

Chapter 2

Of Ships and Shipping: The Maritime Archaeology of Fifteenth Century CE Southeast Asia

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2.1 Introduction

The fifteenth century plays an important part in the history of the Southeast Asian region particularly as a transitional period between the demise of the “Classical Age” in Southeast Asia during thirteenth and fourteenth centuries and the advent of the Europeans starting in the sixteenth century. Reid (1988, 1990, 1993) coined the term ‘Age of Commerce’ to highlight the significance of the fifteenth to the seventeenth centuries in the global economic history in which maritime trade played a crucial role. He considered the fifteenth century as setting the platform for the ‘long sixteenth century’ economic boom in Europe, the eastern Mediterranean, China, Japan and perhaps India in which Southeast Asia played a critical part. The economic take-off was initially stimulated by the demand for spices (pepper, cloves, nutmeg) and other exotic marine and forest products. Merchants from far and wide geographies converge in Southeast Asia to exchange their own trade items in different ports and production areas (Reid 1988, 1993; Wade 2010). Whereas the spice trade was the key commodity that drove maritime commerce, manufactured trade goods such as textiles, glazed ceramics, glass and metals objects also show the multi-faceted aspects of the regional economic exchange networks.

Despite the importance and significance of the period, archaeological research into the maritime polities of fifteenth century Southeast Asia is glaringly deficient. Previous studies focus either on the region’s prehistoric past or during the colonial period starting in the sixteenth century with the arrival of the Europeans in the Philippines and Melaka (e.g. Reid 1988, 1993, 1999; Higham 1989, 1996; Hall 1992, 2011; Miksic 2004; Wang 1998; Brown 2009; Glover and Bellwood 2004; Manguin 2004; Flecker 2009; Wade 2010). Of all the major kingdoms and port

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cities mentioned in historical texts, only Ayutthaya has been subjected to archaeological excavations that give information on the architecture, material objects and religion of the period (Chirapravati 2005). Melaka, considered the period's premier polity, has surprisingly yielded scarce material evidence. Immediate post-Angkor Cambodia has also seen very little archaeological work although burials with ceramics dating from the late fifteenth century has been recently unearthed at KrangKor (Sato 2013). There have been no archaeological investigations on the fifteenth century Javanese trading ports of Tuban, Gresik and Demak.¹

In the absence of material evidence from terrestrial sites, shipwrecks constitute the best source for answering questions on fifteenth century Southeast Asia. Maritime and shipwreck archaeology in the region has emerged as a discipline only in the past few decades. Nevertheless, current scholarly outputs, albeit limited, have given valuable data on the study of shipbuilding technology and ceramic tradewares from China and ceramic-producing Southeast Asian countries. This paper aims to contribute further information by reviewing the different vessel types including the recently excavated ones and also looks at the ceramic as well as the non-ceramic artefacts to enrich the maritime narrative of the period.

2.2 Historical Background of Fifteenth Century Southeast Asia

Archaeological and historical sources mention a number of Southeast Asian port cities such as Melaka, Ayutthaya, Majapahit, Samudra-Pasai, Champa and Angkor (e.g. Reid 1988, 1993, 1999; Higham 1989, 1996; Hall 1992, 2011; Miksic 2004; Wang 1998; Brown 2009; Glover and Bellwood 2004; Manguin 2004; Flecker 2009; Wade 2010). Some polities functioned as regional ports and centres of trade between the Middle East, India and China and while facilitating Southeast Asian intra-regional commercial exchange. Others are small trade centres from which the spices and other local forest and marine products are sourced (Fig. 2.1).

2.2.1 *The Rise of Melaka and Ayutthaya*

At the turn of the fifteenth century, Melaka and Ayutthaya became dominant trading centres of the Southeast Asian region. Melaka's location in the Melaka Straits was crucial; being located between two great markets India and the Middle East in the west and China in the east (Thomaz 1993). Hall (2004: 250) described

¹This is according to Indonesian archaeologists who were interviewed during the recent International Capacity Building on Underwater Cultural Heritage workshop in Makassar, South Sulawesi in Indonesia on October 7–15, 2013.



Fig. 2.1 Southeast Asian map with fifteenth century maritime polities

Melaka: “In essence, it (*Melaka*) was appropriate that this central entrepôt was in Southeast Asia, because Southeast Asia was then the pivotal center of Asian trade, as the source of the most demanded commodities; the most important consumer marketplace for imported textiles and ceramics; and the common center for the exchange of the variety of commodities that derived from China and the Middle East, as well as other secondary sources of supply (*italics added*).” Thomaz (1993) called Melaka as a ‘mercantilist kingdom’ as the state was actively involved in commercial affairs alongside private merchants; even the sultan himself participated in trade and owned a fleet of trading ships.

Melaka served as a regional port-of-call, clearinghouse and collection point where traders from the east and west meet and exchange a wide range of economic commodities.² In addition, it also functioned as a locus for the symbiotic flow of cultural interactions between different ethnicities with their own religious systems,

²Hall (2004: 51) summarized a comprehensive list of the variety of trade items based on some historical documents: “India-based ships arrived regularly from the Gujarat, Malabar, and Coromandel coasts, as well as from Bengal, and Myanmar. Goods included luxury items from the Middle East, such as rosewater, incense, opium, and carpets, as well as seeds and grains. But the bulk of the fifteenth-century cargoes were made up of cotton cloth from the Gujarat and Coromandel coasts. Vessels from Bengal brought foodstuffs, rice, cane sugar, dried and salted meat and fish, preserved vegetables and candied fruits, as well as the local white cloth fabrics. Malabar merchants from India’s southwest coast brought pepper and Middle Eastern goods. The Bago (Pegu) polity in lower Myanmar also supplied foodstuffs, rice and sugar, and ships. In return, spices, gold, camphor, tin, sandalwood, alum, and pearls were sent from Melaka. Re-exports from

beliefs, practices and norms, which was instrumental in shaping Southeast Asia as a melting pot of cultures. When the Portuguese took Melaka in 1511, the population was estimated to be between one hundred to two hundred thousand persons (Thomaz 1993). Tomé Pires, the sixteenth century Portuguese chronicler who was stationed in Melaka for a number of years, compiled a list of foreign traders who disembarked at the capital's harbour³ (Cortesao and Rodrigues 1944: 268). From December to March, Indian Ocean as well as traders from mainland and eastern parts of insular Southeast Asia and China reached Melaka ports, while traders from Java and eastern Indonesia usually arrived in May. Pires also remarked on the diversity of languages during his tenure at Melaka: "in the port of Malacca very often eighty-four languages have been found, every one distinct" (Cortesao and Rodrigues 1944: 269). Despite this wide linguistic variety, the Malay language was used as the *lingua franca* for transactions related to trade. Scholars attributed Melaka's success as Southeast Asia's premier trade centre during the fifteenth century to a combination of factors: location and storage facility, an efficient legal and administrative system, affiliation with China, the conversion of the population to Islam, and the command of the Malay *Orang Laut*s⁴ (sea people).

