tortoise from ritual contexts at Jetavana *stupa* (3rd to 4th century). Carnelian is the largest category of imported beads/debris recovered from my sites. Ten items from Kantharodai are the earliest (mid-4th/late 3rd BC) while Kirinda contains only two carnelian items dating to late 4th and early 8th centuries. Mantai, the most cosmopolitan site, had 140 items of which 97% are production debris. There is evidence for carnelian working from the late 1st century and this continued beyond the Chola attack at Mantai. The majority of the carnelian appears to have come as raw material, which was then worked locally.

Our stone bead/debris assemblage illustrates the preference for rare, high value rocks and minerals, presumably demanded by the growing elite class. Abundantly available local

minerals such as quartz and even garnet were rarely used, although they were worked at main sites such as Mantai. Contrary to the traditional view that Sri Lankan lapidary workers were uninterested in garnets, our Mantai assemblage, as well as those at ASW2, provide clear evidence for garnet working. The lack of finished products in archaeological contexts illustrates that both raw material and finished products were probably exported, as there was no local market for them. Historical references to quartz in Arabic literature and archaeological finds of Sri Lankan garnet beads in Oman (Rosch et al. 1997:763-783) and in Cambodia (Carter 2012:296-307) support this claim. In addition to the minerals/rocks cited above, numbers of Sri Lankan semi-precious stones, such as amethyst, were also worked at Mantai. Sri Lankan sapphires have also been found in Berenike and the Sigiriya earring, illustrating that gems were embedded within jewellery, perhaps that was also locally produced. A well-coordinated network was required to procure and distribute these minerals to workshops and traders at local ports or overseas. Such networking would have facilitated bringing scattered communities together. The reputation of, and the demand for, Sri Lankan precious stones in the ancient world is clear from foreign literature in which Sri Lanka is cited as the source of gems and named as the land of gems (Chapter 7.2.2.1). The enormous wealth that the gem trade generated prompted Sri Lankan kings to take control over mining and to levy taxes from private miners and gem traders, which in turn put power into their hands (Chapter 7.3.2).

8.3.2.6 Other crafts

Along with gems, the Sri Lankan pearl was the other main attraction for foreign traders from the middle of the first millennium BC (Chapter 7.2.2). The vivid colonial era descriptions of pearl fishing undertaken in the proximity of Mantai illustrate the extent of the involvement of

foreign nationals and the magnitude of the industry. Limited archaeological findings from our excavation, and those from Carswell et al. (2013), indicate pearl working at Mantai. The discovery of a gold bead, a limited number of glass and chank shell bangles and a few ivory objects in our assemblage, alongside extensive evidence for them in Carswell's larger excavations, provide insight into thriving crafts unknown from texts. The Mantai bangle industry appears to have flourished much earlier than bangle making in South Asia, probably due to the impetus provided by Persian traders who were present at the port. Although there is no archaeological or textual evidence for the import of Sri Lankan made bangles, I argue that bangles, along with beads, were also traded to the same markets as both industries were closely related and were primarily used as jewellery. They, along with gems and pearls, could have been exported as a Sri Lankan package of personal adornment. Some of the local materials such as pearls seem to have been exchanged for other foreign commodities such as red corals. The local agency of the red coral-pearl exchange network between Sri Lanka and the Mediterranean may be inferred from king Bhatikabhaya's (Malalasekara 1938:630) mission to Rome to obtain red corals (Chapter 7.2.3.1).

Iron and steel making is another significant craft for which there is evidence, including a small hearth, at Mantai (Juleff 2013) and elsewhere on the island. This should be placed alongside the flourishing iron/steel industries at Dehi-elakanda and Samanalawewa (Chapter 6.6.2). Repeated references to '*Sarandib*' high-quality steel in Arabic literature coincides with the peak of this industry at Samanalawewa (Juleff 1996). The production at Alakolawewa and Samanalawewa exceeded local consumption and was exported. Like many other crafts and industries in ancient Sri Lanka, iron technology was introduced from India. The technology was advanced locally to such an extent that Sri Lanka was revered as one of the best quality steel

makers in the ancient word and the iron/steel smelting technologies seem to have transferred from it to regions such as SEA (Chapter 7.8.2).

The significance of these crafts and industries is that they began with impetus from outside and proliferated and standardized due to the market demand. Foreign migrant workers seem to have engaged in some of these crafts and industries at local ports and workshops, at least seasonally (e.g., in pearl fishing), transferring technology and more importantly establishing cultural-commercial relations. Some of the migrant workers, like south Indian potters, settled down in Sri Lanka and were assimilated into local society. The long-term engagement of the same craft, where in most cases the entire family was involved, led to creation of profession-related social groups/castes such as '*Kumbakaras*'- potters, leaving a lasting impact on the social fabric. Introduced from outside, these crafts developed indigenously and acted as the internal dynamics of long-term cultural evolution.

8.3.2.7 'Islandness'

I raised the issue of external influence on small islands, particularly those located in the proximity of a large neighbour as well as the possibility of islands developing unique cultural traits due to their geographical isolation (Chapter 1.5.4). The material and historical evidence discussed in this thesis illustrates that Sri Lanka derived its initial political, ideological and cultural inspirations from India. Indian artisans and craftsmen were probably instrumental in establishing various crafts such as ceramics on the island. Sri Lanka's interactions and inspirations, however, were not confined to India. The early beginning of the Mantai bangle industry, for example, seems to stem from interactions with Persians. The introduction of Islam and Christianity to the island were a result of its interaction with the west.

Despite strong external influences, Sri Lanka, due to its island character, had the unique opportunity to evolve as an independent geo-political and cultural entity. Notwithstanding a number of south Indian invasions, Sri Lanka remained an independent polity for much of its history. While the island's cultural roots are firmly based on mainland South Asia, it received inspiration from the wider Indian Ocean, and much of its cultural evolution took place within the shores of the island due to its geographical isolation. Even some of the crafts and industries, such as glass bead, metallurgy and irrigation, which were probably introduced from India, developed locally to such an extent that they stand as distinctively Sri Lankan among the other South Asian traditions. The colours and surface lustre in IPBs produced at Mantai, for example, are unique among the other contemporary IPB working sites with the result that they could easily be identified from excavations at Siraf, Berenike and possibly from Unguja Ukuu.

The material culture discussed in this thesis stands as a testimony to the localization of external inspirations and indigenous developments in ancient Sri Lanka. While wares in GWF were derived from India, some of its later variants were likely produced locally. Similarly, the inverted firing technique of the BRW, an Indian introduced ware, seems to have continued much after the disappearance of BRW in Sri Lanka. The island character of Sri Lanka provided it the option to accept or reject external influences. The rejection of the rigid subcontinent caste system while preserving Buddhism in its original form, as cited earlier, shows how the island's people could resist and persist with what they saw as being best for their long-term development.

8.3.2.8 Irrigated agriculture and agro-centrism

Much of the discussion in this thesis has centred on traders and the exchanged goods and related crafts and industries. The vast majority of the Sri Lankan people, however, had little or no involvement in trade and maritime activities. They were agriculturists practicing irrigated paddy and *chena* cultivation and to a lesser degree agro-pastoralism. Their staple food was rice. The extent to which irrigated paddy cultivation was practised is explicit from the extensive physical remains of irrigation systems, which are invariably referred to in contemporary texts. Even before the historically recorded north Indian colonizers arrived, ploughed agriculture was well established in the island (Coningham 1999:73–74. Archaeological evidence for irrigated agriculture and water management is found by the 5th century BC at Anuradhapura (Coningham 1999:73–74) and before the beginning of the CE, valve sluice technology (*Bisokotuwa*) was invented in Sri Lanka (Bohingamuwa 2010:173-189). In the subsequent centuries irrigated agriculture developed to such an extent that the earliest civilization of the island is termed a 'hydraulic civilization' and its society a 'hydraulic society' (cf. Brohier 1934/1935; Parker 1909; Leach 1959; Gunawardana 1971; 1978a&b; Siriweera 1994; Myrdal-Runebjer 1996; Seevalee 1998). In addition to the extensive physical remains of irrigation and literary evidence for them, the traditional view that the ancient oriental societies were primarily agricultural and self-sufficient also contributed to such 'agro-centric' views, which disregard equally significant constituents such as the maritime trade component of ancient economies (cf. Ray 1994:1). While the equation of Sri Lanka's irrigated agriculture to that of 'oriental despotism' (Wittfogel 1953; 1974) has long been rejected (Gunawardana 1971; Habib 1969; Seevalee 1998), the agro-centric view that credits most achievements of ancient Sri Lanka to irrigated agriculture persists.

While there is no denial of the contribution of Sri Lanka's ancient irrigation and wet-rice cultivation to the rise of early civilization, other crafts and industries as well as internal and external trade should be placed within their rightful historical context for understanding the multi-faceted character of Sri Lankan civilization for which ample material evidence is discussed in this thesis. The relationship between irrigated agriculture, trade and other crafts and industries need to be explored to a greater extent than this thesis is able to. While most of the agricultural produce was locally consumed, a part of it seems to have been exported as is clear from the sources such as *Pattinapalai* (Chapter 7.2.2). It is also likely that part of the profit generated from foreign trade was invested in state owned irrigation schemes and probably in other crafts and industries as well, although it is argued that most crafts and industries existed outside of state control (Abraham 2013). But taxes on trade and market places were state controlled.

8.4 Concluding remarks

Braudel (1972) concluded that the sea was a paradox in that it acts both as a facilitator that connects regions/people and as a great divider to be overcome: this is certainly true of Sri Lanka. The ocean around the island sufficiently isolated it from the rest of world for it to remain an independent geo-political entity for the most part of its history and to develop a distinct culture. The ocean also opened up the island's shores and linked it with cultures and countries in the wider Indian Ocean, reducing the influence of its nearest neighbour, India. The long-term cultural and historical evolution of Sri Lanka is, thus, a result of its constant struggle against external forces to maintain its geo-political independence on the one hand and to interact with the external world for economic and cultural aspirations on the other. This unique situation provided the island with an opportunity to develop a distinctive culture

while assimilating and accommodating diverse cultural and ideological influences from mainland South Asia as well as from the wider Indian Ocean.

Due to its central location in the Indian Ocean aside a major trans-oceanic trade route in pre-modern times, the availability of numerous harbours, navigable rivers, high value commodities, man-made crafts and the monsoon winds to its advantage meant that Sri Lanka was a mercantile attraction since the earliest historically recorded colonisations. Partly driven by maritime trade, a number of crafts and industries developed; the products of which were also exported. From around the 4th/5th centuries the *entrepôt* trade began to shift from South India to Sri Lanka and by the 6th century Sri Lanka was the centre of East-West maritime trade in the Indian Ocean. This situation remained almost the same until about the end of the 10th century, after which the trading patterns, partners and the intensity changed. Mantai was at the centre of this trade, while a number of other ports around the island were also involved to varying degrees. Being the fulcrum of the east-west trade, Sri Lanka enjoyed the middle-man's position, engaging in transhipping trade while also exporting its own products. Foreign traders and mercantile guilds actively engaged in this trade and sometimes even outnumbered the locals. The Sri Lankan state and local traders as individuals or groups took no less an active part in both internal and maritime trade.

Nevertheless, Sri Lanka has never been a mercantile society *per se* and it remained chiefly agrarian throughout its history. Irrigated agriculture was the driving force behind Sri Lanka's early civilization, while internal and external trade had been a secondary but extremely important stimulant in the ancient economy and cultural evolution of the island. The

significance of external trade is the role it played in linking the island with cultures and countries across the Indian Ocean, bringing diversity to its shores.

Trade was not the only means of external connectivity. I demonstrated, through historical analysis, how Sri Lankan kings made constant and concerted efforts to establish and reinforce political alliances and cultural-commercial relations through marriages, gift-exchanges, formal embassies and Buddhist missionaries. Asoka's Buddhist diplomacy to expand Mauryan hegemony over Sri Lanka, Vijaya's marriage and gift-exchange with the Pandyas, and Mahanama's Buddhist embassies to China are such examples. While the role of Buddhist monks in furthering maritime trade is well known (Ray 1999, Chakrabarti 1995:1985-202), their role in other forms of diplomacy is less well established. Buddhist networks, for example, were the forerunners of Sri Lanka's cultural and commercial connection with SEA.

Thus, Sri Lanka's external connectivity did not depend on a single factor or mechanism with all regions throughout the time period covered here. As I concluded in Chapter 7, the island's interaction with various regions in the Indian Ocean was based on specific historical realities, which were constantly redefined and reformulated in response to the changing dynamics within Sri Lanka and across the region as a whole.

BIBLIOGRAPHY

Abeydeera, A. 2009. 'Raki's Mission to Romanukharatha: New Evidence in Favor of Pliny's Account of Taprobanê, "N. H." 6.84-91'. *Habis* 40: 145–65.

Abraham, S. A. 2013. 'In Search of Craft and Society: The Glass Beads of Early Historic Tamil South India.' In *Connections and Complexity: New Approacjes to the Archaeology of South Asia.*, Abraham, S. A., Gullapalli, P., Raczek, T. P. and Rizvi, U. Z. (eds.), 239–261. Walnut Creek, California: Left Coast Press, Inc.

Adams, R. McC. 1970. 'Tell Abu Sarifa. A Sassanian—Islamic Ceramic Sequence from South Central Iraq.' *Ars Orientalis* 8: 87–119.

Adhyatman, S. 1983. *Notes on early olive green wares found in Indonesia*. Jakarta. The Ceramic Society of Indonesia.

Allchin, B. 1958. 'The late stone age of Ceylon'. *Journal of the Royal Anthropological Institute.* 88 (2): 179-201

Appadorai, A. 1936. *Economic Conditions in Southern India, 1000-1500 A.D.* Madras University Historical Series 12.

Ardika, I. W., and Bellwood, P. S. 1991. 'Sembiran: The Beginnings of Indian Contact with Bali.' *Antiquity* 65: 221–32.

Ardika, I. W., Bellwood, P. S. Eggleton, R. A. and Ellis, D. J. 1993. 'A Single Source for South Asian Export-Quality Rouletted Ware.' *Man and Environment* 18 (1): 101–9.

Arkell, A. J. 1936. 'Cambay and the Bead Trade.' *Antiquity* 10: 292–305.

Arthashastra. 2000 (Reprint). New Delhi: Penguin Books Limited

ASCAR. 1933. Colombo: Archaeological Survey of Ceylon.

Bandaranayake, S. 1974. Sinhalese Monastic Architecture; the Viharas of Anuradhapura. Leiden. Brill.

———. 1978. 'The External Factor in Sri Lanka's Historical Formation.' *Ceylon Historical Journal* XXV (25th Anniversary Issue): 74–94.

———. 1990. 'The Periodization of Sri Lankan History and Some Related Historical and Archaeological Problems.' In *Asian Panorama: Essays in History*, De Silva, K. M., Kiribamune, S., and De Silva, C. R. (eds.), 151–76. Delhi: Vikas Publishing House.

———. 2003. 'Introductory Note: Sri Lanka and the "Silk Road" of the Sea'. In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 9–12. Colombo: Central Cultural Fund.

———. 2012. *Continuties and Transformations: Studies in Sri Lankan Archaeology and History*. Colombo: Social Scientists Association.