In addition, Melaka's success as the fifteenth century's foremost regional entrepôt was closely linked with its affiliation to China⁵ (Wang 1964, 1968; Taylor 1992; Shaffer 1996; Wade 2008). For the Melakan rulers, having strong ties with

(Footnote 2 continued)

China included porcelain, musk, silk, quicksilver, copper, and vermillion. Malabar and Sumatran pepper was carried back to Bengal, with some opium from Middle Eastern countries".

³"Moors from Cairo, Mecca, Aden, Abyssinians, men of Kilwa, Malindi, Ormuz, Parsees, Rumes, Turks, Turkomans, Christian Armenians, Gujaratees, men of Chaul, Dabhol, Goa, of the kingdom of Deccan, Malabars and Klings, merchants from Orissa, Ceylon, Bengal, Arakan, Pegu, Siamese, men of Kedah, Malays, men of Pahang, Patani, Cambodia, Champa, Cochin China, Chinese, Lequeos, men of Brunei, Luções, men of Tamjompura, Laue, Banka, Linga (they have a thousand other islands), Moluccas, Banda, Bima, Timor, Madura, Java, Sunda, Palembang, Jambi, Tongkal, Indragiri, Kappata, Menangkabau, Siak, Arqua (Arcat?), Aru, Bata, country of the Tomjano, Pase, Pedir, Maldives".

⁴Andaya and Andaya (2001) surmised that the sultan's command over the *Orang Laut*s, or the sea people was important as the *Orang Laut*s provided protection for trading ships destined for Melaka and harassed ships en route to rival ports. The strategy is sound, as most of the *Orang Laut*s have possibly engaged in 'piratical' activities in the Melaka Straits before the fifteenth century. Melaka was reportedly a pirate haven with a marketplace that sold spoils from shipping plunder when Parameswara arrived. Merchants understandably go to ports where assurance of a safe passage is given.

⁵China first took notice of Melaka in 1403 from the reports of Indian Muslim merchants and sent an envoy to visit the polity the next year (Groeneveldt 1877; Andaya and Andaya 2001). Recognising its advantages, Parameswara immediately placed Melaka under China's sovereignty as a vassal state (Taylor 1992). Tribute-bearing missions to China commenced in 1405 and then again in 1407, 1408, 1413, and 1416 and thereafter about once every one or two years (Wake 1964). Melakan rulers even visited China in 1411, 1414, 1419 and 1424 (Coedès 1968). The Zheng He voyages further set the platform for Melaka's later achievement as it cleared the Melaka Straits of pirates who have been preying on merchant shipping for centuries and conducted naval patrols in the first two decades of the fifteenth century (Taylor 1992; Chenoweth 1996–1998).

China held numerous advantages: Chinese endorsement meant prestige and respectability as a commercial centre (Andaya and Andaya 2001). The kingdom also needed Chinese protection from Ayutthaya, Java, and Samudra-Pasai who were trying to expand or maintain their status as regional powers (Wang 1964; Coedès 1968). Melaka's relationship with Ayutthaya could be described as strained since prior to Melaka's rise as a trading centre, Ayutthaya had placed much of the Malay Peninsula under its sphere and considered Melaka as a vassal state (Wake 1964). In fact, the Melakan king reported to China of Ayutthaya's punitive raids and harassment tactics to put his kingdom under the Ayutthaya realm (Wang 1964). Java had been controlling trade in the Melaka Straits for centuries and did not wish an upcoming polity to take over the trade monopoly. To prevent further hostilities between the competing kingdoms, Melaka also recognised Ayutthaya and Java's sovereignty but did not place itself directly under their domain. When China discontinued the tribute missions in 1435, Melaka was by this time impregnable in its position and did not need China's diplomatic support (Wang 1964; Andaya and Andaya 2001).

The Royal Chronicles of Ayutthaya stated that Prince Uthong from northern Thailand founded Ayutthaya in 1351 (Kasetsiri 1976; Taylor 1992; Dumarçay and Smithies 1995; Chirapavati 2005). The kingdom is located in the central Menam Basin and lies at the convergence of three rivers, the Chao Phraya from the south, Pasak from the east and Lopburi from the north, making it an island-like kingdom (Beek and Tettoni 1991). A succession of Ayutthaya kings created and improved canals and drainage systems partly for defensive purposes and for ease of transport for watercraft vessels to and from the capital. The Chao Phraya River served as the main waterway as it can accommodate large boats and even small ocean-going ships.

Foreign trade transformed Ayutthaya into a cosmopolitan commercial centre and its success as a trade entrepôt can be primarily attributed to two factors: the production of surplus rice and other crops that have been exported to neighbouring states Melaka and Patani in the Malay Peninsula and the successful management of trade activities (Kasetsiri 1991; Pombejra 2005). Ayutthaya was also a major source of marine products as well as terrestrial flora and fauna.⁶ The kingdom's most important export during the fifteenth century from an archaeological perspective

⁶Diplomatic documents, merchant lists and travellers accounts provides an idea of the various items exchanged: animal skins (cow and buffalo hides and deerskins), stingray skins, dried fish, wood (sapanwood, eagle wood, ironwood and teak timbers) ivory, horn, wax, benzoin (gum benjamin), gumlac, namrack, metals (lead and tin) (Pombejra 2005). The Pires accounts also listed the following Siam-Melaka exchanged merchandise: rice, dried salted fish, arak, vegetables, lac, benzoin, brazil, lead, tin, silver, gold ivory, cassia fistula, copper and gold vessels, ruby, diamond ring and cloth (Baker 2003). In addition, Ayutthaya sent tribute items to China that included elephants, turtles, aromatics and exotics, textiles and slaves in exchange for Chinese luxury fabrics, porcelain, medicine and currency.

was the high-fired, glazed ceramic stonewares primarily produced in the kilns of Sukhothai and Si Satchanalai, which were also powerful kingdoms. These Thai ceramics were especially useful in determining Thailand's participation in fifteenth century maritime trade as they appear in most Southeast Asian archaeological contexts during this period (Brown 1979).