Bandaranayake, S., Maldeniya, G. and Binaragama, D. 1984. 'Pottery and Other Related Materials.' In *Sigiriya Project, First Archaeological Excavation and Research Report*, Bandaranayake, S. (ed.), 136–80. Colombo: Central Cultural Fund.

Bandaranayake, S., Mogren, M. and Epitawatte, S. 1990. *Studies in the Settlement Archaeology of the Sigiriya-Dambulla Region*. Colombo: Postgraduate Institute of Archaeology, University of Kelaniya.

———. 1994. *Further Studies in the Settlement Archaeology of the Sigiriya-Dambulla Region*. Colombo: Postgraduate Institute of Archaeology, University of Kelaniya.

Bandara, R. 2005. 'The Archaeology of Pottery Recovered from Lower Kirindi-Oya Basin 1999-2003.' Unpublished MPhil Dissertation, Colombo: Postgraduate Institute of Archaeology, University of Kelaniya, Sri Lanka.

Basa, K. K. 1991. 'The Westerly Trade of South-East Asia from C. 400 B.C. to 500 A.D. with Special Reference to Glass Beads.' Unpublished PhD Thesis, London: University College of London.

———. 1992. 'Early Glass Beads in India.' *South Asian Studies* 8: 91–104.

———. 1993. 'Manufacturing Methods of Monochrome Glass Beads in South Asia.' *Man and Environment* 18 (1): 93–100.

Beal, S., trans. 1884. *Si- Yu-Ki, Buddhist Records of the Western World*. London: Trubner & Co.

Beaujard, P. 2005. 'The Indian Ocean in Eurasian and African World-Systems before the Sixteenth Century.' *Journal of World History* 16 (4): 411–65.

Beck, H. 1928. *Classification and Nomenclature of Beads and Pendants*. York: Liberty Cap Books.

———. 1930. 'Notes on Sundry Asiatic Beads.' *Man* 30: 166–82.

Begley, V. 1967. 'Archaeological Exploration in Northern Ceylon.' *Expedition* 9 (4): 20–24.

———. 1981. 'Excavation of Iron Age Burial at Pomparippu 1970.' *Ancient Ceylon* 4: 49–142.

———. 1983. 'Arikamedu Reconsidered.' *American Journal of Archaeology* 87: 461–81.

———. 1988. 'Rouletted Ware at Arikamedu: A New Approach.' *American Journal of Archaeology* 92: 427–40.

———. 1992a. 'Ceramic Evidence for Pre-Periplus Trade on the Indian Coasts.' In *Rome and India: The Ancient Sea Trade*, Begley, V. and De Puma, R. D. (eds.), 157–96. Wisconsin: The University of Wisconsin Press.

———. 1996a. 'Changing Perceptions of Arikamedu.' In *The Ancient Port of Arikamedu: New Excavations and Researches 1989-92*, Vol. I, "Mémoires archéologiques".22, Begley, V. (ed.), 1-40. Pondicherry: Ecole Francaise d'Extreme Orient.

———. 1996b. ‘Pottery from the Northern Sector, 1989-92.’ In *The Ancient Port of Arikamedu: New Excavations and Researches 1989-92*, Vol. I, “Mémoires archéologiques”.22, Begley, V. (ed.), 15–285. Pondicherry: Ecole Francaise d’Extreme Orient.

———. 2004. ‘Chronology. In *The Ancient Port of Arikamedu: New Excavations and Researches 1989-92*, Vol. II, “Mémoires archéologiques”.22. , Begley, V. (ed.) Paris: Ecole Francaise d’Extreme Orient.

Begley, V. and De Puma, R. D. (eds.). 1992. *Rome and India: The Ancient Sea Trade*. Wisconsin: The University of Wisconsin Press.

Behera, K. S. 1994. ‘Maritime Contacts of Orissa: Literary and Archaeological Evidence.’ *Utkal Historical Research Journal* 5: 59–60.

Bell, H. C. P. 1911. ‘Archaeological Survey of Ceylon, Annual Report: 1907’, *Ceylon Sessional Papers*, 1911.

Bellina, B. 2003. ‘Beads, Social Change and Interaction between India and South-East Asia.’ *Antiquity* 77 (296): 285–97.

Bellina, B., and Silapanth, P. 2006. ‘Khao Sam Kaeo and the Upper Thai Peninsula: Understanding the Mechanisms of Early Trans-Asiatic Trade and Cultural Exchange.’ In *Uncovering Southeast Asia’s Past – Selected Papers from the Tenth Biennial Conference of the European Association of Southeast Asian Archaeologists, London, 14th – 17th September 2004*, Bacus, E, Glover, I. and Piggot, V. (eds.), 378–91. Singapore: National University Press.

Bellwood, P. 1992. ‘South East Asian before History.’ In *Cambridge History of South East Asia*, Tarling, N (ed.), 55–136. Cambridge: Cambridge University Press.

———. 1997. *Prehistory of the Indo-Malaysian Archipelago*. Honolulu: University of Hawai Press.

Bellwood, P. S. 2005. *First Farmers: The Origins of Agricultural Societies*. Oxford/Malden (MA): Blackwell Publishing.

Boake, W. J. S. 1887. ‘Tirukketisvaram, Mahatittha, Matoddam or Mantoddai.’ *JRASCB* X.

Bohingamuwa, W. 2010. ‘Sluice Technology in Ancient Sri Lankan Reservoirs: The Bisokotuwa Sluice.’ In *Sirinumal Lakdusinghe Felicitation Volume*, 173–89. Colombo: Neptune Publishers.

Boivin, N., Blench, R. and Fuller, D. Q. 2009. ‘Archaeological, Linguistic and Historical Sources on Ancient Seafaring: A Multidisciplinary Approach to the Study of the Early Maritime Contact and Exchange in the Arabian Peninsula.’ In *The Evolution of the Human Populations in Arabia, Vertebrate Paleobiology and Paleoanthropology*, Petraglia, M. D. and Rose, J. J. (eds.), 251–78. Sringer Science Business media.

Bopearachchi, O. 1990. ‘Some Observations on the Roman Coins Found in the Recent Excavations at Sigiriya.’ *Ancient Ceylon*, 20–37.

———. 1995. ‘Recent Discoveries of Ancient Foreign Coins, Hitherto Unknown in Sri Lankan Context.’ In *Sesquicentennial Commemorative Volume, Royal Asiatic Society of Sri Lanka 1845–1995*, Commemorative volume:127–39. Colombo.

———. 1996. ‘Seafaring in the Indian Ocean: Archaeological evidence from Sri Lanka’, In *Tradition and Archaeology. Early Maritime Contacts in the Indian Ocean*, Ray, H. P. and Salles, J.-F. (eds.), 59-77. New Delhi: Manohar Publishers

———. 1997a. ‘Ancient Coins in Sri Lanka.’ *Economic Review* 23 (October/November): 21–26.

———. 1997b. Preface to the book by D.P.M. Weerakkody, *Taprobanê: Ancient Sri Lanka as known to Greeks and Romans*, I-XV. Brépols: Turnhout (Belgium).

———. 1998. ‘Archaeological Evidence on Changing Patterns of International Trade Relations of Ancient Sri Lanka.’ In *Origin, Evolution and Circulation of Foreign Coins in the Indian Ocean*, Bopearachchi, O. and Weerakkody, D. P. M. 133–78. New Delhi: Manohar Publishers.

———. 2001. “Ancient Sri Lanka: New archaeological data of the trade between Rome and China”, in *Men and Monuments. D.T. Devendra. A century Tribute*, Prematilleke, L. (ed.), 97–112. Colombo.

———. 2002. "Archaeological evidence on cultural and commercial relationships between ancient Sri Lanka and South India”, in *Honouring Martin Quéré o.m.i.*, Robuchon, G. (ed.), 60-75. Negombo : Viator Publications

———. 2004. ‘New Archaeological Evidence on Cultural and Commercial Relationships between Ancient Sri Lanka and Tamil Nadu.’ *Journal of Interdisciplinary Studies in History and Archaeology* 1 (1 (Summer 2004)): 60–72.

———. 2006. ‘Circulation of Roman and Byzantine Gold Coins in Sri Lanka: Fact or Fiction.’ In *Dal Denarius Al Dinar l’Oriente E La Moneta Romana*, 181–200. Rome.

———. 2008. ‘Tamil Traders in Sri Lanka and Sinhalese Traders in Tamil Nadu.’ presented at the ICES Lecture/Discussion Series, International Centre for Ethnic Studies, Colombo.

Bopearachchi, O., Barnes, R. and Parkin, D. 2002. 'On Shipping Communities of Sri Lanka.' In *Ships and the Development of Maritime Technology on the Indian Ocean*, 93–125. London: Routledge Curzon.

Bopearachchi, O., and Prematilleke, P. L. 2001. 'Ancient Sri Lanka: New Archaeological Data of the Trade between Rome and China.' In *Men and Monuments. D. T. Devendra. A Century Tribute*, 97–112. Colombo: Central Cultural Fund.

Bopearachchi, O., and Rajan, K. 2002. 'Graffiti Marks of Kodumanal (India) and Ridiyagama (Sri Lanka) — A Comparative Study.' *Man and Environment* XXVII (2): 97–105.

Bopearachchi, O., and Weerakkody, D. P. M. (eds.). 1998. *Origin, Evolution and Circulation of Foreign Coins in the Indian Ocean*. New Delhi.

Bopearachchi, O., and Wickremesinhe, R. M. . 1999. *Ruhuna. An Ancient Civilisation Re-Visited., Numismatic and Archaeological Evidence on Inland and Maritime Trade*. Colombo: R. M. Wickremesinhe.

Bouzek, J., ed. 1993. *Ceylon between East and West; Abhayagiri Vihara 1981-1984; Excavations and Studies*. Prague: Charles University Press.

Braudel, F. 1972. *The Mediterranean and the Mediterranean World in the Age of Philip II*. London: Collins.

Brohier, R. L. 1934/1935. *Ancient Irrigation Works in Ceylon*. 2nd (Part I-III). Colombo: Sri Lanka Government Press.

Carboni, S. 2013. 'The Mantai Glass.' In *Mantai-City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 313–48. Aichwarld: Linden Soft Verlag.

Carswell, J. 1978. 'Excavations at Vankalai, Sri Lanka.' In *National Geographic Society Research Reports*, 129–37. Washington D.C.: National Geographic Society.

———. 1983. 'Medieval Trading Post in the Indian Ocean.' *Illustrated London News*, 84–85.

———.1985. Chinese ceramics from Allapiddy in Sri Lanka. In *A Legacy of Asia's maritime trade*. 3-49. Kuala Lumpur (Southeast Asian Ceramic Society), West Malaysian Chapter.

———. 1991. 'The Port at Mantai, Sri Lanka.' In *Rome and India: The Ancient Sea Trade*, 197–203. Madison: The University of Wisconsin Press.

———. 1996. 'The Excavations of Mantai.' In *The Indian Ocean in Antiquity*, Read, J. (ed.), 501–15. London: British Museum.

Carswell, J., Deraniyagala, S. and Graham, A. 2013. *Mantai-City by the Sea*. Aichwarld: Linden Soft Verlag.

Carswell, J., and Prickett, M. E. 1984. 'Mantai 1980: A Preliminary Investigation.' *Ancient Ceylon* V: 3–80.

Carter, A. K. 2012. 'Garnet Beads in Southeast Asia: Evidence for Local Production?' In *Crossing Borders: Selected Papers from the 13th International Conference of the European Association of Southeast Asian Archaeologists*, Tjoa-Bonatz, M. L., Reinecke, A. and Bonatz, D., 296–304. Singapore: National University of Singapore.

Casparis, J. G. de. 1961. 'New Evidence on Cultural Relations between Java and Ceylon in Ancient Times.' *Artibus Asiae*, 241–48.

———. 1990. 'Expansion of Buddhism into Southeast Asia (mainly before C. AD 1000).' *Ancient Ceylon*, 1–23.

Casson, L. 1960. *The Ancient Mariners, from the Dim Beginnings of Sea-Conquest to the Great Maritime Empires of Antiquity*. London: Vitor Gallancz Ltd.

Chakrabarti, D. K. 1995. *The Archaeology of Ancient Indian Cities*. Delhi: Oxford University Press.

Champakalakshmi, R. 1996. *Trade, Ideology and Urbanization: South India 300 BC to AD*

1300. New Delhi: Oxford University Press.

Chandra, L. 1979. 'Cultural Contacts of Indonesia and Sri Lanka in the 8th Century and Their Bearing on the Barabudur.' *Vishveshvaranand Indological Journal* 17: 267–286.

Chandra, S., (ed.). 1987. *The Indian Ocean: Explorations in History, Commerce and Politics*. New Delhi and Newbury Park: Sage Publications.

Chaudhuri, K. N. 1985. *The Trade and Civilization in the Indian Ocean: An Economic History from the Rise of Islam to 1750*. Cambridge: Cambridge University Press.

———. 1990. *Asia before Europe: Economy and Civilization of the Indian Ocean from the Rise of Islam to 1750*. Cambridge and New York: Cambridge University Press.

Cherian, P. J., Ravi Prasad, G. V., Dutta, K., Ray, D. K., Selvakumar, V. and Shajan, K. P. 2009. 'Chronology at Pattanam: A Multi-Cultural Port Site on the Malabar Coast'.' *Current Science* 97 (2): 236–40.

Chittick, N. 1974. *Kilwa: An Islamic Trading City on the East African Coast*. Nairobi: British Institute in East Africa.

———. 1984. *Manda. Excavations at an Island Port on the Kenyan Coast*. Nairobi: British Institute in East Africa.

Codrington, H. W. 1919. 'A Sinhalese Embassy to Egypt.' *Journal of Royal Asiatic Society Ceylon Branch* XXVIII (72): 83.

———. 1924. *Ceylon Coins and Currency*. Colombo: Government Printer.

———. 1926. *A Short History of Ceylon*. London: McMillan.

Coedes, G. 1968. *The Indianized States of Southeast Asia*. Honalulu: An East-west center Books.

Colles, D. E. 1969. 'The Traders of the Pearl: the mercantile and missionary activities of Persian and Armenian Christians in South-East Asia', *Abr-Nahrain*' IX (1970):17–38.

ColomboPage, 2011. *ColomboPage: Sri Lanka Internet Newspaper.* [Online] Available at: http://www.colombopage.com/archive_11/Mar14_1300117391KA.php [Accessed 25. 08. 2014].

Coningham, R. A. E. 1999. *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta 2 Volume I – the Site*. Vol. I. British Archaeological Reports International Series 824. Oxford: Archaeopress for Society for South Asian Studies monograph 3.

———. 2002. 'Beyond and Before the Imperial Frontiers: Early Historic Sri Lanka and the Origins of Indian Ocean Trade.' *Man and Environment* 27: 99–108.

———. 2006. *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta, 2 Volume 2 – the Artefacts*. Vol. 2. British Archaeological Reports International Series 1508. Oxford: Archaeopress.

———. 2006. 'Glass Objects.' In *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta, 2 Volume 2 – the Artefacts*, Coningham, R.:333–76. British Archaeological Reports International Series 1508. Oxford: Archaeopress.

Coningham, R. A. E., and Allchin, F. R. 1995. 'The Rise of Cities in Sri Lanka.' In *The Archaeology of Early Historic South Asia*, 152–84. Cambridge: Cambridge University Press.

Coningham, R. A. E., Allchin, F. R., Batt, C. M. and Lucy, D. 1996. 'Passage to India? Anuradhapura and the Early Use of the Brahmi Script.' *Cambridge Archaeological Journal* 6 (1): 73–79.

Coningham, R. A. E., and Batt. C. M. 1999. 'Dating the Sequence.' In *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta 2 Volume I – the Site*, Coningham, R. A. E. (eds.), 47–70. British Archaeological Reports International

Series 824. Oxford: Archaeopress for Society for South Asian Studies monograph 3.

———. 1999a. 'Dating the Sequence.' In *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta 2 Volume I – the Site*, Coningham, R. A. E. (eds.),125–33. British Archaeological Reports International Series 824. Oxford: Archaeopress.

Coningham, R.A.E. and Gunawardhana,P. 2013. *Anuradhapura: Volume 3 The Hinterland*. BAR International Series. Oxford: Archaeopress.

Coningham, R. A. E., Burroni, D. Donahue, R. and Ford, L. 2006. 'Stone Objects.' In *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta, 2 Volume 2 – the Artefacts*, Coningham, R. A. E. (eds.), 377–413. British Archaeological Reports International Series 1508. Oxford: Archaeopress.

Coningham, R. A. E., Ford, L., Cheshire, S. and Young, R. 2006. 'Unglazed Ceramics.' In *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta, 2 Volume 2 – the Artefacts*, Coningham, R. A. E. (eds.), 127–332. British Archaeological Reports International Series 1508. Oxford: Archaeopress.

Connan, J., Lombard, P. Killick, R., Flemming, H., Salles, J. F. and Khalaf, A. 1998. 'The Archaeological Bitumens of Bahrain from the Early Dilmun Period (c . 2200 BC) to the Sixteenth Century AD: A Problem of Sources and Trade.' *Arabian Archaeology and Epigraphy* 9: 141–81.

Coomaraswamy, A. K. 1906. *Medieval Sinhalese Art*. New York: Pantheon Books.

———. 1956. *Medieval Sinhalese Art*. 2nd ed. New York: Pantheon Books.

Cooray, P. G. (1967) 1984. *An Introduction to the Geology of Sri Lanka (Ceylon)*. Colombo: National Museum of Sri Lanka.

Cosmos Indicopleustes: Topographia Christiana. II-XI

D'Ancona, M. L. 1952. 'Amaravati, Ceylon, and Three "Imported" Bronzes'. *The Art Bulletin* 34 (1): 1–17.

Das Gupta, A., and Dasgupta, U. 2001. *The World of the Indian Ocean Merchant, 1500-1800: Collected Essays of Ashin Das Gupta*. Oxford India Paperbacks. Oxford University Press.

Davy, J. 1983. *An Account of the Interior of Ceylon and Its Inhabitants with Travels in That Island*. Dehiwala: Tisara Prakasakayo Ltd.

DeCorse, C. R., Francois, G. R. and Thiaw, I. 2003. 'Toward a Systematic Bead Description System.' *Journal of African Archaeology* 1 (1): 77–110.

Deo, S. B. 2000. *Indian Beads: A Cultural and Technological Study*. Pune: Deccan College Postgraduate and Research Institute.

Deo, S. B., and Gupte, R. 1974. *Excavations at Bhokardan*. Nagpur: Nagpur University.

Deo, S. B., and Joshi, J. P. 1972. *Pauni Excavation, 1969-70*. Nagpur: Nagpur University.

Deraniyagala P. E. P. 1958. 'Report on the Archaeological Survey of Ceylon for 1957'. *Ceylon Administrative Reports IV Education, Science and Art (G).* Colombo: Government Press.

Deraniyagala, S. U. 1972. 'The Citadel of Anuradhapura 1969: The Gedige Area.' *Ancient Ceylon* 2: 48–170.

———. (1992) 2004. *The Prehistory of Sri Lanka: An Ecological Perspective*. Colombo: Department of Archaeological Survey of Sri Lanka.

———. 2013. 'Mesolithic Activity on the Ancient Shore Line: Interpretation and Conclusions.' In *Mantai-City by the Sea*, Carswell, J., Deraniyagala, S., and Graham,

A. (eds.), 121–30. Aichwarld: Linden Soft Verlag.

Deraniyagala, S. U., and Abeyratne, M. 2000. 'Radiocarbon Chronology of Anuradhapura, Sri Lanka: A Revised Age Estimate.' In *South Asian Archaeology 1997*, Taddei, M. and De Marco, G. (eds.), 759–91. Rome: IsIAO.

De Silva, C. R. 1987. *Sri Lanka: A History*. London/New Delhi: Sangam Books/Vikas Publishing House.

De Silva, K. M. D. 1981. *A History of Sri Lanka*. London: C Hurts & Company, University of California Press.

De Silva, N., and Dissanayake, R. B. 2008. *A Catalogue of Ancient Pottery from Sri Lanka*. Colombo: Postgraduate Institute of Archaeology.

Devendra, S. 2011. 'Sailing on a String and a Prayer: The "Oru Culture".' In *Sri Lanka and the Indian Ocean Gujarat and the Sea*, Varadarajan, L. (ed.). Gujarat: Darshak Itihas Nidhi.

———. 2013. *The Lost Ships of Lanka. Maritime Heritage of Lanka: Ancient Ports and Harbours*. Colombo: National Heritage Trust.

Dewaraja, L. 2003. 'Muslim Merchants and Pilgrims in Sarandib C.900-1500AD.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 183–90. Colombo: Central Cultural Fund.

———. 2003b. 'Thailand Repays Her Debt to Sri Lanka: A Study of the Cultural Contact between the Two Countries from the Fifteenth to the Eighteenth Centuries.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 245–53. Colombo: Central Cultural Fund.

De Zilva Wickremasinghe, D. M., (ed.). 1912a. *Epigraphia Zeylanica*. Vol. II. Colombo: Archaeological Survey of Ceylon.

———. (ed.). 1912b. *Epigraphia Zeylanica*. Vol. I. Colombo: Archaeological Survey of Ceylon.

———. (ed.). 1928. *Epigraphia Zeylanica*. Vol. III. Colombo: Archaeological Survey of Ceylon.

Dharmawardene, R. 2015. 'A Classification for Black and Red Ware in Sri Lanka.' *Ancient Ceylon* 24: 15–38.

Dias, M. 2008. 'Trade in Ancient Sri Lanka Epigraphical Evidence 3rd BC to 7th AD.' In *Roland Silva Felicitation Volume*, Chutiwong, N. and Silva, R. (ed.), 78–83. Colombo: PGIAR.

Dikshit, M. G. 1969. *History of Indian Glass Beads*. Bombay: University of Bombay.

Dipavamsa. Oldenberg, H. (ed.). 1879. London: Williams and Norgate.

Dissanayake, C. B., Chandrajith, R. and Tobschall, H. J. 2000. 'Rare Element Geochemistry and Mineralogy of Gem-Bearing Sediments of Sri Lanka.' *Bulletine of the Geographical Society of Finland* 72 (1-2): 5–20.

Divyavadana. Cowell, E. B., and Neil, R. A. (eds.). 1886. Cambridge: Cambridge University Press.

Dubin, L.S. 1987. *The History of Beads: From 30,000 B.C. to the Present*. London: Thames and Hudson.

———. 1995. *The History of Beads: From 30,000 B.C. to the Present*. Concise edition. London: Thames and Hudson.

Dupont, P. 1959. 'Les Buddha Dits d'Amaravati En Asie Du Sud-Est.' *Bulletin de l'École Française d'Extrême-Orient* 49 (2): 631–36.

Dussubieux, L. 2001. 'L'Apport de L'ablation Laser Couplée a l'ICP-MS à La Caractérisation Des Verres: Application a L'étude Du Verre de L'océan Indien.' Unpublished PhD Thesis, Orleans France: Université d'Orléans.

———. 2014. 'LA-ICP-MS Analysis of Glass Beads from the Indian Ocean.' Sealinks Project.

Dussubieux, L., and Gratuze, B. 2010. 'Glass in Southeast Asia.' In *50 Years of Archaeology:*

Essays in Honour of Ian Glover, Bellina, B., Bacus, E., Pryce, T. and Wisseman, C., (eds.), 247–59. Bangkok: River Books.

Dussubieux, L., Gratuze, B. and Blet-Lemarquan, M . 2010. 'Mineral Soda Alumina Glass Occurrence and Meaning.' *Journal of Archaeological Science* 37: 1646–55.

Dussubieux, L., Kusimba, C. M., Gogte, V., Kusimba, S. B., Gratuze, B. and Oka. R. 2008. 'The Trading of Ancient Glass Beads: New Analytical Data from South Asian and East African Soda-Alumina Glass Beads.' *Archaeometry* 50 (5): 797–821.

Dussubieux, L., Lankton, J. W., Bellina-Pryce, B. and Chaisuwara, B. 2012. 'Early Glass Trade in South and South East Asia: Now Insights from Two Sites, Phu Khao Thong in Thailand and Arikamedu in South India.' In *Crossing Borders: Selected Papers from the 13th International Conference of the European Association of Southeast Asian Archaeologists*, Tjoa-Bonatz, M. L., Reinecke, A. and Bonatz, D. 307–28. Singapore: National University of Singapore.

Dussubieux, L., Robertshaw, P. and Glascock, M. 2009. 'LA-ICP-MS Analysis of African Glass Beads: Laboratory Inter-Comparison with an Emphasis on the Impact of Cor-Rosion on Data Interpretation.' *International Journal of Mass Spectrometry* 284: 152–61.

Evans, I. H. N. 1932. 'Excavations at Tanjong Rawa, Kuala Selinsing, Perak.' *Journal of the Federated Malay States Museum* XV: 79–134.

Fausboll, V., (ed.). 1963. *Jataka*. Vol. IV. London: Luzac&Co.

Fernandeze-Armesto, F. 2006. *Pathfinders: A Global History of Exploration*. Oxford: Oxford University Press.

Fernando, A. D. N. 1982. 'The Ancient Hydraulic Civilisation of Sri Lanka in Relation to Its

Natural Resources.' *JRASCB* XXVII (Special number): 1–48.

Flecker, M. 2001. 'A Ninth-Century AD Arab or Indian Shipwreck in Indonesia: First Evidence for Direct Trade with China.' *World Archaeology* 32 (No. 3, Shipwrecks (Feb., 2001)): 335–54.

Frank, A. G. 1998. *Re-Orient: Global Economy in the Asian Age*. Berkley, CA: University of California Press.

Ford, L. A., Pollard, A. M. Coningham, R. A. E. and Stern, B. 2005. 'A Geochemical Investigation of the Origin of Rouletted and Other Related South Asian Fine Wares.' *Antiquity* 79 ((2005)): 909–20.

Forenius, S., and Solangaarachchi, R. 1994. 'Dehigaha-Ala-Kanda (KO 14) at Alakolavava: An Early Iron Production Site with a Highly Developed Technology.' In *Further Studies in the Settlement Archaeology of the Sigiriya-Dambulla Region*, Bandaranayake, S., Mogren, M. and Epitawatte, S. (eds.), 134–42. Colombo: Postgraduate Institute of Archaeology, University of Kelaniya.

Francis, P. 1984. 'A Note.' *Journal of Glass Studies* 26: 152–53.

———. 1986. 'Bead Report, XVIII: The Asian Bead Study Tour, Part IV: A Little Tube of Tube of Glass.' *Ornament* 10 (1): 54–57, 74–78.

———. 1989a. 'Beads of the Early Islamic Period.' *Beads* 1: 21–39.

———. 1989b. 'Glass Beads in Asia, Part I: Indo-Pacific Beads.' *Asian Perspectives* XXIX (1): 1–21.

———. 1989b. *Beads and bead trade in Southeast Asia.* CCBR 4. Lake Placis, N. Y.

———. 1990. ‘Glass Beads in Asia, Part II: Indo-Pacific Beads.’ *Asian Perspectives* XXIX (1): 1–23.

———. 1991a. ‘Glass Bead in Malaya: A Reassessment.’ *Journal of the Malayan Branch of Lhe Royal Asiatic Society* 64 (1): 97–118.

———. 1991b. ‘Beadmaking at Arikamedu and beyond.’ *World Archaeology* 23 (1): 28–43.

———. 2001. ‘Human Ornaments.’ In *Report of the 1998 Excavations at Berenike*, Sidebotham, S. E. and Wendrich. W. Z. (eds.). Leiden: Research School of Asian, African and Amerindian Studies.

———. 2002. *Asia’s Maritime Bead Trade: 300 B.C. to the Present.* Honolulu: University of Hawai Press.

———. 2013a. ‘The Beads.’ In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 349–80. Aichwarld: Linden Soft Verlag.

———. 2013b. ‘Western Geographic Knowledge of Sri Lanka and Mantai C. 325 B.C. Tp 1170 A. D.’ In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 53–60. Aichwarld: Linden Soft Verlag.

———. 2013c. ‘The glass bangles and rings’ In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 381–384. Aichwarld: Linden Soft Verlag.

Frifelt, K. 2001. *Islamic Remains in Bahrain*. Aarhus: Aarhus University Press.

Fuller, D. Q. Boivin, N. and Korisettar, R. 2007. ‘Dating the Neolithic of South India: new radiometric evidence for key economic, social and ritual transformations. *Antiquity* 81: 755-778

Gardi, R. 1969. *African Crafts and Craftsmen*. New York: Van Nostrand Reinhold.

Gaur, A. S., R. Muthucumarana, W. M. Chandraratne, B. C. Orillandeda, M. Manders, S. Karunarathna, P. Weerasinghe, et al. 2011. ‘Preliminary Assessment of an Early

Historic (2000 Year Old) Shipwreck at Godawaya, Sri Lanka.' *The Bulletin of the Australasian Institute for Maritime Archaeology* 35: 9–17.

GAZETTEERS OF THE BOMBAY PRESIDENCY – POONA. n.d. Vol. XIV.

Ghosh, A. 1989. *An Encyclopaedia of Indian Archaeology. Vol 2: A Gazetteer of Explored and Excavated Sites in India*. Delhi: Munshiram Manoharlal Publishers Pvt. Ltd.

Ghosh, D. 1937. 'Two Bodhisattva images from Ceylon and Srivijaya'. *Journal of the Greater India Society* 4: 125–127.

Ghosh, A., and K. C. Panigrahi. 1946. 'The Pottery of Ahichchhatra, District Bareilly, U.P.' *Ancient India* 1: 37–59.

Gills, K. B., and Frank, A. G. 1993. 'World System Cycles, Crises and Hegemonic Shifts, 1700 BC to 1700 AD.' In *The World System Five Hundred Years or Five Thousand?*, Frank A. G. and Barry, G. K. (eds.), 143–99. London: Routledge.

Glover, I. C. 1996. 'Archaeological Evidence for the Early Maritime Contacts between India and Southeast Asia.' In *Tradition and Archaeology, Early Maritime Contacts in the Indian Ocean*, Ray, H. P. and Salles, J. F. (eds.), 129–58. Delhi: Manohar Publishers and Distributors.

———. 2002. 'West Asian Sassanian-Islamic Ceramics in the Indian Ocean, South, Southeast and East.' *Man and Environment* 27 (1): 165–77.