When China's new Ming Dynasty sent envoys to proclaim the ascension of the Ming dynasty's first emperor Hong-wu and to solicit tribute missions, Ayutthaya was one of the most enthusiastic respondents (Grimm 1961; Wade 2000). Between the years 1369 and 1439, Ayutthaya sent the most number of tribute missions with 68 (Reid 1995). Kasetsiri (1991) noted that the peak of these tribute missions occurred during the early part of the fifteenth century coinciding with the founding of Melaka and also with the Zheng He naval voyages (c. 1405–1433). Siamese envoys to China from 1381–1438 also included a number of Chinese delegates as translators (Reid 1995). Baker (2003: 53) summarised Ayutthaya's role in the Chinese trade: "First it was a supplier of the exotic goods (aromatics, animals, ornaments) demanded in the Chinese luxury market. Second, it acted as an entrepôt or distribution centre for China's exports of silk, ceramics and other manufactures."

2.2.2 *The Fall of Angkor, Majapahit and Champa*

2.2.2.1 Angkor

Angkor, an empire that developed in the lower Mekong River starting in the ninth century, reached its peak in the twelfth and thirteenth centuries CE. At its height, the Khmer empire encompassed a sphere of influence considerably larger than present-day Cambodia, including parts of Vietnam, Laos and Thailand (Stark 2004). Grand and massive temples and other monuments were erected in the lands between Tonle Sap River and Kulen Plateau that displayed the grandeur and complexity of Cambodian culture. A key feature in the design of the Angkorian complex was the establishment of a water management system (Fletcher et al. 2008; Day et al. 2012). This system consisted of canals, dikes, moats, embankments, reservoirs, and modified rivers intended to manipulate and control the flow and use of water for various agricultural, economic and religious activities. The river combined with an already extensive road network also had enabled Angkor to access natural resources and developed an effective communication system from the centre to the peripheral communities (Hendrickson 2011).

When the Mongols were defeated and China ushered in the new Ming Dynasty, Angkor sent tribute missions to recognise emperor Hongwu's ascension to the throne and also conduct trade with Chinese merchants. Reid (1995) listed thirteen tribute missions in the years 1369–1399, four missions in 1400–1409 and lastly, three final missions in the period 1410–1419. Internal turmoil and territorial warfare

with the Siamese must have caused a significant disruption for the Cambodians to terminate the China-Angkor link.

The disintegration of the Angkorian civilisation that began after the reign of Jayavarman VII (r. 1181–1218) until its final collapse in 1431 had been attributed to a number of reasons: warfare, ecology, religion, and economy (Higham 1989, 2004; Stark 2004). What is clear however was that the disappearance of the Angkorian phase in Cambodia's history occurred during the middle part of the fifteenth century. It is widely believed that the Angkor royalty relocated to an area near the confluence of the Bassac River and the Tonle Sap near the present-day Phnom Penh to have more direct access to maritime trade. However, no tangible evidence at the new capital of fifteenth century sites that could illuminate the new state's role and extent in maritime trade participation.

2.2.2.2 Champa

Artefacts, historical texts and epigraphic inscriptions provided evidence for the existence of Champa; a group of coastal polities that occupied what is now present-day Central Vietnam (Southworth 2004; Hall 2011). Champa's geographical proximity to China, the world's greatest centre of trade during this period, ensured that most tribute and commercial shipping passed by Champa's coasts (Hall 2011). A number of ports including Hoi An in the north, Vijaya's Sri Banoi in the centre and NhaTrang in the south developed during different periods as important ports of call for inbound and outbound merchants serving the Srivijaya–Melaka Straits to China route. For China-bound traders, the ports served as a final stop for shelter and provisions before crossing the Gulf of Tonkin towards south China. For outbound traders from China, the ports served as the first leg of a long, return journey. In both cases, significant exchange of economic products must have occurred between foreign traders and local merchants.

The socio-political and economic growth of the Cham kingdom gradually diminished owing to a multitude of factors. Foremost were the political crises and the long standing armed conflicts within the allied principalities and beyond its borders. Champa also defended its territorial lands against immediate neighbours Vietnam and Cambodia as well as China and even Java. It was, however, the Viets, Champa's long-standing rivals, who ultimately pushed Champa to collapse. At the turn of the fifteenth century, the Vietnamese army captured the Cham principality of Amaravati and continued its relentless southward advance that was halted only when Chinese forces invaded and occupied northern Vietnam from 1406–1424. After Vietnam regained its independence, it again set its sights in Champa. Hostilities resumed in 1445 that finally culminated in the capture of Vijaya, the Cham capital, in 1471. It was recorded that Viet king Le Thanh Tong ordered the beheading of more than 40,000 people and deported more than 30,000 that included

the king and royalty to the north (Coedès 1968). The destruction of the capital signalled the decline of the Champa civilization as their territorial area gradually diminished in size until it finally disappeared in 1832 (Guillon 2001).

2.2.2.3 Majapahit

The Majapahit Empire was both a land-based and maritime empire whose territory stretched from Sumatra, Java, Borneo, Moluccas and southern Philippines. The empire's success lies in the state's ability to effectively manage both an agrarian and maritime economy through political and economic strategies that enabled the simultaneous development of both sectors. Majapahit's central realm was located in the Brantas Valley, an area with fertile plains and plenty of rainfall, an essential ingredient for rice cultivation. Java became the main importer of rice in insular and mainland Southeast Asia during the fourteenth century. A hierarchical market network was established to facilitate the link between inland and the coast. Roads were built as an alternate to river systems to enable the transport of hinterland goods towards the coast and also as an avenue for political processions (Reid 2009). Copper coins called *pasis* were also increasingly used as the medium of exchange for commercial transactions (Wicks 1992; Hall 2011). The ruling house also acquired foreign luxury goods such as ceramics, metals and textiles for distribution to local hinterland and coastal rulers for political and ceremonial purposes.