———. 2005. Avant le Champa: Fouilles a Tra Kieu et GoCam, Province de Quang Nam, Centre Vietnam, 2000–2003. In Tresors d'art du Vietnam. La sculpture du Champa. V^{e} – XV^{e} siecles. Establissement public du musee des arts asiatiques Guimet.

Catalogue realise sous la direction de Pierre Baptiste et Thierry Zephir. 12 October 2005 – 9 Janvier 2006, 14–21. Paris.

Glover, I. C., and Yamagata, M. 1995. 'The Origins of Cham Civilization: Indigenous, Chinese and Indian Influences in Central Vietnam as Revealed by Excavations at Tra Kieu, Vietnam 1990 and 1993.' In *Conference Papers on Archaeology in Southeast Asia*, Yeung Cun-tong and Li Wai-ling Brenda (ed.), 145–69. Hong Kong: University Art Gallery, University of Hong Kong.

Goddio, F., Crick, M., Lam, P., Pierson, S. and Scott, R. 2002. *Lost at Sea: The Strange Route of the Lena Shoal Junk*. London: Periplus Publishing.

Gogte, V. 2001. 'XRD Analysis of the Rouletted Ware and Other Fine Grey Ware from Tissamaharama.' In *Ancient Ruhuna: Sri Lanka German Archaeological Project in the Southern Province*, Weisshaar, H. J., Roth, H. and Wijeyapala, W. (eds.),197–202. Mainz am Rhein: Verlag Philpp von Zabern.

Gogte, V. D. 1997. 'The Chandraketugahr-Tamluk Region of Bengal: Source of the Early Historic Rouletted Ware from India and Southeast Asia.' *Man and Environment* XXII (I): 69–85.

Goswami, M. C., and S. K. Roy. 1977. 'A Report on the Selected Potsherds from Ambari, Assam, India.' *Bulletine of the Department of Anthropology, Guhawaty University* 1: 122–27.

Graham, A. 2013a. 'Defining an Occupational Sequence for the Mantai Mound.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 131–42. Aichwarld: Linden Soft Verlag.

———. 2013b. 'The Primary Development of the Mound.' In *Mantai: City by the Sea*,

Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 143–56. Aichwarld: Linden Soft Verlag.

———. 2013c. 'Synthesis.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 183–86. Aichwarld: Linden Soft Verlag.

———. 2013d. 'The Developed Settlement and Defensive Circuit.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 157–74. Aichwarld: Linden Soft Verlag.

———. 2013e. 'Earthenware Pottery: Pottery from the Excavated Sequence in Trenches H and G.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 191–212. Aichwarld: Linden Soft Verlag.

———. 2013f. 'The Bone and Ivory Objects.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 399–406. Aichwarld: Linden Soft Verlag.

———. 2013g. 'The Metal Artifacts.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 273–76. Aichwarld: Linden Soft Verlag.

Gratuze, B., and Barrandon, J.-N. 1990. 'Islamic Glass Weights and Stamps: Analysis Using Nuclear Technique.' *Archaeometry* 32 (2): 155–62.

Grillo, K. and Aultman, J. (2003) 2014. DAACS cataloguing manual: Beads. Online accessed: http://www.daacs.org/wp-content/uploads/2014/05/beads.pdf; accessed 23/12/2014 at 11.33

Grimes, A. 1941. 'The Journey of Fa-Hsien from Ceylon to Cantan.' *The Journal of the Malayan Branch of Royal Asiatic Society* XIX (1): 76–92.

Gunasekera, U. A., Prematilleke, P. L. and Silva, R. 1971. 'A Corpus of Pottery Fonns Found in CeyIon.' *Ancient Ceylon* 1: 166–92.

Gunawardana, R. A. L. H. 1967. 'Ceylon and Malaysia: A Study of Professor S. Paranavitana's Research on the Relations between the Two Regions.' *University of Ceylon Review* XV? (1&2 (April-October)).

———. 1971. 'Irrigation and Hydraulic Society in Early Medieval Ceylon.' *Past and Present* 53: 3–27.

———. 1978a. 'Hydraulic Engineering in Ancient Sri Lanka: The Cistern Sluices.' In *Senerat Paranavitana Commemoration Volume. Studies in South Asian Culture*, Indrapala, K., Prematilleke, P. L. and Van Lohuizen-de Leeuw, VII:61–74. Leiden: E. J. Beill.

———. 1978b. 'Social Function and Political Power: A Case Study of State Formation in Irrigation Society.' *Indian Historical Review* IV (2): 259–73.

———. 1982. 'Prelude to the State: An Early Phase in the Evolution in Ancient Sri Lanka.' *The Sri Lanka Journal of the Humanities* VIII (1&2): 1–39.

———. 2003. 'Seaways to Seilediba: Changing Patterns of Navigation in the Indian Ocean and Their Impact on Precolonial Sri Lanka.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 17–36. Colombo: Central Cultural Fund.

———. 2008. *Periodization in Sri Lankan History: Some Reflections with Special Emphasis on the Developments of State*. Colombo: Social Scientists Association.

Gunawardana, V. D. N. S. 2011. 'Banking System of Ancient Sri Lanka.' In *Proceedings of the Annual Research Symposium*, 51. Kelaniya: Faculty of Graduate Studies, University of Kelaniya.

Gupta, S. 2005. 'The Bay of Bengal Interaction Sphere (1000 BC- AD 500).' *Indo-Pacific Prehistoric Association Bulletin 25* 3: 21–30.

_____. 1999. Indo pacific beads in Japan. Bead Study Trust Newsletter. 34:11-14

Gupta, S. P., Dalal, K. F., Dandekar, A., Nanji, R. J., Pandey, R. and Mitra, R. 2003. 'Early Medieval Indian Ocean Trade: Excavations at Sanjan, India.' *Circle of Inner Asian Art Newsletter* 17 (June 2003): 26–34.

Guruge, A. W. P. 2003. 'The Sri Lankan Factor in the Development of the Art of Sukhotai and Lanna Tai.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 237–44. Colombo: Central Cultural Fund.

Guy, J. 2008. 'Early Nineth-Century Chinese Export Ceramics and the Persian Gulf Connection: The Belitung Shipwreck Evidence.' *The Oriental Ceramic Society of the Philippines News Letter*, no. February 2008: 7–12.

Gwinnett, A. J., and Gorelick, L. 1986. 'Evidence for the Use of a Diamond Drill for Bead Making in Sri-Lanka C. 700-1000 A.D.' *Scanning Electron Microscopy* II: 473–77.

Habib, I. M. 1969. 'An Examination of Wittfogell's Theory of 'Oriental Despotism.' In *Studies in Asian History*, 378–92. New Delhi.

Hadfield, R. 1912. 'On Sinhalese Iron and Steel of Ancient Origin.' In *Proceedings of the Royal Society of London. Series A, Containing Papers of a Mathematical and Physical Character (1905-1934)*, 86 (584):94–105. London: Royal Society of London.

Hallet, J. 2000. 'Trade and Innovation: The Rise of the Pottery Industry in Abbasid Basra.' Unpublished PhD Dissertation, Oxford: University of Oxford.

Hannibal-Deraniyagala, A. S. 2001. 'Beads from Tissamaharama: A Typology of Sri Lankan Glass Beads and Semi-Precious Stone Beads in Ancient Ruhuna.' In *Ancient Ruhuna:*

Sri Lankan-German Archaeological Project in the Southern Province, Weisshaar, H. J., Roth, H. and Wijeyapala, W. (eds.), 203–26. Mainz am Rhein: Verlag Philpp von Zabern.

———. 2003. 'Beads from Tissamaharama, Sri Lanka: Long Distance Contacts.' In *South Asian Archaeology*, Franke-Vogt, U. and Weisshaar, H. J. (eds.), 365–68. Aachen: Linden Soft Verlag.

———. 2005. 'Beads from Anuradhapura and Tissamaharama, Sri Lanka: Trade Contacts in the Early Historic Period.' *Journal of Indian Ocean Archaeology* 2: 21–24.

———. 2013. 'The Beads: Addendum II.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 370–73. Aichwarld: Linden Soft Verlag.

Hansman, J. 1985. *Julfar, an Arabian Port- Its Settlement and Far Eastern Ceramic Trade from 14th to the 18th Century AD*. London: The Royal Asiatic Society of the Great Britain and Ireland.

Harrell, J. A. 1999. 'Geology.' In *Berenike 1997: Report of the 1997 Excavations at Berenike and the Survey of the Egyptian Eastern Desert, Including Excavations at Shenshef*, Sidebotham, S. E. and Wendrich, W. Z. (eds.), 107–21. Leiden: CNWS Publications.

Harrison, T. 1949. *Some Ceramics Excavated in Borneo*. London: Transactions of the Oriental Ceramic Society.

Hegde, K. T. M. 1978. 'Analysis of Ancient Indian Deluxe Wares.' *Archaeo-Physika* 10: 141–155.

Henderson, J., McLoughlin, S. D. and McPhail, D. S. 2004. 'Radical Changes in Islamic Glass Technology: Evidence for Conservatism and Experimentation with New Glass Recipes from Early and Middle Islamic Raqqa, Syria.' *Archaeometry* 46 (3): 439–68.

Higham, C. 1991. *Archaeology of Mainland Southeast Asia*. Cambridge: Cambridge University

Hitti, P. K., trans. 1924. *Baladhuri: Futuh-Al-Buldan*. New York.

Hocart, A. M. 1927. 'Annual Report of the Archaeological Survey of Ceylon for 1925-26', *Ceylon Administrative Reports for 1926; Part IV, Education, Science and Art, Section 1*, H. Ross Cottle, Government Printer, Colombo, 1927.

Hoogervorst, T. 2013. *Southeast Asia in the Ancient Indian Ocean World*. Oxford: Archaeopress.

Hornell, J. 1922. *The Indian Pearl Fisheries of the Gulf Mannar and Palk Bay*. Madras: Government Press.

Horton, M. 1996. *Shanga, Archaeology of a Muslim Trading Community on the Coast of East Africa*. The British Institute of the Eastern Africa Memoir 14. London: The British Institute of the Eastern Africa.

Horton, M., and Middleton, J. 2000. *The Swahili- The Social Landscape of a Mercantile Society*. Oxford: Blackwell's Publishers.

Horton, M. 2013. 'Ceramics'. In Crowther, A., Horton, M. C., Kortaba-Morley, A., Kirkwood, L., Boivin, N., Blair, A., Matheson, C., Prendergast, M., Wood, M. and Wilmsen, E. 2013. 'Report on Fieldwork at Zanzibar.' Preliminary report-. Zanzibar: Sealinks Project. 58-67

Hourani, G. F. 1963. *Arab Seafaring in the Indian Ocean in Ancient and Early Medieval Times*. Beirut: Khayats.

Hoyland, R. G., and Gilmour, B. 2006. *Medieval Islamic Swords and Swordmaking: Kindi's Treatise 'On Swords and Their Kinds*. Oxford: Gibb Memorial Trust.

Imam, S. A. 1965. 'Ceylon Arab Relations.' In *Moors' Islamic Cultural Home Souvenir 1944-65*, 10–13. Colombo: Moors' Islamic Cultural Home.

———. 2003. ‘Cultural Relations between Sri Lanka and Iran.’ In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 165–70. Colombo: Central Cultural Fund.

Indrapala, K. 1963. ‘The Nainativu Tamil Inscription of Parakrambahu I.’ *University of Ceylon Review* XXI (1): 63ff.

———. 1970. ‘Some Medieval Mercantile Communities of South India and Ceylon.’ *Journal of Tamil Studies* II (2): 33–34.

———. 1971a. ‘Invasions from South India and the Abandonment of Polonnaruva.’ In *The Collapse of the Rajarata Civilisation in Ceylon and the Drift to the South- West*. Peradeniya: Ceylon study seminar.

———. 1971b. A fragmentary inscription from Fort Hammenhiel, Kayts, Epigraphia Tamilica Vol.I.1 Jaffna. 10-13

———. 1991. Inscription no.2 from Fort Hammenhiel, Kayts, Epigraphia Zeylanica. Vol.VI, 2 Colombo-154-160.

———. 2003. ‘South Indian Mercantile Communities in Ceylon, circa 950–1250.’ In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 153–60. Colombo: Central Cultural Fund.

———. 2005. *The Evolution of an Ethnic Identity: The Tamils in Sri Lanka C. 300 BCE to C. 1200 CE*. Sydney: MV Publications.

———. 2013. ‘Historical Evidence: Tamil Sources.’ In *Mantai-City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 61–72. Aichwarld: Linden Soft Verlag.

Janse, O. R. T. 1947. *Archaeological Research in Indo-China. Vol. I. The District of Chiu-Chen during the Han Dynasty, General Considerations and Plates*. Vol. 10. Harvard-Yenching Institute Monograph Series. Cambridge, Mass.: Harvard University Press.

Jayasingha, P. 2011. 'A Gemmological Perspective of Gem Beads of Jetavana Heritage Site, Sri Lanka.' *Archaeologia* 1 (part 2): 41–45.

JRASCB XXIV. 1915-16. Colombo: Royal Asiatic Society of Ceylon.

JRASCB XXVII. 1919. Colombo: Royal Asiatic Society of Ceylon.

JRASCB XXXV. 1943. Colombo: Royal Asiatic Society of Ceylon.

Journal Asiatique. 1900. May–June 1900:418-421

Juleff, G. 1996. 'An Ancient Wind-Powered Iron Smelting Technology in Sri Lanka.' *Nature* 379: 60–63.

———. 1998. *Early Iron and Steel in Sri Lanka: A Study of the Samanalavava Area*. Von Zabern: Mainz am Rhein.

———. 2009. 'Technology and Evolution: A Root and Branch View of Asian Iron from First-Millennium BC Sri Lanka to Japanese Steel.' *World Archaeology* 41 (4): 557–77.

———. 2013. 'Metal-Working at Mantai.' In *Mantai: City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 277–312. Aichwarld: Linden Soft Verlag.

Juma, A. 2004. *Unguja Ukuu on Zanzibar. An Archaeological Study of Early Urbanism*. Studies in Global Archaeology 3. Uppsala.

Kaap, D. B. 1985. 'The Kurumbas' Relationship to the "megalithic" Cult of Nilgiri Hills (South India)'. *Anthropos* 80: 493–534.

———. 1989. 'The "Ālu Kuṟumba Rāmāyaṇa": The Story of Rāma as Narrated by a South Indian Tribe'. *Asian Folklore Studies* 48 (1 (1989)): 123–40.

Kanungo, A. K. 2002. 'Glass Beads in Ancient India: An Ethnoarchaeological Approach.' PhD Thesis, Pune: Deccan College Post-Graduate and Research Institute.

———. 2004. 'Glass Beads in Ancient India and Furnace-Wound Beads at Purdalpur: An

Ethnoarchaeological Approach.' *Asian Perspectives* 43 (1): 123–50.

Kapitan, G. 2009. *Records of Traditional Watercraft from South and West Sri Lanka*. BAR International Series 1931.

Karashima, N. 2004. *In Search of Chinese-Sherds in South India and Sri Lanka*. Tokyo: Taisho University.

Karklins, K. 1985. *Glass Beads*. Canada: Minister of the Environment.

Karunarathne, P. P. 2010. 'Secondary State Formation during the Early Iron Age on the Island of Sri Lanka: The Evolution of a Periphery.' PhD Thesis, San Diego: University of California, San Diego.

Karunathilake, M., Sampath, K. N. and Rajendran, P. 2010. 'Sri Lankawe varthamana kalu walan thakshanaya pilibanda mulika adhyayanayak.' Wijethilaka, J. D. *National Archaeological Symposium* 1: 201–11.

Katz, M. B. 1975. 'Geomorphology and Reconnaissance Geology of Wilpattu National Park, Ceylon'. *Ceylon Journal of Science* 11 (2): 83–94

Kelly, G. 2012. 'Meaning in Context in the Iron Age: Beads and Ornaments in Megaliths, Ritual and Daily Life at Kadebakele, Karnataka (1200– 300 Bce).' *South Asian Archaeology*.

———. 2013. 'Craft Specialization, Technology and Social Change: A Study of Material Culture in Iron Age and Early Historic South India (c. 1200 BCE- 400CE).' PhD Thesis, Madison: University of Wisconsin.

Kennet, D. 1994. 'Jazirat Al-J:lulaylah - Early Julfar.' *Journal of Royal Asiatic Society* 4: 163–212.

———. 2004. *Sassanian and Islamic Pottery from Ras Al-Khaimah*. British Archaeological Reports International Series 1248. Oxford: Archaeopress.

Kenoyer, J. M. 1989. 'Socio-Economic Structures of the Indus Civilization as Reflected in Specialized Crafts and the Question of Ritual Segregation.' In *Old Problems and New Perspective in the Archaeology of South Asia*, Kenoyer, J. M. (ed.), 183–92. Madison: Wisconsin Archaeological Reports.

———. 1991. 'Harappan Craft Specialization and the Question of Urban Segregation and Stratification.' *Eastern Anthropologist* 44 (3-4).

———. 1992. 'Harappan Craft Specialization and the Question of Urban Segregation and Stratification.' *Eastern Anthropologist* 45 (1-2): 39–54.

———. 1995. 'Interaction Systems, Specialized Crafts and Culture Change: The Indus Valley Tradition and the Indo-Gangetic Tradition in South Asia.' Wezler, A. A. M. W. and de Gruyter, W. *Indian Philology and South Asian Studies*.

———. 1997. 'Trade and Technology of the Indus Valley: New Insights from Harappa, Pakistan.' *World Archaeology* 29 (2): 262–80.

———. 2000. 'Wealth and Socio-Economic Hierarchies of the Indus Valley Civilization.' In *Order, Legitimacy and Wealth in Early States*, Richards, J. and Van Buren, M. (eds.), 90–112. Cambridge: Cambridge University Press.

Kenoyer, J. M., Vidale, M. and Bhan, K. K. 1991. 'Contemporary Stone Beadmaking in Khambhat, India: Patterns of Craft Specialization and Organization of Production as Reflected in the Archaeological Record.' *World Archaeology* 23 (1): 44–63.

Kerr, R. 2002. 'Chinese Porcelain in the Gulf Region.' *The Journal of Oman Studies* 12: 125–31.

Kervran, M. 1977. 'Les Niveaux Islamiques de Secteur Oriental de l'Apadana, II.—Le Materiel Ceramique.' *Cahiers de La Delegation Archeologique Frangaise En Iran* 7: 75–161.

———. 1979. ‘Une Sucrerie D’epoque Islamique Sur La Rive Droite Du Chaour a Suse: II, Le Material Archeologique.’ *CDAFI* 10: 177–237.

———. 1996. ‘Indian Ceramics in Southern Iran and Eastern Arabia: Repertory, Classification and Chronology.’ In *Tradition and Archaeology: Early Maritime Contacts in the Indian Ocean*, Ray, H. P. and Salles, J. F. (eds.), 37–58. New Delhi: Manohar Publishers and Distributors.

———. 2004. ‘Archaeological Research at Suhar 1980-1986.’ *Journal of Oman Studies* 13: 263–381.

Kervran, M., and Hiebert, F. 1991. ‘Sohar Pre-Islamic. Note Stratigraphique.’ In *Golf-Archaeologie: Mesopotamien, Iran, Bahrain, Vereinigte Arabische Emirate Und Oman*, Schippman, K., Herling, A. and Salles, J. F. (eds.), 337–48. Internationale Archaeologie 6.

Kidd, K. E., and Kidd, M. A. 1970. ‘A Classification System for Glass Beads for the Use If Field Archaeologists.’ *Canadian Historic Sites: Occasional Paper in Archeology and History*, no. 1: 45–89.

———. 1983 A Classification System for Glass Beads for the Use of Field Archaeologists. In Proceedings of the 1982 Glass Trade Bead Conference, Hayes III, C. F. (eds.), 219-255. Rochester Museum and Science Center, Research Records 16.

Kiribamune, S. 1986. ‘Muslims and Trade of the Arabian Sea with Special Reference to Sri Lanka from the Birth of Islam of the Fifteenth Century.’ In *Muslims of Sri Lanka: Avenues to Antiquity*, Shukri, M. A. M. (eds.), 89–112. Colombo.

———. 1987. ‘Trade Patterns in the Indian Ocean and Their Impact on Politics of Medieval

Sri Lanka.' In *K. W. Gunawardena Felicitation Volume*, De Silva, C. R. and Kiribamune, S. (eds.), 67–78. Peradeniya: T. B. S. Godamunne & Sons.

———. 1991. 'The Role of the Port City of Mahatittha (Mantota) in the Trade Networks of the Indian Ocean.' *Sri Lanka Journal of Humanities* XVII & XVIII: 171–92.

———. 2003. 'Muslims and the Trade of the Arabian Sea with Special Reference to Sri Lanka from the Birth of Islam to the Fifteenth Century.' In In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 171–82. Colombo: Central Cultural Fund.

———. 2013. 'The Role of the Port City of Mahatittha (Matota) in the Trade Networks of the Indian Ocean.' In *Mantai-City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 40–52. Aichwarld: Linden Soft Verlag.

Krahl, R. 2011. 'Green Wares of Southern China.' In *Shipwrecked: Tang Treasures and Monsoon Winds*, Krahl, R., Guy, J., Wilson, J. K. and Raby, J. (eds.), 185–99. Singapore and Washington D.C.: Arthur M. Sackler Gallery, Smithsonian Institution.

Krahl, R., Guy, J. Wilson, J. K. and Raby, J. (eds.). 2011. *Shipwrecked: Tang Treasures and Monsoon Winds*. Singapore and Washington D.C.: Arthur M. Sackler Gallery, Smithsonian Institution.

Krishnamurthy, R. 1991. 'Oblong Copper Coins with "Mother Goddess" Symbol from Karur, Tamilnadu.' *Journal of Numismatic Society of India* 53 (Part I&II): 59–61.

Krishnamurthy, R., and Wickramasinghe, S. 2005. *A Catalogue of the Sangam Age Pandya and Chola Coins in the National Museum, Colombo, Sri Lanka*. Colombo: Department of National Museums.

Krishnan, K., and Coningham, R. A. E. 1997. 'Microstructural Analysis of Samples of Rouletted Ware and Associated Pottery from Anuradhapura, Sri Lanka.' In , Allchin, F. R.

Allchin, B., 925–937. USA and New Delhi: Science Publishers, Inc. and Oxford & IBH Publising Co. Pvt. Ltd.

Lahiri, N. 1992. *The Archaeology of Indian Trade Routes (up to C. 200 BC)*. Delhi: Oxford University Press.

Lamb, A. 1965. 'Some Observations on Stone and Glass Beads in Early Southeast Asia.' *Journal of Malaysian Branch of Royal Asiatic Society* 38 (2): 85–124.

Lane, A. 1947. *Early Islamic Pottery. Mesopotamia, Egypt and Persia.* London: Faber and Faber.

Lankton, J. W. 2011. 'First Millennium CE Bead Production in Southern Thailand.' Paper presentaion presented at the Society for American Archaeology, Sacramento, CA.

Larsen, C. E. 1983. *Life and Land Use on the Bahrain Islands, the Geography of an Ancient Society*. Chicago: University of Chicago Press.

Law, B. C. 1947. *On the Chronicles of Ceylon*. Calcutta: Royal Asiatic Society.

Leach, E. R. 1959. 'Hydraulic Society in Ceylon.' *Past and Present*, no. 15: 2–26.

Legge, J., trans. 1886. *A Record of Buddhistic Kingdoms Being an Account by the Chinese Monk Fa-Hien of His Travels in India and Ceylon*. Oxford: Clarendon Press.

Lertrit, S. 2004. 'Late Prehistoric and Early Historic Ceramic Chronology for Central Thailand.' *Silpakorn University International Journal* 4 (1-2): 5–37.

Levi, S. 1925. 'Ptolemee Le Niddesa et La Brhatkatha.' *Etudes Asiatiques* II: 1–55.

Linrothe, R. 2013. 'The Chinese, Islamic and Other Imported Pottery: A Changsha Sherd.' In *Mantai-City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 267–70. Aichwarld: Linden Soft Verlag.

Liu, L. 1991. *A Survey of Chinese Ceramics. Early Wares: Prehistoric to Tenth Century*. Taiwan.

Liu, X. 1988. *Ancient India & Ancient China: Trade and Religious Exchanges AD 1- 600*. Delhi:

Oxford University Press.

———. 1998. *The Silk Road: Overland Trade and Cultural Interactions in Eurasia*. Washington D.C.: American Historical Association.

Liyanagamage, A. and Gunawardana, R. (eds.). (1961) 1987. *Anuradhapura Yugaya*. Colombo: Sri Lanka Library Services Board.

Maharoof, M. M. M. 1992. 'Pearls in Sri Lankan History.' *South Asian Studies* 8 (I).

Mahavamsa. 1912. Colombo: National Museum.

Majumdar, R. C. 1941. *Greater India*. Lahore: Dayanand College Book Depot.

Malleret, L. 1962. *L'archéologie Du Delta Du Mékong. Tome Troisième. La Culture Du Fou-Nan, Planches*. Paris: L'ecole Francaise d'extreme-orient.

Maloney, C. 1970. 'The Beginnings of Civilization in South India.' *The Journal of Asian Studies* 29 (3): 603–16.

Mason, R. B. 1997. 'Early Medieval Iraqi Lustre-Painted and Associated Wares: Typology in a Multidisciplinary Study.' *Iraq* 54: 15–61.

———. 2004. *Shine like the Sun*. Toronto: Royal Ontario Museum.

Mason, R. B., and E. J. Keall. 1991. 'The Abbasid Glazed Wares of Siraf and the Basra Connection: Petrographic Analysis.' *Iran* XXIX: 51–66.

McCrindle, J. W. 1877. *Ancient India as Described by Megathenese and Arrain*. London: Trubner & Co.

———. 1897. *The Christian Topography of Cosmas, an Egyptian Monk*. Vol. 98. London: Haklyt Society.

———. 1901. *Ancient India as Described in Classical Literature*. A. Constable and Company Limited.

———. 1972. *Ancient India as Described by Megasthenes and Arrian*. Jain, R. (ed.), New

Delhi: Today's and Tomorrows Printers.

———. 1984. *The Commerce and Navigation of the Erythraean Sea*. New Delhi: Today's and Tomorrows Printers.,

McPherson, K. 1993. *The Indian Ocean: A History of People and the Sea*. Oxford: Oxford University Press.

Mehta, R. N., and Shah, D. R. 1968. *Excavations at Nagara*. MS University Archaeology Series 10. Baroda: MS University of Baroda.

Mendis, D. L. O. 1990. 'A Comparative Study of Hydraulic Engineering in Ancient Sri Lanka and Ancient China.' *Transactions of the Engineers Association of Ceylon*, 1–14.

———. 1993. 'Ancient Tank Systems Misunderstood.' *The Island*.

Mendis, G. C. 1932. *The Early History of Ceylon*. Calcutta: YMCA Press.

———. 1935. *The Early History of Ceylon, and the Relations with Indian and Other Foreign Countries*. Calcutta: YMCA Press.

Meyer, E. 1996. 'The Specificity of Sri Lanka: Towards a Comparative History of Sri Lanka and India.' *Economic and Political Weekly* 31 (7): 395–98.

Miller, D. 1985. *Artefacts as Categories: A Study of Ceramic Variability in Central India*. Cambridge: Cambridge University Press.

Minorsky, V. 1970. *Hudūd Al-ʿĀlam; 'The Regions of the World': A Persian Geography*. London: Luzac&Co.

Mirti, P., Pace, M., Malandrino, M. and Negro Ponzi, M. M. 2009. 'Sassanian Glass from Veh Ardašīr.' *Journal of Archaeological Science* 36 (4): 1061–69.

Mirti, P., Pace, M., Negro Ponzi, M. M. and Aceto, M. 2008. 'ICP-MS Analysis of Glass Fragments If Parthian and Sassanian Epoch from Seleucia and Veh Ardasir (Central Iraq).' *Archaeometry* 50 (3): 429–50.

Misra, V. N. 2001. 'Prehistoric Human Colonization of India.' *Journal of Biological Science* 26 (4): 491–531.

Mohanty, R. 2013. 'Earthenware Pottery: Indian Imported Pottery.' In *Mantai-City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 213–227. Aichwarld: Linden Soft Verlag.

Moorey, P. R. S. 1994. *Ancient Mesopotamian Materials and Industries: The Archaeological Evidence*. Oxford.

Morgen, P. and Leatherby, J. 1987. 'Excavated Ceramics from Sirjan.' Allan, J. and Roberts, C. (eds.). *Oxford Studies in Islamic Art* 4: 23–172.

Mouton, M. 1992. 'La Peninsule d'Oman de La Fin de L'age Du Fer Au Debut de La Periode Sassanide (250 Av. - 350 Ap. JC).' Unpublished PhD Dissertation, Pantheon-Sorbonne: Universite de Paris I.

Munsell Bead Colour Book (2012 year revised/2012 production)

Muthucumarana, R., Gaur, A. S., Chandraratne, W. M. , Manders, M., Ramlingeswara Rao, B., Bhushan, R., Khedekar, V. D. and Dayananda, A. M. A. 2014. 'An Early Historic Assemblage Offshore of Godawaya, Sri Lanka: Evidence for Early Regional Seafaring in South Asia.' *Journal of Maritime Archaeology* 9 (1): 41–58.

Myrdal-Runebjer, E. 1996. 'Rice and Millet. An Archaeological Case Study of a Sri Lankan Transbasin Irrigation System.' Unpublished PhD Thesis, Göteborg: Göteborg University.

Nagaswamy, R. 1995. *Roman Karur: A Peep into Tamil's Past*. Madras: Brahad Prakashan.

Nanji, R. J. 2011. *Mariners and Merchants: A Study of the Ceramics from Sanjan (Gujarat)*. Vol. 1. BAR International Series 2231. Oxford: Archaeopress.

Nicholas, C. W. 1961. 'The North-West Passage between Ceylon and India.' *University of*

Ceylon Review XIX (1): 1–9.

———. 1963. *Historical Topography of Ancient and Medieval Ceylon*. Vol. VI. Colombo: Ceylon Branch of the Royal Asiatic Society.

———. 2003. 'Sinhalese Naval Power.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.),, 273–81. Colombo: Central Cultural Fund.

Northedge, A. 1996. 'Friedrich Sarre's "Die Keramik von Samarra" in Perspective'. In *Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period*, 229–58. Berliner Beitrage Zum Vorderen Orient 17. Berlin: Reimer.