Despite the paucity of available written sources for fifteenth century Majapahit, historians theorised that the empire's demise commenced after King Rajasanagara died in 1389 as rival rulers competed for leadership. Further, Majapahit went to war with Srivijaya, its vassal state, when it sent a separate tribute mission to China in 1373 to congratulate the ascension of the new Ming emperor (Slametmuljana 1976). Although Majapahit won the battle, it further depleted Majapahit's resources, increasing the dissatisfaction of other polity leaders in northern Java. This strained relationship between the centre and the northern Java ports carried over to the next century. When the monarchy showed signs of weakening, the leaders of Javanese northern ports Demak, Tuban, and Gresik, who had become powerful and influential, demanded autonomy and further damaged the already tenuous relationship. In the end, the Majapahit centre separated from its coastal enclaves while maintaining commercial relations, as coastal ports needed the hinterland produce and inland centres wanted foreign goods. The monarchy's shift in the revenue generation from the maritime coast to the agrarian sector however did not sit well with inland leaders, resulting in the shift of alliances that further destabilised Majapahit's power. In 1528, the Majapahit capital was again attacked and finally captured by coastal forces led by Muslim leaders who established Mataram, an Islamic sultanate (Hall 2011). The royal centre was relocated from eastern Java to central Java, what is now Jogjakarta (Shaffer 1996).

2.3 The Shipwreck Evidence

The proliferation of port cities meant new shipping routes and shipping destinations thus it is also logical to assume a sharp rise in the number of ships. Below are some of the shipwrecks that were excavated in Southeast Asian waters dated to the fifteenth century (Fig. 2.2).

2.3.1 Rang Kwien (c. 1400–1430)

This shipwreck was found about 800 m from the Rang Kwien islet, approximately five nautical miles southwest of Bangsare District, Chonburi Province, Thailand at a depth of 21 m below sea surface level (Intakosi 1983). Rang Kwien is also known as the Chinese Coin Wreck as it contained substantial amounts of Chinese coins (Prishanchit 1996). The site was archaeologically excavated by the Thailand Fine Arts Department during the years 1978–1981 (Fig. 2.3). In 2003, the Southeast Asian of Education Organization Project in Archaeology and Fine Arts (SEAMEO-SPAFA) sponsored another excavation that served as a training venue for Southeast Asian maritime archaeologists under the supervision of the Thai



Fig. 2.2 Distribution of shipwrecks excavated in Southeast Asia dated to 15th century



Fig. 2.3 The underwater survey of wooden remain of Rang Kwien shipwreck (Photo courtesy of Sira Ploymukda, Thai Underwater Archaeology Division)

Underwater Archaeology Division (UAD) (Ploymukda 2013). Another excavation was undertaken by the UAD in 2012 (Ploymukda 2013).

The wreck's wooden remains included the keel (20 meters long), hull planks, frames and a decorated stern castle (Prishanchit 1996; Ploymukda 2013). The vessel was estimated to be 25 m long and was constructed using the even-edged-joined technique and used roundhead wooden pegs to fasten planks to ribs (Ploymukda 2013). No bulkheads were observed and a waterway was cut into the keel (Green and Harper 1987).

The large amounts of Chinese coins (200 kg were accessioned during the 1977–81) were generally in good condition and dated from the Tang Dynasty (618–907 CE), Five Dynasties (907–960 CE), Sung Dynasty (960–1279 CE), and the Hongwu reign of the Ming Dynasty (1368–1403 CE) (Fig. 2.4). In addition, the wreck contained elephant tusks and ceramics from China, Thailand and Vietnam (Green and Harper 1987; Brown 2009). The Chinese ceramics comprised celadon dishes, small bowls and jarlets dated to the Chinese Yuan Dynasty period (1271–1368 CE) (Ploymukda 2013). The ceramics from Thailand included celadon dishes, large and small stoneware jars, and bottles from the kilns of Sisatchanalai, Maenam Noi and Suphanburi as well as earthenware pots, lids and kendi from still unidentified kilns in Thailand. The Vietnamese ceramics were composed of blue and white and celadon saucers, bowls, and boxes. Non-ceramic items included a metal pot, a bronze gong, copper and lead ingots, and a pair of gold bracelets embedded with precious stones. Life on board artifacts whetstones, bronze harpoons, forceps, foodstuffs (betel nuts, salted crabs, fish bones), a string tuner, copper hammer, and Chinese mirrors with bronze handles (Ploymukda 2013).



Fig. 2.4 Chinese coins from Rang Kwien shipwreck

2.3.2 *Nanyang Shipwreck (c. 1425–1450)*

The Nanyang was discovered in 1995 about 10 nautical miles from Pulau Pemanggil at a depth of 54 m below sea surface level (Brown and Sjostrand 2002; Sjostrand et.al 2006). Representative samples of glazed ceramics totaling 420 pieces were recovered during the initial investigations but an archaeological excavation was not carried out. The ship was estimated to be 18 meters long and five meters wide and built using the South China Sea shipbuilding tradition. Wooden dowels were used to join the hull planks indicating a Southeast Asian shipbuilding technique while transverse bulkheads, a Chinese shipbuilding technique, were used to compartmentalize the lower hulls and separate the cargo.

Approximately 10,000 ceramic pieces were found in the cargo holds (Sjostrand et.al. 2006). A substantial number of the ceramics were speculated to be the earliest examples of celadon plates, jars, small bowls and earthenware produced by the Sisatchanalai kiln sites of Thailand (Figs. 2.5 and 2.6). This is evidenced by the presence of spur marks in the central medallion of the dish caused by the feet of the disc-shaped spacers used to stack the plates for firing, an early type of production method thought to have been abandoned before the production of celadons (Brown and Sjostrand 2002). In addition, there were large storage jars from the Suphanburi kilns as well as large and small jars from the Maenam Noi kilns of Thailand. Brown-glazed jars of different sizes complete the ceramic inventory.

Fig. 2.5 Si Satchanalai kiln bowl from the Nanyang shipwreck (Photo courtesy of Sten Sjostrand)

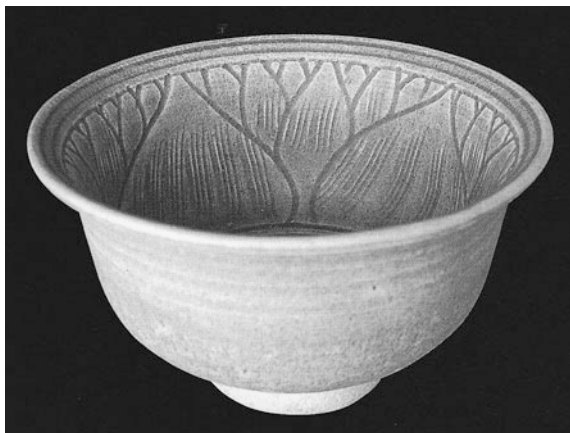


Fig. 2.6 Si Satchanalai plate from the Nanyang shipwreck (Photo courtesy of Sten Sjostrand)



2.3.3 *Ko Khram (c. 1450–1487)*

Also known as the Sattahip site, this wreck was discovered in the Ko Khram Channel that faces Sattahip Bay, Chonburi Province, Thailand at a depth of 38–43 m below sea surface level (Green and Harper 1987; Prishanchit 1996). Systematic underwater archaeological surveys and excavations between 1975 and 1979 were carried out by the Fine Arts Department of Thailand in cooperation with the Royal Thai Navy and assisted by underwater archaeologists from Denmark. The site was investigated again in 1986 by the Thai underwater team and archaeologists

from Australia (Green and Harper 1987). In 1993, the site was again visited to monitor its condition and assess the underwater environment surrounding the shipwreck.