Northedge, A., and Kennet, D. 1994. 'The Samarra Horizon.' In *Cobalt and Lustre. The First Centuries of Islamic Pottery*, Grube, E. J. (ed.), 21–35. The Nasser D. Khalili Collection of Islamic Art, IX. Oxford: Khalili Collections.

Oda, S. 1966. 'A Chemical Study on the Glass from the Noruzmahale Site.' In *Dailaman II*, Egami, N., Fukai, S. and Masuda, S. 27–49. Tokyo: Institute of Oriental Culture, University of Tokyo.

Ogden, J. 1996. 'The Pearl in Classical Jewellery.' *Jewellery Studies* 7: 37–42.

Ondaatje, W. C. 1854. *The Kandyan Mode of Manufacture of Steel, Ceylon Almanac and Annual Register*. Colombo: Government Printer.

Oppenheim, A. L. 1970. 'The Cuneiform Texts.' In *Glass and Glassmaking in Ancient Mesopotamia: An Edition of the Cuneiform Text Which Contain Instructions for Glass Makers with a Catalogue of Surviving Objects*, 2–104. Corning: Corning Museum of Glass.

Orton, C., Tyers, P. and Vince, A. 1993. *Pottery in Archaeology*. Cambridge: Cambridge University Press.

Orton, N. P. 1991. 'Red Polished Ware in Gujarat: A Catalogue of Twelve Sites.' In *Rome and India: The Ancient Sea Trade*, Begley, V. and De Puma, R. D. (eds.), 46–81. Wisconsin: The University of Wisconsin Press.

Panikkar, K. M. 1947. *A Survey of Indian History*. London: Meridian Books.

Paranavitana, S. 1930. 'Epigraphical Summery'. In Ceylon Journal of Science Section G Vol. II: 99–128.

———. 1956. 'The Triumph of Dutthagamani.' In *University of Ceylon, History of Ceylon*, Attygalle, N. (ed.). 1 (Part 1):144–61. Colombo: Ceylon University Press.

———. 1960. 'Ceylon and Malaysia in Mediaeval Times.' *Journal of Royal Asiatic Society Ceylon Branch* VII: 1–43.

———. 1963. 'Ceylon and Malaysia: A Rejoinder to K. A. Nilakantha Sastri.' *Journal of Royal Asiatic Society Ceylon Branch* VIII (Part II): 330–37.

———. 1966. 'Ceylon and Sri Vijaya. Papers on Asian History, Religion, Language, Literature, Music Folklore and Anthropology.' *Artibus Asiae* 23: 205–212.

———. 1970. *Inscription of Ceylon: Early Brahmi Inscriptions*. Vol. I (Part1). Colombo: Department of Archaeological Survey of Sri Lanka.

———. 1983. *Inscriptions of Ceylon*. Vol. II Part 1. Colombo: Archaeological Survey of Ceylon.

Paranavitana, S., and Codrington, H. W., (eds.). 1934. *Epigraphia Zeylanica*. Vol. IV. Colombo: Archaeological Survey of Ceylon.

Paranavitana, S., and Godakumbure, C. E., (eds.). 1963. *Epigraphia Zeylanica*. Vol. V. (Pt 2). Colombo: Archaeological Survey of Ceylon.

Parker, H. 1885. 'Report on Archaeological Discoveries at Tissamaharama in the Southern Province of Ceylon.' *Journal of the Royal Asiatic Society Ceylon Branch* 8 part1 (27,

1884).

———. 1909. *Ancient Ceylon*. New Delhi: Asian Educational Service.

Pathmanathan, S. 1976. 'The Velaikkarar in Medieval South India and Sri Lanka.' *The Sri Lanka Journal of the Humanities*, 120–37.

———. 1984. 'The Nagaram of the Nanadesis in Sri Lanka C. 1000-1300.' *The Sri Lanka Journal of the Humanities*, 122–63.

———. 1990. 'The Bronze Seal of the Nanadesis from Hambantota (Sri Lanka).' In *Asian Panorama*, De Silva, K. M., Kiribamune, S., and De Silva, C. R. (eds.), 139–50. Delhi: Vikas Publishing House.

———. 1994. 'The Tamil Slab Inscription of the Virakkoti at Budumuttava, Nikaweratoya Urbanization at Magala.' *The Sri Lanka Journal of the Humanities*, 15–30.

Pavan, A., and H. Schenk. 2012. 'Crossing the Indian Ocean before the Periplus: Pottery Assemblages in Comparison. The Sites of Sumhuram (Oman) and Tissamaharama (Sri Lanka).' *Arabian Archaeology and Epigraphy* 23 ((2012)): 191–202.

Peacock, P. V. A. 1959. 'A Short Description of Malayan Prehistoric Pottery.' *Asian Perspectives* 3: 121–56.

Pearson, M. 2003. *The Indian Ocean*. London & New York: Routledge.

———. 2005. *The World of the Indian Ocean, 1500–1800: Studies in Economic, Social and Cultural History*. Burlington: Ashgate.

Percival, R. 1803. *An Account of the Island of Ceylon: Containing Its History, Geography, Natural History, with the Manners and Customs of Its Various Inhabitants, to Which Is Added , The Journal of an Embassy to the Court of Candy*. London: C. & H. Baldwin.

Perera, B. J. 1952. 'Foreign Trade and Commerce of Ancient Ceylon. III- Ancient Ceylon. The

Ancient Ceylon's Trade with the Empires of the Eastern and Western Worlds.' *Historical Journal* 1 (July-October 1(4)): 301–20.

Periplus Maris Erythraei. Schoff, W. H.(Trans. and ed.). 1912. London

Pieris, P. E. 1917. 'Nagadeepa and Buddhist Remains in Jaffna.' *JRAS (Ceylon Branch)* XXVI (17): 11–29.

———. 1921. 'Nagadipa and Buddhist Remains in Jaffna.' *Journal of the Royal Asiatic Society Ceylon Branch* 28 (72 (parts 1, 2, 3, 4)): 40–67.

Pillay, K. K. 1975. *South India and Sri Lanka*. Madras: University of Madras.

Pliny. *Natural History*. Volume VII. Libri XXVIII-XXXII. London. 1963.

Poyil, M. 2013. 'Megalithism and Tribal Ritualism: A Passage through the Kurumbas of Attappadi.' *Advances in Historical Studies* 2 (2): 54–56.

Prange, S. R. 2008. 'Scholars and the Sea: A Historiography of the Indian Ocean.' *History Compass* 6 (5): 1382–93.

Prematilleke, P. L. 1982. *Alahana Pirivena, Polonnaruwa Archaeological Excavation Report (April – September 1981)*. Colombo: Central Cultural Fund.

———. 2003. 'Chinese Ceramics Discovered in Sri Lanka - an Overview.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 225–36. Colombo: Central Cultural Fund.

Prickett-Fernando, M. 1991. 'Ancient Science and Technology.' In *Annual Review*, 66–67. Kandy: Institute of Fundamental Studies.

———. 1994. 'Middlemen and End-Users: The Finds of Yue and Longquan Celadons in Sri Lanka.' In *New Lights on Chinese Yue and Longquan Wareswares: Archaeological Ceramics Found in Eastern and Southern Asian, A.D. 800-1400*, Ho, C. M. (ed.), 299–

221. Hong Kong: Centre of Asian Studies, University of Hong Kong.

———. 2003a. 'Durable Goods: The Archaeological Evidence of Sri Lanka's Role in the Indian Ocean Trade.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 53–76. Colombo: Central Cultural Fund.

———. 2003b. 'Mantai-Mahatittha: The Great Port and Entrepot in the India Ocean Trade.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 107–13. Colombo: Central Cultural Fund.

Prickett, M. 1990. 'Sri Lanka's Foreign Trade before AD 600: Archaeological Evidence Asian Panorama: Essays in History.' In *Asian Panorama: Essays in History*, De Silva, K. M., Kiribamune, S., and De Silva, C. R. (eds.), 151–80. Delhi: Vikas Publishing House.

Priestman, S. M. N. 2005. 'Settlement & Ceramics in Southern Iran: An Analysis of the Sassanian &Islamic Periods in the Williamson Collection.' PhD Thesis, Durham: University of Durham.

———. 2011. 'Opaque Glazed Wares: Definition, Dating and Distribution of a Key Iraqi Ceramic Export in the Abbasid Period.' *Iran* 49: 89–114.

Priestman, S. M. N., and Kennet, D. 2002. 'The Williamson Collection Project: Sassanian and Islamic Pottery from Southern Iran.' *Iran* 40 (Shorter Notices): 265–67.

Procopius, *History of the wars*. London: The Loeb Classical Library, Vol. I, 1961

Quaritch, W. H. G. 1961. *The Making of Greater India*. 2nd ed. London: Quaritch, B.

Quast, D., and Schussler, U. 2000. 'Mineralogische Untersuchungen Zur Herkunft Der Granate Merowingerzeitlicher Cloisonnearbeiten.' *Germania* 78: 75–96.

Ptolemy. *Geographia*. n.d.

Rajan, K. 1994. *Archaeology of Tamil Nadu: Kongu Country*. Noida: Book India Publication

Company.

———. 1996. ‘Kodumanal Excavations - A Report.’ In *Gauravaṁ: Recent Research in Indology : Prof. B.K. Garuraja Rao Felicitation Volume*, Ramesh, K. V. (ed.), 72–86. New Delhi: Harman Pub. House.

———. 1999. ‘Further Excavations at Kodumanal.’ *Man and Environment: Journal of the Indian Society for Prehistoric and Quarternary Studies* 23 (2): 65–76.

———. 2011. ‘Emergence of Early Historic Trade in Peninsular India.’ In *Early Interactions between South and Southeast Asia: Reflections on Cross-Cultural Exchange*, Manguin, P., Mani, A. and Wade, G. (eds.), 177–96. Singapore & New Delhi: Institute of Southeast Asian Studies & Manohar.

Rajatarangani. Sittaram Pandit, R. (ed.). n.d. Sarga 1, VV.

Rajavaliya. Guṇasekara, B, (ed.). 1953. New Delhi: Asian Educational Services.

Rajavelu, K. 1999. ‘Pottery Inscription in Sinhala-Brahmi from Pumpuhar (in Tamil).’ *Aavanam* 10: 154.

Rajayyan, K. 1995. *History of Tamil Nadu: Past to Present*. Madurai: Ratna Publications.

Raman, K. V. 1975. ‘Karaikadu.’ *Indian Archaeology 1966-67- A Review*, 21.

———. 1991. ‘Further Evidence of Roman Trade from Coastal Sites in Tamil Nadu.’ In *Rome and India: The Ancient Sea Trade*, Begley, V. and De Puma, R. D. (eds.), 125–33. Wisconsin: The University of Wisconsin Press.

Rao, K. P. 2004. ‘Kottapatnam: A South Indian Port Trading with Eastern Lands.’ In *In Search of Chinese Ceramic- Sherds in South India and Sri Lanka*, Karashima, N. Tokyo: Tokyo University Press.

Rao, N. C. 1938. ‘The Brahmi Inscriptions of South India.’ *New Indian Antiquary* 1938-39: 367–68.

Rao, S. N. 1977. 'Excavations at Sarutaru: A Neolithic Site in Assam.' *Man and Environment* 1: 39–43.

Rao, S. R. 1966. Excavations at Amreli: a Kshatrapa-Gupta town. Museum and picture gallery Baroda. Belletin vol. 18. Baroda.

Ratnayake, H. 2003. 'The Jetavana Treasures'. In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 37–52. Colombo: Central Cultural Fund.

Ray, A. 1993. *Maritime India: Ports and Shipping*. Calcutta: Pearl Publishers.

Ray, H. P. 1986. *Monastery and Guild Commerce under the Satavahanas*. Delhi: Oxford University Press.

———. 1988. 'Early Trade in the Bay of Bengal.' *Indian Historical Review* XIV (1&2): 79–89.

———. 1990. 'Seafaring in the Bay of Bengal in the Early Centuries AD.' *Studies in History* VI (1): 1–14.

———. 1994. *The Winds of Change: Buddhism and the Maritime Links of Early South Asia*. Delhi: Oxford University Press.

———. 1999. *Archaeology of Seafaring: The Indian Ocean in the Ancient Period*. Indian Council for Historical Research Monograph Series 1. New Delhi: Indian Council for Historical Research.

———. 2003. *The Archaeology of Seafaring in Ancient South Asia*. Cambridge: Cambridge University Press.

Roberts, W. L., Campbell, T. J. and Rapp, G. R. 1974. *Encyclopedia of Minerals*. 1st ed. New York: Van Nostrand Reinhold.

Rohanadheera, M. 2000. 'Glimpses of Cultural Relations between Sri Lanka and Thailand

prior to Sukhothai Period.' In *History and Archaeology of Sri Lanka: Reflections on a Heritage: Historical Scholarship on Premodern Sri Lanka Part 1*, Gunawardana, R. A. L. H., Pathmanathan, S. and Rohanadheera, M. (eds.), 345–76. Colombo: Central Cultural Fund.

Rosch, C., Hock, R. Schussler, U. Yule, P. and Hannibal, A. 1997. 'Electron Microprobe Analysis and X-Ray Diffraction Methods in Archaeometry: Investigations on Ancient Neads from the Sultanate of Oman and from Sri Lanka.' *Eur. J. Mineral* 9: 763–83.

Roth, H., Kessler, O., Recker, U. and Wijeyapala, W. 2001. 'The Godavaya Habour Site- Report on the Excavations 1994-1997.' In *Ancient Ruhuna: Sri Lanka German Archaeological Project in the Southern Province*, Weisshaar, H. J., Roth, H. and Wijeyapala, W. (eds.), 291–334. Mainz am Rhein: Verlag Philpp von Zabern.

Rougeulle, A. 1991. 'Les Importations de Ceramiques Chinoises Dans Le Golfe Arabo-Persique (VIIIe-Xe Siecles).' *Archaeologie Islamique* 2: 5–46.

———. 1996. 'Mediaval Trade Networks in the Indian Ocean (8-14th Centuries): Some Reflections from the Distribution Pattern of Chinese Imports in the Islamic World.' In *Tradition and Archaeology: Early Maritime Contacts in the Indian Ocean : Proceedings of the International Seminar, Techno-Archaeological Perspectives of Seafaring in the Indian Ocean, 4th Cent. B.C.-15th Cent. A.D., New Delhi, February 28-March 4, 1994*, Salles, J. F. and Ray, H. P. (eds.), 150–80. New Delhi: Manohar Publishers and Distributors.

Roy, T. N. 1986. *A Study of Northern Black Polished Ware Culture: An Iron Age Culture of India*. New Delhi: Ramanand Vidya Bhawan.

Rumrill, D. A. 1991. 'The Mohawk Glass Trade Bead Chronology: *Ca.* 1560-1785.' *Journal of the Society of Bead Researchers* 3: 5–45.

Saddharmalankaraya. Gnanawimala, K. Rev., (ed.). 1954. Colombo

Sahassavattuppakarana. Buddhadatta, A. P. Rev., (ed.). 1959. Colombo: Anula Press.

Salles, J. F. 1984. 'Ceramiques de Surface a Ed-Dour.' *E. A. U. AOMIM*, 241–70.

Sammohavinodini. Buddhadatta, A. P. Rev., (ed.). 1923. London: Pali Text Society.