Structural remains included wood planks from the hull that contained thirteen bulkheads and ribs. Prishanchit (1996: 279) remarked: “the vessel was built using an even-edge-joined building technique with a double-planked hull. Wood pegs and bolts were used to hold the planks together. The cargo walls were fastened to the wooden floor planks with iron nails and split bamboo flooring lined the wooden floor. Presumably, the Sattahip vessel is a flat junk and has no keel.” This ship also belongs to the South China Sea shipbuilding tradition. Radiocarbon analysis yielded two conflicting dates: 1520 ± 140 and 1680 ± 270 (Green and Harper 1987: 3).

Approximately 5000 ceramic pieces were recovered of which Thai ceramics from Sukhothai and Sawankhalok kilns account for almost two-thirds. These included celadon bottles, plates, bowls and jarlets from the Si Satchanalai kilns and under painted fish-plates and bowls from the Sukhothai kilns among others (Figs. 2.7 and 2.8). A smaller number of Vietnamese wares including a blue and white jarlet and a saucer green-glazed bowl with an unglazed ring in the inside center was identified by Roxanna Brown in 1975 as probable Cham (Green and Harper 1987). Earthenware pots, lids and kendi were also present. The only non-ceramic items were pieces of ivory (Prishanchit 1996).

2.3.4 *Pandanan Wreck (c. 1450–1487)*

This shipwreck was accidentally discovered below a pearl farm at a depth of 40 m near Pandanan Island, southern Palawan (Dizon 1998, 1996; Diem 1996, 1997, 1999, 2001). Initial investigations were undertaken in 1993 followed by

Fig. 2.7 Si Satchanalai kiln dish from the Ko Khram shipwreck



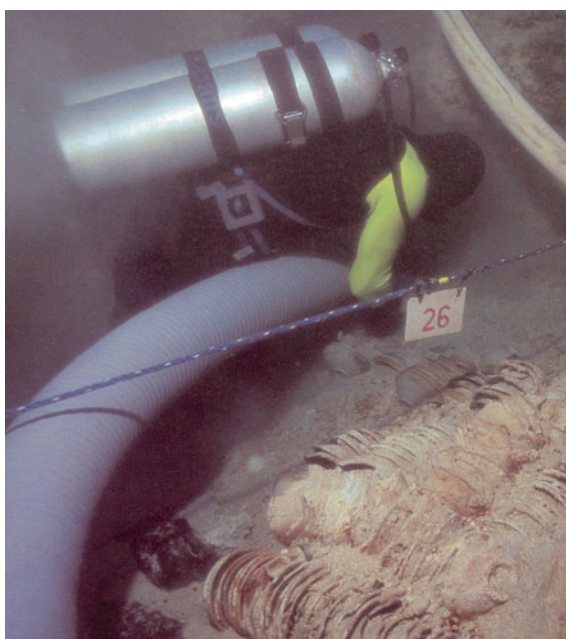
Fig. 2.8 Sukhothai kiln dish from the Ko Khram shipwreck



archaeological excavations between February and May in 1995. The entire archaeological project was realized through a joint effort between the National Museum of the Philippines and the Ecofarm Systems, Incorporated (Fig. 2.9).

More than 4700 archaeological materials were recovered from the Pandanan shipwreck. Majority of the cargo were ceramics from Vietnam, Thailand and China (Fig. 2.10). Vietnamese export wares in the form of bowls, plates, dishes, cups, saucers and jars comprised more than 70 % of the ceramic inventory. Most of these were manufactured in the Binh Dinh region, central Vietnam while a lesser number

Fig. 2.9 Pandanan Wreck excavated underwater (Photo courtesy of Gilbert Fournier)



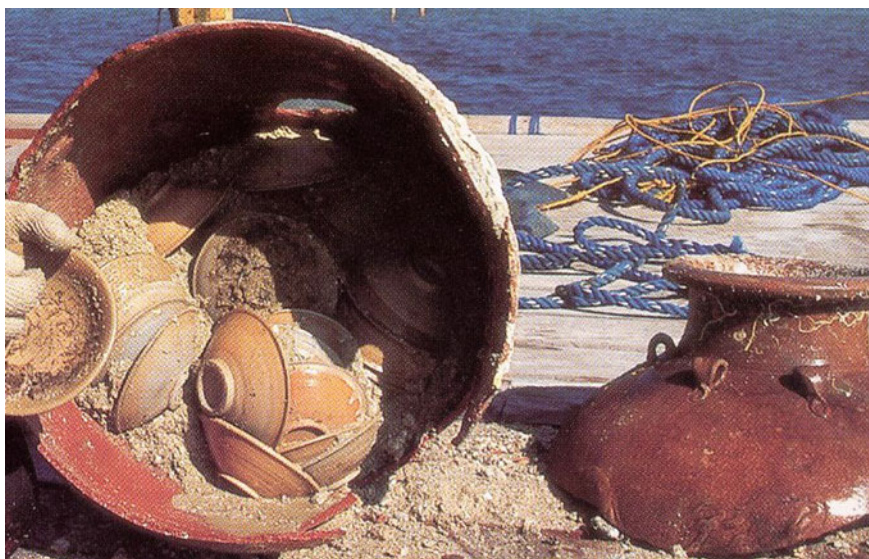


Fig. 2.10 Ceramics collected from the Pandanan shipwreck (Photo courtesy of Gilbert Fournier)

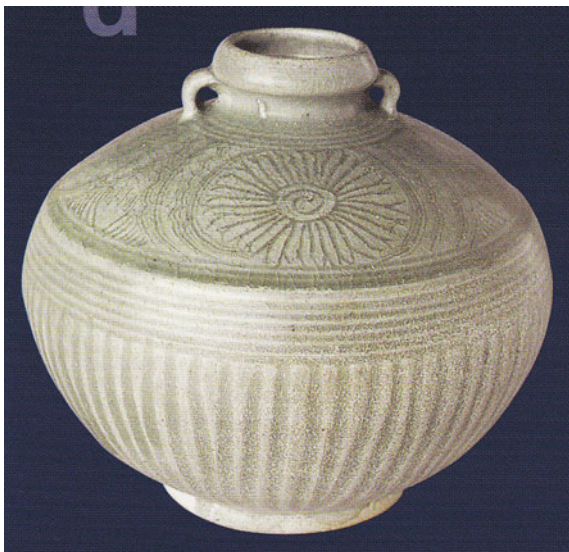
were produced in southern Vietnam (Diem 2001, 1999, 1997, 1996). Majority of the blue and white porcelain pieces were identified by Filipino ceramic scholar Rita Tan as belonging to the Early Ming, specifically to the so-called Interregnum Period (1436–64) (Tan 1998/99: 73). The Thai wares were from the Si Satchanalai and Sukhothai kilns. Other archaeological materials included glass beads, earthenware pots and stove, metal artifacts such as bronze gongs, iron cauldrons and small cannons, and sharpening or grinding stones.

On the basis of a Chinese copper coin dated to the Yong-Le period (1403–24) and the analysed ceramic wares, the Pandanan can be firmly dated to the fifteenth century. The ship construction type of the Pandanan wreck suggests it is a Southeast Asian trading ship (Probably Indo-Chinese) approximately 25–30 m long and about six to eight meters wide.

2.3.5 *Royal Nanhai (c. 1450–1487)*

Discovered in 1995, the Royal Nanhai lies 40 nautical miles off eastern Malaysia at a depth of 46 m (Brown and Sjostrand 2002; Sjostrand et.al 2006). The ship, measuring 28 m long and 8 m wide, was built in the South China Sea shipbuilding tradition as evidenced by the presence of transverse bulkheads and the use of wooden dowels to edge-join the planks. The vessel was named after the Nanhai Ocean, the old name of the South China Sea. High-quality, glazed Sisatchanalai celadon in the form of bottles, dishes and jars comprised the bulk of approximately

Fig. 2.11 Celadon bottle from the Nanhai shipwreck (Photo courtesy of Sten Sjostrand)



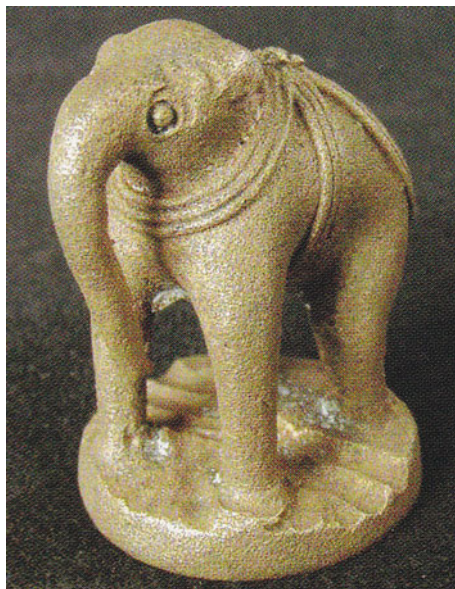
21,000 ceramics, along with lesser quantities of brown-glazed Chinese bowls, jarlets and black-glazed storage jars from the Maenam Noi kilns of central Thailand (Brown and Sjostrand 2002, Sjostrand et.al. 2006). Some large storage jars contained fish bones of the mackerel variety that may have been traded or consumed by the crew and passengers (Fig. 2.11).

A hidden compartment in a section near the keel below the main cargo contained Chinese blue and white porcelain bowls, a green-glazed Chinese bowl, two Vietnamese blue and white covered boxes, as well as a red and black lacquer box, an ivory sword handle and a bronze seal with an elephant seal (Fig. 2.12). The five Chinese blue and white bowls were conclusively dated to the reigns of Chinese emperors Jingtai and Tiensun of the Interregnum period (1450–1464 CE) and may have been intended as a gift to foster alliance for political and economic reasons (Brown and Sjostrand 2002; Sjostrand et al. 2006).

2.3.6 *Lena Shoal Wreck (c. 1488–1505)*

This wreck was discovered by a group of fishermen from Marinduque Island, southern Luzon, Philippines during the course of spear fishing (Conese 1997: 1). Located on the northwestern side of Busuanga Island, northern Palawan, the wreck along with its cultural deposits lies 48 m below sea surface level. Using the local hookah system, the fishermen looted the site, retrieving porcelain blue and white wares and stoneware jars and sold to antique dealers in Manila. After preventing further looting activities and reconnaissance dives at the site, archaeological excavation activities commenced with the National Museum as the lead proponent

Fig. 2.12 Nanhai royal seal
(Photo courtesy of
Sten Sjostrand)



in collaboration with the European Institute of Underwater Archaeology (IEASM) (Goddio 2002: 13).

The site yielded 6958 archaeological specimens including a significant portion of ceramic cargo dated to the Chinese Hongzhi Dynasty period (1488–1505 CE). Blue and white porcelain, celadon and stoneware jars of different shapes and styles comprise the export trade ceramics. Also recovered were earthenware, bracelets, bronze gongs, elephant tusks, lead and iron ingots among others (Goddio 2002: 18). The hull, measuring 18.3 m long and five (5) meters wide, was remarkably intact due to the accumulation of iron ingots and the sand overburden that protected the wood from further deterioration (Goddio 2002: 22). Examination of the ship building technology revealed the Lena Shoal wreck to be a trading vessel that was constructed using the edge-pegged plank measuring approximately 24 m long with a 100-ton tonnage.

2.3.7 Santa Cruz Shipwreck (1488–1505)

A fisherman accidentally discovered the Santa Cruz shipwreck approximately 10 nautical miles from the Santa Cruz municipality in northern Zambales, northwest Luzon in the Philippines (Orillaneda 2008). The site was actively looted before the National Museum of the Philippines in collaboration with the Far Eastern Foundation for Nautical Archaeology (FEFNA) carried out archaeological investigations from July to September 2001.