Sankalia, H. D. 1947. 'The Antiquity of Glass Bangles in India' Bulletin of the Deccan College Research Institute 8 1947, pp. 252-259

Sankalia, H. D., Deo, S. B., Ansari, Z. D. and Ehrhardt, S. 1960. *From History to Prehistory at Nevasa (1954-56)*. Pune.

Sankalia, H. D., and Dikshit, M. G. 1952. *Excavations at Brahmapuri (Kolhapur) 1945-46*. Deccan College Monograph Series 5. Poona: Deccan College.

Sanmuganathan, S. 1951. 'Excavations at Tirrukketisvaram' in Report on the Archaeological Survey of Ceylon for 1950', *Ceylon Administrative Reports, Part IV, Education, Science and Art, Section G.* Ceylon Government Press, Colombo.

Sasaki, H. 1989. 'Trade Ceramics from the Coast of the Indian Ocean.' *Jounal of East-West Maritime Relations* 1 ((1989)): 117–65.

———. 2004. 'Chinese and Thai Ceramics in Kottapatnam.' In *In Search of Ceramic-Sherds in South India and Sri Lanka*, Karashima, N. (ed.), 16–21. Tokyo: Taisho University Press.

Sastri, K. A. N. 1939. *Foreign Notices of South India from Megasthenes to Ma Huan*. Chennai: University of Madras.

———. 1960. *A History of South India*. 2nd ed. New Delhi: Oxford University Press.

———. 1962. 'Ceylon and Sri Vijaya.' *JRASCB* VIII Part 1: 125–40.

———. 1972. *The Pandya Kingdom – From the Earliest Times to the Sixteenth Century*. Madras.

Saunders, B. 2013. 'The Trade and Distribution of Ceramics in the Western Indian Ocean

1250-1550 AD- An Analysis of Current Available Assemblages from Arabia, Iran and East Africa.' MPhil Dissertation, Durham: University of Durham.

Sauvaget, J. 1948. *Relation de La Chine et de l'Inde, Redigee En +851*. Paris: Belles Lettres.

Schenk, H. 2000. 'Rouletted Ware and Other Imports of Tissamaharama: Observations on the Pottery Sequence from Southern Sri Lanka.' In *South Asian Archaeology 1997*, Taddei, M. and De Marco, G. (eds.), 653–77. Rome.

———. 2001. 'Development of Pottery at Tissamaharama.' In *Ancient Ruhuna: Sri Lanka German Archaeological Project in the Southern Province*, Weisshaar, H. J., Roth, H. and Wijeyapala, W. (eds.), 59–137. Mainz am Rhein: Verlag Philpp von Zabern.

———. 2005. 'Pottery of so-Called "Kaolin Fabric" at Tissamaharama-Citadel (Sri Lanka) in the 4th and 5th Century AD.' In *South Asian Archaeology*, Franke-Vogt, U. and Weisshaar, H. J. (eds.), 357–64. Linden Soft Verlag.

———. 2006. 'The Dating and Historical Value of Rouletted Ware.' *Zeitschrift Für Archäologie Außereuropäischer Kulturen* 1 ((2006)): 123–52.

———. 2007. 'Parthian Glazed Pottery from Sri Lanka and the Indian Ocean Trade.' *Zeitschrift Für Archäologie Außereuropäischer Kulturen* 2: 57–90.

———. 2014. 'Tissamaharama Pottery Sequence and the Early Historic Maritime Silk Route across the Indian Ocean.' In *ZEITSCHRIFT FÜR ARCHÄOLOGIE AUSSEREUROPÄISCHER KULTUREN*, 95–117. Wiesbaden, Germany: Reichert Verlag.

Schoff, W. H. (1912) 1974. *The Periplus of the Erythraean Sea: Travel and Trade in the Indian Ocean by a Merchant of the First Century*. New Delhi: Munshiram Manoharlal Publishers Pvt. Ltd.

Schussler, U., Rosch, G. and Hock, R. 2001. 'Beads from Ancient Sri Lanka- First Result of a

Systematic Material Analysis in Ancient Ruhuna.' In *Ancient Ruhuna: Sri Lanka German Archaeological Project in the Southern Province*, Weisshaar, H. J., Roth, H. and Wijeyapala, W. (eds.),227–42. Mainz am Rhein: Verlag Philpp von Zabern.

Sedov, A. V. 1996. '"Qana" (Yemen) and the Indian Ocean: The Archaeological Evidence'. In *Tradition and Archaeology: Early Maritime Contacts in the Indian Ocean*, Ray, H. P. and Salles, J. F. (eds.), 11–36. New Delhi: Manohar Publishers and Distributors.

———. 2007. 'The Port of 'Qana' and the Incense Trade.' In *Food for the Gods. New Light on the Ancient Incense Trade*, Peacock, D. P. S. and Williams, D. (eds.), 71–111. Oxford: Oxbow.

Sedov, A. V., and Benvenuti, C. 2002. 'The Pottery of Sumhuram: General Typology.' In *Khor Rori Report 1*, Avanzini, A. (ed.), 177–248. Pisa: Edizioni Plus, Universit a di Pisa.

Seehalavattuppakarana. Buddhadatta, A. P. Rev., (ed.). 1959. Colombo: Anula Press.

Seely, P., Canby, S. and Coningham, R. 2006. 'Glazed Ceramics.' In *Anuradhapura: The British-Sri Lankan Excavations at Anuradhapura Salagha Watta, 2 Volume 2 – the Artefacts*, by R. Coningham, 2:107–26. Oxford: Archaeopress for Society for South Asian Studies monograph 4.

Seevalee, G. Rev. 1998. 'Irrigation and Society in Ancient Sri Lanka with Special Reference to Panda Wewa.' MPhil Dissertation, Cambridge: University of Cambridge.

Selvakumar, V. 1996. 'Investigations into the Prehistoric and Protohistoric Cultures of the Upper Gundar Basin, Madurai District, Tamil Nadu.' PhD Thesis, Poona: University of Poona.

———. 2011. 'Contacts between India and Southeast Asia in Ceramic and Boat Building Traditions.' In *Early Interactions between South and Southeast Asia: Reflections on*

Cross-Cultural Exchange, Manguin, P.Y., Mani, A. and Wade, G. (eds.). Singapore & New Delhi: Institute of Southeast Asian Studies & Manohar.

Selvakumar, V., Gopi, P. K. and Shajan, K. P. 2005. 'Trial Excavations at Pattanam: A Preliminary Report.' *Journal of the Centre for Heritage Studies* 2: 57–66.

Seneviratne, S. 1984. 'The Archaeology of the Megalithic-Black and Red Ware Complex in Sri Lanka.' *Ancient Ceylon* 5: 237–307.

Seneviratne, S. 1985a. 'Iron Technology in Sri Lanka. A Preliminary Study of Resource Use and Production Techniques during Early Iron Age.' *Sri Lanka Journal of Humanities* XI (1&2): 129–78

———. 1985b. 'The Baratas: A Case of Community Integration in Early Historic Sri Lanka.' In *James Ratnam Festschrift*, Amarasingha, A. R. B. and Sumanasekara, S. J. (eds.), 49–56. Colombo: UNESCO-Sri Lanka.

———. 1989. 'Pre-State Chieftains and Servants of the State: A Case Study of Parumaka.' *Sri Lanka Journal of Humanities* XV (1&2): 99–131.

———. 1994. 'The Ecology and Archaeology of the Seruwila Copper-Magnetite Prospect-Northeast Sri Lanka.' *Sri Lanka Journal of Humanities* XX (1&2): 114–46.

———. 1996. 'Peripheral Regions and Marginal Communities.' In *Towards an Alternative Explanation of Early Iron Age Materials and Social Formation in Sri Lanka. Tradition, Dissent and Ideology Essays in Honour of Romila Thapar*, Champakalakshmi, R. and Gopal, S. (eds.), 264–312. Delhi: Oxford University Press.

———. 2005. 'From Language to "Race": Deconstructing Tamil Identity'. *International Relations in a Globalizing World* I (I): 137–60.

Sen, T. 2003. *Buddhism, Diplomacy and Trade: Sino Indian Relations between Years 600-1400*. New Delhi: Manohar Publishers and Distributors.

———. 2006. 'The Travel Records of Chinese Pilgrim Faxian, Xuanzang and Yijing- Sources

for Cross-Cultural Encounters between Ancient China and Ancient India, 'Education about ASIA' II (3): 24–33.

Shaffer, J.G. and Lichtenstein, D. A. 1999. "Migration, Philology and South Asian Archaeology." In Aryan and Non-Aryan in South Asia. Evidence, Interpretation, and Ideology. J. Bronkhorst and Deshpande, M. M. (eds.), 239-260. Harvard Oriental Series, Opera Minora. Department of Sanskrit and Indian Studies. Cambridge: Harvard University.

Shajan, K. P., Cherian, P. J., Tomber, R. and Selvakumar, V. 2008. 'The External Connections of Early Historic Pattanam, India: The Ceramic Evidence.' *Antiquity* 082 (315): 1–3.

Shamasastry, R., trans. 1919. *Kautilyas Arthasastra*. Mysore.

Sharma G. R. 1960. Excavations at Kausambi 1957-59, Allahabad: University of Allahabad

Sharma, G. R., Misra, V. D. , Mandal, D., Mishra, B. B. and Pal, J. N. 1980. *From Hunting and Food Gathering to Domestication of Plants and Animals, Beginnings of Agriculture*. Allahabad: University of Allahabad.

Sharma, T. C. 1967. 'A Note on the Neolithic Pottery of Assam.' *Man*, New Series, 2 (1): 126–28.

Shimin, L. 1999. *Qingci Yu Yue yao/Celadon and Yue Kilns*. Shanghai.

Sidebotham, S. E. 1991. 'Ports of the Red Sea and the Arabia-India Trade.' In *Rome and India: The Ancient Sea Trade*, Begley, V. and De Puma, R. D. (eds.), 12–38. Wisconsin: The University of Wisconsin Press.

———. 2011. *Berenike and the Ancient Maritime Spice Route*. Berkeley: University of California Press.

Sieveking, G. de G. 1962. 'The Prehistoric Cemetery at Bukit Tengku Lembu, Perils.' *Federation Museums Journal* VII: 25–54.

Silva, R. 2006. *Environment, Town, Village and Monastic Planning*. Vol. X. Memoirs of the Archaeological Survey of Ceylon. Colombo: Department of Archaeology.

———. 2011. 'Mantai- The Great Emporium of Cosmos Indicoleustes.' Keynote Presentation presented at the UNESCO experts meeting: Underwater Archaeology, Galle.

Silva, R. and Bouzek, J. "Mantai a second Arikamedu: a Note on Roman Finds". In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 115-117. Colombo: Sri Lanka National Commission for UNESCO and the Central Cultural Fund.

Simpson, St. J. 1992. 'Aspects of the Archaeology the Sassanian Period in Mesopotamia.' Unpublished D.Phil thesis, Oxford: University of Oxford.

Sinclair, P. 1982. 'Chibuene - an Early Trading Site in Southern Mozambique.' *Paideuma* 28: 149–64.

Singh, P. 2002. 'The Neolithic Cultures of Northern and Eastern India.' In *Indian Archaeology in Retrospect: Prehistory*, Korisettar, R. and Settar, S. (eds.), 127–50. New Delhi: Manohar and ICHR Publication.

Sinopoli, C. M. 1991. *Approaches to Archaeological Ceramics*. New York: Plenum Press.

Sirisena, W. M. 1978. *Sri Lanka and Southeast Asia: Political, Religious and Cultural Relations from AD C. 1000-c.1500*. Leiden: Brill.

Siriweera, W. I. 1994. *A Study of the Economic History of Pre-Modern Sri Lanka*. New Delhi: Vikas Publishing House.

———. 2003. 'Pre-Colonial Sri Lanka's Maritime Commerce with Special Reference to Its Ports.' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 117–26. Colombo: Central Cultural Fund.

Sleen, W. G. N. 1956. ‘Trade Wind Beads.’ *Man* 56: 27–29.

———. 1958. ‘Ancient Glass Beads, with Special Reference to the Beads of East and Central Africa and the Indian Ocean.’ *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 88: 203–16.

———. 1973. *A Handbook on Beads*. 2nd ed. Belgium: Librarie Halbart.

Smith, M. C., and Wright, H. T. 1988. ‘The Ceramics from Ras Hafun in Somalia: Notes on a Classical Maritime Site.’ *Azania* 23: 115–41.

Solangaarachchi, R. 1997. ‘History of Metallurgy and Ancient Iron Smelting.’ *Vidurava* 19 (1): 30–40.

———. 2011. ‘Ancient Iron Smelting Technology and Settlement Pattern on the Kiri Oya Basin in the Dry Zone of Sri Lanka.’ PhD Thesis, USA: University of Florida.

Solheim II, W. G. 1990. ‘Earthen Ware Pottery: The Ta’i and Malay.’ *Asian Perspectives* 29 (1): 25–36.

Solheim II, W. G., Harrison, B. and Wall, L. 1956. ‘Niah Three Coloured Ware and Related Prehistoric Pottery from Borneo.’ *Asian Perspectives* 2: 167–76.

Solheim, W. G., and S. U. Deraniyagala. 1972. ‘Archaeological Survey to Investigate South Asian Prehistoric Presence in Ceylon.’ *Ancient Ceylon Occasional Papers no.1*.

Somadeva, R. 2005. ‘Andhra-Sri Lanka Sub-System? Probably Another Way of Thinking.’ *Journal of Indian Ocean Archaeology* 2: 8–20.

———. 2006. *Urban Origins in Southern Sri Lanka*. Colombo: Postgraduate Institute of Archaeology.

———. 2008. ‘Advance Hunter-Gatherers or Conservative Farmers: Excavation of the Earthenware Burial Canoes in Ranchamadama of Sabaragamuva Province.’ *Journal of Indian Ocean Archaeology* 4: 93–101.

———. 2010a. ‘Archaeology of the Uda Walave Basin.’ In *PGIAR Occasional Paper No.2*. Colombo: PGIAR.

———. 2010b. ‘Sri Lanka in the Indian Ocean World: A Historical Appraisal.’ *Archaeology.lk*, 1–5.

Somasekaram, T., De Silva, M. B. G., Perera, L. A. G., Karunanayake, M. M., Perera, M. P. and Epitawatte, D. S. (eds.). 1988. *The National Atlas of Sri Lanka*. Colombo: Department of Survey.

Sprague, R. 1985. ‘Glass Trade Beads: A Progress Report.’ *Historical Archaeology* 19 (2): 87–105.

Sridhar, T. S., ed. 2005. *Alagankulam. An Ancient Roman Port City of Tamil Nadu*. Chennai: Department of Archaeology Government of Tamilnadu.

Stargardt, J. 1990. *The Ancient Pyu of Burma Early Pyu Cities in a Man-Made Landscape*. Cambridge: The Institute of Southeast Asian Studies, Singapore.

Stern, B., Connan, J., Blakelock, E., Jackman, R. and Coningham, R. A. E. 2008. ‘From Susa to Anuradhapura: Reconstructing Aspects of Trade and Exchange in Bitumen-Coated Ceramic Vessels between Iran and Sri Lanka from the Third to the Ninth Centuries AD.’ *Archaeometry* 50 (3): 409–28.

Still, J. 1911. ‘Northern Province’ , Circuit report in H. C. P. Bell, 1911.

Streeter, E. W. 1886. *Pearls and Pearling Life*. London: George Bell and Sons.