Fig. 2.13 Preserved hull and cargo underwater of Santa Cruz shipwreck (Photo courtesy of Christoph Gerick, copyright Franck Goddio/HILTI foundation)

The vessel itself was found to be in a remarkable state of preservation. The structure and the cargo were largely in place (Figs. 2.13 and 2.14). Based on the 80 % preserved hull, the shipwreck is approximately 25 m long and six meters wide with 16 transverse bulkheads on its cargo hold containing various ceramics and iron cauldrons still in its original packing position (Orillaneda 2008). Based on



Fig. 2.14 Santa Cruz shipwreck remains (Photo courtesy of Christoph Gerick, copyright Franck Goddio/HILTI foundation)

the noted features, the Santa Cruz was identified to belong to the South China Sea Shipbuilding Tradition.

The site yielded close to 15,000 ceramics of which more than 8000 pieces are intact (Orillaneda 2008). Stylistic and morphologic analysis of the predominantly Chinese ceramics revealed that the wares were produced at the kilns of Jingdezhen, Guangdong and Longquan during the Hongzhi period (1488–1505). The Thai wares were made in the Si Satchanalai and Maenam Noi kilns, the Vietnamese wares in the Chu Dau kilns and the Burmese wares in the Twante kilns (Orillaneda 2008). Other cargo items included metal wares made of iron (cauldrons and ingots) and bronze such as armament (small cannons, guns) gongs, bracelets, handles, oil lamps and coins as well as tin ingots. Glassware (beads, bracelets), wood and stone implements (carnelian beads, sharpener, and grinding roller) also appeared in lesser numbers alongside other unidentified organic and inorganic remains.

2.4 Summary

The Southeast Asian maritime world during the fifteenth century was a region in flux due to diverging political and economic trajectories mainly dictated by the development of international maritime trade. On the one hand, powerful empires Angkor, Majapahit as well as the port polities of Champa ceased to be important states. On the other hand, Melaka and Ayutthaya became dominant trading centres that controlled the flow of international seaborne trade in the region.

The regional maritime trade network in fifteenth century Southeast Asia appeared to be confined intra-regionally as new trade patterns emerged during the fourteenth to early sixteenth century. Hall (2004, 2011) noted that maritime trade during this period is segmented and that merchants from the Indian Ocean⁷ did not make the direct, long-distance voyage to China anymore. The Indian Ocean

⁷The Southeast Asia–Indian Ocean maritime trading network is also a significant subject. Melaka, as the foremost trading centre of the period, housed a substantial population of people with different ethnicities. Among these are the *chatis*, a group of merchants from the Indian Ocean states according to Ma Huan's description (Mills 1970). These merchants represent the vibrant maritime trade relationship between the Bay of Bengal and the Melaka straits in the fifteenth century. Besides Melaka, Wade (2010) notes that the *chatis* resides and operates also in port cities such as Pegu, Ava, Tenasserim, Bantam and the Moluccas. Some of the traders even occupy important political positions such as the case of Tamil merchant TunMutahir who became Bendahara with the title Bendahara Seri Maharaja (Wade 2010). In the realm of maritime economy, their participation is mostly confined to trading activities with major Southeast Asian port cities as a collection and transit point for trade goods to be transported back to the Indian Ocean sphere. There are however, a number of publications that emphasize the significant role and influence of the Indian Ocean traders in matters of politics, religion, economy and culture but are currently outside of the purview of this chapter.

merchants deemed it uneconomical, time-consuming and riskier, and instead stopped at the ports of Melaka, Ayutthaya or northern Java to unload their goods (Lieberman 2009). One possible reason was the closure of China to private commercial trade as the Ming emperors focused on the diplomatic tribute missions. This meant that only a trickle of Chinese goods was available and non-Southeast Asians had no choice but to acquire in-demand merchandise in Southeast Asian ports. Another possible reason was that Southeast Asian markets were already well organised, efficient and had all the merchandise needed by Indian Ocean traders, thereby negating the requirement for the extra voyage to China. Reid (1996: 34) noted that “It appears that the majority of the shipping between the Malay world and China around 1500 was not China-based but in Southeast Asian junks, owned by Melaka merchants.”

The Southeast Asian region not only exports commodities, the region itself is also a huge market. The vibrant intra-regional economy gave rise to multiple port cities and market places that served as centres of trade and exchange. Hall (2004: 237) cited an example: “The Southeast Asian marketplace was important enough that Indian textiles were manufactured to Southeast Asian specifications, as for example the long pieces of ritual cloth that Gujarat weavers produced to the specifications (size and design) of the Toraja society of the eastern Indonesian archipelago.” Specific types of ceramic assemblages found in Southeast Asian shipwrecks are suggested to be for Southeast Asian markets (Brown 2009).

Southeast Asia’s political and economic relationship with China through tribute missions generated considerable profit for its rulers and merchants as evidenced by the torrent of diplomatic visits early in the fifteenth century until the imperial government regulated it to every three years during the mid-fifteenth century (Reid 2009). T’ien (1981) noted that the deluge of Southeast Asian products, especially pepper and sappanwood, filled Chinese warehouses and became items of mass consumption for the first time. Surplus items were even used as part payment for government officials and soldiers. Reid (1993, 1996) stated that the Zheng He voyages also stimulated the large-scale production of pepper, clove, nutmeg, and sappanwood in agricultural areas in Sumatra, Java and the Moluccas. What is equally important, and perhaps more substantial, is the intra-regional commercial activities between inland production and local market networks as well as ports-of-trade and other coastal trading centres within the region (Hall 2011).

2.4.1 The Shipwreck Evidence

The current shipwreck evidence, albeit incomplete, revealed various types of vessels involved in long distance trade as well as the range, diversity and amounts of trade cargo that were distributed throughout the region.

2.4.2 *The Emergence of a New Type of Trade Vessel*

Prior to the fifteenth century, two types of trade ships dominate the Southeast Asian seascape: the ‘Chinese’ and ‘Southeast Asian’ ships.

Manguin (1998, 1984) characterized the Chinese ships as having flat or round bottom hulls with no keels and transom stern for vessels north of Fujian while three additional characteristics were shared with southern vessels in Guangdong, Hainan or northern Vietnam such as the fastening of strakes and frames with iron nails and/or clamps, structurally essential bulkheads dividing the hold into watertight compartments and single, axial rudders. The coastal and riverine environment of north China has been influential in the flat or rounded hull of the vessels.

The Southeast Asian ships on the other hand are large, stitched-planked vessels with “(1) V-shaped hulls with a keel; (2) pointed, more or less symmetrical stems and sterns; (3) strakes and frames joined exclusively by wooden dowels (actually not a single piece of metal is said to have been used on the whole vessel); (4) no bulkheads with waterways (limber holes); and (5) double, quarter rudders.” (Manguin 1984: 198).