Subbarao, B. 1953. *Baroda through the Ages*. Baroda.

Subbarayalu, Y., and Shanmugam, P. 2001. ‘Anjuvannam: “A Maritime Trade Guild of Medieval Times”.’ In *Kaveri: Studies in Epigraphy, Archaeology and History*, Rajagopala, S. (ed.), 144–52. Chennai: Panpattu Veliyiittakam.

Subrahmanyam, R. 1964. *Salihundam, A Buddhist Site in Andhra Pradesh*. Hyderabad.

Suresh, S. 2004. *Symbols of Trade. Roman and Pseudo-RomanObjects Found in India*. New Delhi: Manohar Publishers and Distributors.

Swaminatha Iyer, U. V. 1918. *Pattupattu*. Madras.

Tampoe, M. 1989. *Maritime Trade between China and the West. An Archaeological Study of the Ceramics from Siraf (Persian Gulf), 8th to 15th Centuries A.D.* BAR International Series 555. Oxford: Archaeopress.

———. 1990. 'Periodisation of Indian Ocean Maritime Trade: The Trade-Ceramic Tool.' In *Perspectives in Archaeology- Leelananda Prematthilake Festschrift*, 173–87. Kandy: University of Peradeniya.

———. 2003. 'Tracing the Silk Road of the Sea: Ceramic and Other Evidence from the Partner Ports of the Western Indian Ocean (8th-10th C. A.D).' In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 77–96. Colombo: Central Cultural Fund.

Tennent, E. J. 1860. *Ceylon. An Account of the Island Physical, Historical and Topographical with Notices of Its Natural History, Antiquities and Productions*. Vol. 1. London: Longman Green.

Thantilage, A. 2008. 'Archaeo-Metallurgical Investigation of Sri Lankan Historical Bronzes.' PhD Thesis, Colombo: Postgraduate Institute of Archaeology, University of Kelaniya, Sri Lanka.

Thantilage, A., and Vithanage, I. 2015. *Resource Utilization in Sri Lankan Historical Iron Production*. PGIAR Occasional Paper 4. Colombo: PGIAR.

Thapar, B. K. 1952. 'Porkalam 1948: Excavation of a Megalithic Urn Burial.' *Ancient India* 8: 3–16.

Thapar, R. 2000. *Cultural pasts: Essays in Early Indian History*. Oxford University Press.

———. 1957. ‘Maski 1954: A Chalcolithic Site of the Southern Deccan.’ *Ancient India* 13: 4–115.

The Christian Topography of Cosmas, an Egyptian monk, McCrindle, J. W. (Trans. Ed.). 1897. London: Hakluyt Soc. Vol. 98

Theunissen, R. 2003. ‘Agate and Carnelian Beads and the Dynamics of Social Complexity in Iron Age Mainland Southeast Asia.’ Unpublished PhD Dissertation, New South Wales: University of New England.

Theunissen, R. G., Grave, P. and Bailey, G. 2000. ‘Doubts on Diffusion: Challenging the Assumed Indian Origin of Iron Age Agate and Carnelian Beads in South-East Asia.’ *World Archaeology* 32 (1): 84–105.

Tomber, R. 2002. ‘Indian Fine Wares from the Red Sea Coast of Egypt.’ *Man and Environment* 27 (1): 26–31.

———. 2007. ‘Rome and Mesopotamia -Imports into India in the First Millennium AD.’ *Antiquity* 81: 972–88.

———. 2008. *Indo-Roman Trade: From Pots to Pepper*. London: Duckworth.

Tomber, R., and Begley, V. 1999. ‘Indian Pottery Sherds.’ In *Berenike 1997: Report of the 1997 Excavations at Berenike and the Survey of the Egyptian Eastern Desert, Including Excavations at Shenshef*, Sidebotham, S. E. and Wendrich. W. Z. (eds.), 161–81. Special Series 4. Leiden: CNWS Publications.

———. 2000. ‘Indian Pottery Sherds.’ In *Berenike 1997: Report of the 1997 Excavations at Berenike and the Survey of the Egyptian Eastern Desert, Including Excavations at Shenshef*, Sidebotham, S. E. and Wendrich. W. Z. (eds.), 149–67. Special Series 4. Leiden: CNWS Publications.

Toussaint, A. M. 1966. *History of the Indian Ocean*. London: Routledge.

Tripitaka grantha mala (reprint) 2005. Lankananda, L. Rev. (ed.). Nedimala: Buddist Cultural

Centre.

Turner, L. 1922. *Handbook of Commercial and General Information for Ceylon*. Colombo: Superintendent of Census and Director of Statistics.

UCHC. Vol. 1 (Part 1). 1956. Attygalle, N., (ed.). Colombo: Ceylon University Press.

Ueyama, Y., and Nozaki, S. 1993. *The Excavation Report of JOCV Project in the Citadel of Anuradhapura (1991-92)*. Colombo: Archaeological Survey Department.

Vamsatthappakasini. Malalasekara, G. P. (ed.). 1938. Vol. I&II. London: Pali Text Society.

Vandercone, R., Sajithran, T. M., Wijeyamohan, S. and Santiapillai, C. 2004. 'The Status of the Baobab (Adansonia Digitata L.) in Mannar Island, Sri Lanka.' *Current Science* 87 (12): 1709–13.

Velupillai, A., ed. 1971. *Ceylon Tamil Inscriptions*. Vol. 1. Peradeniya: Royal Printers.

Vidanapatirana, P. 2012. *Settlement Patterns of the Malvatu Oya and Kala Oya Basins*. Colombo: Postgraduate Institute of Archaeology.

Vincent, W. 1807. *The Commerce and Navigation of the Ancients in the India Ocean*. Vol. I and II. London: Printed for T. Cadell and W. Davies.

Vink, M. 2007. 'Indian Ocean Studies and the 'new Thalassology'.' *Journal of Global History* 2 (1): 41–62.

Vitharana, V. 1992. *The ORU and the YATHRA: Traditional Outrigger Craft of Sri Lanka*. Colombo: Vini Vitharana.

Vogt, B. 1996. 'Bronze Age Maritime Trade in the Indian Ocean.' In *The Indian Ocean in Antiquity*, Read, J. (ed.), 107–32. London: Routledge.

Waddington, E. J., and Kenoyer, J. M. 2013. 'The Shell Bangles.' In *Mantai-City by the Sea*, Carswell, J., Deraniyagala, S., and Graham, A. (eds.), 385–95. Aichwarld: Linden Soft

Verlag.

Wade Haddon, R. A. 1992. 'Abbasid Lustre Ware in the Egyptian Context.' Unpublished MA thesis, Cairo: American University in Cairo.

———. 2002. 'More Thoughts on Early Abbasid Lusterwares in the Egyptian Context.' In *Historians in Cairo. Essays in Honour of George Scanlon*, 1–16. Cairo: The American University in Cairo Press.

Walburg, R. 1998. 'Roman Coins on Ceylon: A Puzzling and Hardly Known Chapter of Ancient Numismatics in Sri Lanka.' In *Past and Present. Archaeology Geography Economics*, Domroes, M. and Roth, H. (eds.), 52–60. Margraf Verlag.

———. 2008. 'Coins and Tokens from Ancient Ceylon.' In *Ancient Ruhuna: Sri Lankan-German Archaeological Project in the Southern Province*, Weisshaar, H. J., Roth, H. and Wijeyapala, W. (eds.), 31–39. Wiesbaden, Germany: Reichert Verlag.

Walker, M. J., and Santoso, S. 1977. 'Romano-Indian Rouletted Pottery in Indonesia.' *Mankind* 11: 39–45.

Wallerstein, I. 1974. *The Modern World System I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York: Academic Press.

———. 1980. *The Modern World System II: Mercantilism and the Consolidation of the European World-Economy, 1600-1750*. New York: Academic Press.

———. 1989. *The Modern World System III: The Second Era of Great Expansion for the Capitalist World-Economy, 1730-1780*. New York: Academic Press.

Warmington, E. H. 1928. *The Commerce between the Roman Empire and India*. Cambridge: Cambridge University Press.

Weerakkody, D. P. M. 1984. 'The Earliest Greek Notices of Sri Lanka.' *Sri Lanka Journal of Humanities* 6: 1–26.

———. 1986. ‘The Foreign Relations and Trade of Ancient Sri Lanka from Greek and Latin Sources.’ In *Silver Jubilee Commemoration Volume of the University of Kelaniya*, Weerasinghe, S. G. M., Gunatilleke, D. C. R. A. and Abesinghe, A. A. (eds.), 447–63. Kelaniya: University of Kelaniya.

———. 1997. *Taprobane: Ancient Sri Lanka as Known to the Greeks and Romans. Indicopleustoi: Archaeologies of the Indian Ocean*. Turnhout: Brepols.

Weerasinghe, S. G. M. 1995. *A History of the Cultural Relations between Sri Lanka and China: An Aspect of the Silk Route*. Colombo: Central Cultural Fund.

Weisshaar, H. J., Roth, H. and Wijeyapala, W. (eds.). 2001. *Ancient Ruhuna: Sri Lanka German Archaeological Project in the Southern Province*. Vol. I. Mainz am Rhein: Verlag Philpp von Zabern.

Weisshaar, H. J., and Wijeyapala, W. 1993. ‘Ancient Ruhuna (Sri Lanka). The Tissamaharama Project: Excavations at Akurugoda 1992-1993.’ *Beitrage Zur Allgemeinen Und Vergleichenden Archaologie* 13: 127–66.

Werake, K. M. M. 1978. ‘A New Date for the Beginning of Sino- Lankan Relations.’ *The Sri Lankan Journal of the Humanities* iv ((1&2)): 64–73.

———. 1984. ‘The Abhaygiri Vihara and the Sino-Sri Lankan Buddhistic Relations during the Anuradhapura Period.’ *The Quarterly of the Cultural Triangle UNESCO- Sri Lanka Project* II (3): 23–28.

———. 2003. ‘Sino-Sri Lankan Relations during the Pre-Colonial Times.’ In *Sri Lanka and the Silk Road of the Sea*, Bandaranayake, S. Dewaraja, L., Silva, R. and Wimalaratne, K. D.G. (eds.), 213–24. Colombo: Central Cultural Fund.

Wheeler, R. E. M. 1954. *Roman Contacts with India, Pakistan and Afghanistan*.

———. 1955. *Rome beyond the Imperial Frontiers*. London: G. Bell and Sons.

Wheeler, R. E. M., Ghosh, A. and Deva, K. 1946. 'Arikamedu: An Indo-Roman Trading-Station on the East Coast of India.' *Ancient India* 2: 17–124.

Whitcomb, D. S. 1975. 'The Archaeology of Oman: A Preliminary Discussion of the Islamic Periods.' *JOS* 1: 123–57.

———. 1989. 'Coptic Glazed Ceramics from the Excavations at Aqaba, Jordan.' *JARCE* 26: 167–82.

Whitcomb, D. S., and Johnson, J. H. 1979. *Quseir Al-Qadim 1978. Preliminary Report*. Cairo: American Research Centre.

———. 1980. *Quseir Al-Qadim 1980. American Research centre in Egypt*. Vol. 7. Malibu: Undea

———. 1981. *Egypt and the spice trade. Archaeology 34 (2) 16-23*

Whitehouse, D. 1968. 'Excavations at Siraf, First Interim Report.' *Iran* 6: 1–22.

———. 1973. 'Chinese Stoneware from Siraf: The Earliest Finds.' In *South Asian Archaeology. Papers from the First International Conference of South Asian Archaeologists Held in the University of Cambridge*, Hammond, N. (ed.). 241–55. London.

———. 1979. 'Islamic Glazed Pottery in Iraq and the Persian Gulf: The Ninth and Tenth Centuries.' *Annali, Instituto Orientate Di Napoli* 39: 45–61.

———. 1992. 'Epilogue: Roman Trade in Perspective.' In *Rome and India: The Ancient Sea Trade*, Begley, V. and De Puma, R. D. (eds.), 216–18. Wisconsin: The University of Wisconsin Press.

Whitehouse, D., and Williamson, A. 1973. 'Sassanian Maritime Trade.' *Iran* XI: 29–49.

White, J. C. 1982. *Ban Chiang: Discovering of a Lost Bronze Age*. Philadelphia/Washington: University museum, University of Pennsylvania/Smithsonian Institution.

Whitelaw, G. 1994. 'KwaGandaganda: Settlement Patterns in the Natal Early Iron Age.' *Natal Museum Journal of Humanities* 6: 1–64.

Wickramagamage, C. 1984. *Abhayagiri Vihara Project. Anuradhapura: First Report of the Archaeological Excavations*. Colombo: Ministry of Cultural Affairs.

Wickramagamage, C., Hettiarachchi, S., Bouzek, J., Bren, J. and Charvat, P. 1983. 'Excavations at Abhayagiri Vihara (Anuradhapura, Sri Lanka) in 1982.' *Archiv Orientani* 51: 337–72.

———. 1984. 'Excavations at Abhayagiri Vihara (Anuradhapura, Sri Lanka) in 1983.' *Archiv Orientani* 52: 42–74.

Wickramasinghe, S. 1960. 'Ceylon's Relations with South-East Asia with Special Relations to Burma.' *Ceylon Journal of Historical and Social Studies* III (1): 38–58.

Wijesekara, N. 1952. 'Historical Background of Sinhalese-Foreign Relations from Earliest Times to the Twelfth Century.' *The Ceylon Historical Journal (1952)*, 172–91.

Wijeyapala, W. 1992. 'Excavation.' In *ASCAR*, Deraniyagala, S. U. (ed.), 32–36. Colombo: Archaeological Survey of Ceylon.

Wijeyapala, W., and Prickett, M. 1986. *Sri Lanka and the International Trade: An Exhibition of Ancient Imported Ceramics Found in Sri Lanka's Archaeological Sites.* Colombo: Archaeological Survey Department.

Wikipedia, 2007. *Buddhism and the Roman world.* [Online]
Available at:
https://en.wikipedia.org/wiki/Buddhism_and_the_Roman_world#/media/File:ExtentOfBuddhismAndTrade.jpg [Accessed 29. 12. 2014].

Wilkinson, C. K. 1976. *Chinese Wares", Nishapur: Pottery of the Early Islamic Period*. New York: The Metropolitan Museum of Art.

Wittfogel, K. A. 1953. 'The Ruling Buraucracy of Oriental Despotism: A Phenomenon That

Paralyzed Marx.' *Review of Politics* XV (3): 350–59.

———. 1957. *Oriental Despotism: A Comparative Study of Total Power*. New Haven: Yale University Press.

———. 1974. 'Developmental Aspects of Hydraulic Societies.' In *Rise and Fall of Civilisations. Modern Archaeological Approaches to Ancient Cultures. Selected Readings*, Lamberg-Karlosky, C. C. and Sabloff, J. A. (eds.), 15–25. California: Cummings Publishing Company.

Wolters, O.W. 1967. *Early Indonesian Commerce: A Study of the Origins of Srivijaya*. Ithaca: Cornell University Press.

———. 1999. *History, Culture, and Region in South-East Asian Perspectives,*. Revd. ed.

Wood, M. 2000. 'Making Connections: Relationships between International Trade and Glass Beads from the Shashe-Limpopo Area.' *African Naissance: The Limpopo Valley 1000 Years Ago* 8: 78–90.