The most distinguishing feature of this tradition is the use of “lashed-lug and stitched plank method.” Manguin (1998: 4) added:

Their hulls were built by raising planks on each side of a keel-piece that shows clear signs of having evolved from a dugout base (thus pointing to a development from an earlier simple dug-out canoe). Moreover, all or part of their components were held together by vegetal stiches or lashings (the fibre of the sugar palm *Arengapinnata*)...Vessels assembled in such a way are conventionally described as belonging to the stitched-plank type when the planks with which their hulls are built up are held together by way of stitches of vegetal fibre passed through holes frilled near the edges...The lashed-lug technique that is also associated with most of these vessels has protruding cleats or lugs carved out on the inner side of the planks, with holes hollowed out in them, so as to be able to lash them, and the planks they are part of, to sets of more or less flexible ribs and/or transverse thwarts.

However, as the quantity of excavated shipwrecks grew, naval architecture specialists (Green and Harper 1987; Manguin 2003; Flecker 2005) observed a new shipbuilding tradition that incorporated the Chinese and Southeast Asian shipbuilding tradition. Manguin (1984) proposed the term ‘South China Sea Tradition’ for these hybrid ships that possess both the Chinese and the Southeast Asian shipbuilding techniques. He observed:

Their planks are always fastened by iron nails to the frames and are commonly dowelled together by wooden pegs; some have a single, axial rudder while others have quarter rudders; their holds are separated by bulkheads, but these are not structurally essential and kept water tight as in the Chinese tradition (all have waterways with limber [small drain holes hollowed out of bulkheads]; all their hulls are V-shaped and have a keel that plays as essential structure role, a striking difference from the traditional flat-bottomed, keelless (Northern) Chinese build (Manguin 2003:39).

Flecker (2005) remarked that this type of ships may have originated in Thailand as export of Thai ceramics flourished with the decline of Chinese ceramic export from the 14th to 16th centuries C.E. They are usually made of teak, a type of

hardwood that is resistant to teredo worm or shipworm attack, accounting for the preserved shipwreck hulls for most South China Sea Tradition ships. The Bukit Jakas (c. 1450–1487 C.E.) in Indonesia (Manguin 1984); Longquan (c.1424–1440 C.E.), Nanyang (c. 1425–1450 C.E.) and Royal Nanhai (1450–1487 C.E.) in Malaysia (Brown 2002, 2004); the KoKhram (c. 1450–1487 C.E.), Ko Si Chang III (c. 1450–1487 C.E.) and Pattaya (c. 1488–1505 C.E.) in the Gulf of Thailand (Green 1987); the Hoi An (c. 1488–1505 C.E.) in Vietnam and the Lena Shoal and the Santa Cruz shipwrecks (c. 1488–1505 C.E.) in the Philippines (Goddio 2002) are all examples of the South China Sea Tradition of shipbuilding.

2.4.3 *The Cargo*

2.4.3.1 *Ceramics*

Brown's (2004, 2009) thesis on the 'Ming Gap and Shipwreck Ceramics in Southeast Asia' examined quantitatively the Chinese, Thai and Vietnamese ceramics that were found in 20 shipwrecks dated to the late fourteenth and the fifteenth century and proposed a chronology of the various Thai trade wares based on the shipwreck ceramic evidence. This research came about due to the observation of terrestrial archaeologists on the dearth of early Ming ceramics in various archaeological sites in Southeast Asia. This prompted the term "Ming gap"⁸ to explain this phenomenon (Brown 1998). Her studies showed that during the late fourteenth to the early fifteenth centuries, Chinese ceramics account for about 40 % when mixed with Southeast Asian wares as shown by the Turiang, Maranei and Rang Kwien shipwrecks. Middle 15th century shipwrecks like Nanyang, Belanakan, Ko Khram and Ko Si Chang III reveal that Chinese ceramic wares plunged to less than five percent (5 %) for the period between c. 1424 and 1487 C.E. (Brown 2004, 2009).

The appearance of Thai and Vietnamese ceramics as export trade items provided by the Rang Kwien and the Song Doc wrecks (c. 1380–1400 C.E.) seemed to coincide with the decline of the quantity of Chinese ceramics (Brown 2004, 2009). This is contrary to pre-Ming Dynasty shipwrecks such as the thirteenth century Java Sea and the Breaker Reef shipwrecks that contained homogenously Chinese high-fired ceramic wares (Dupoizat 2001; Flecker 2003). This continued downfall of Chinese wares vis-à-vis the Thai and Vietnamese wares beginning in the middle fifteenth century possibly due to Ming restrictions prompted scholars to raise the possibility of the Southeast Asian wares replacing Chinese wares in the Southeast Asian market. It seemed that Thai and Vietnamese wares and Burmese wares

⁸Ming Gap is used by archaeologists and ceramic specialists to explain the general absence of Chinese blue and white porcelain in the region and also the coincidental rise of exported ceramic wares from other ceramic-producing Southeast Asian countries such as Thailand, Vietnam and Burma (present day Myanmar).

increased their production and export to compensate for the decline of Chinese ceramic exports especially during the late fourteenth century towards the middle 15th century when the trade prohibition was strictly enforced.

Conversely, the reappearance of Chinese ceramic wares on board the Santa Cruz and Lena Shoal and Brunei shipwrecks dated to the reign of emperor Hongzhi (1488–1505 C.E.) provide tangible evidence of China's resumption of maritime trade. It also coincided with the decline of Southeast Asian wares. There are at least two plausible reasons to explain this event: First, private or illicit trading. There have been a number of historical records detailing the proliferation of illegal trading (e.g. Tan 2001; Lam 2002). Its emergence has been attributed to the collapse of the tributary missions from various Southeast Asian trade polities (e.g. Brunei, Sulu, Magindanao, Malacca, Ayutthaya) to China in the mid-fifteenth century coupled with the Chinese coastal merchants' disobedience of the anti-mercantilism actions of the Ming emperors (Guy 1986, Lam 2002). This very profitable trade was even participated in by corrupt government officials, eunuchs, tribute mission people and pirates (Tan 2001). Ts'ao (1962 as cited by Junker 2001) reported that illegal trade so flourished that its scale even surpassed the free trade practices during the Sung Dynasty period, and noted that this type of trade was the primary means of trade with the Philippines and the rest of Southeast Asia. The repeated issuance of imperial decrees over the duration of the Ming ban period highlights the uncontrolled illegal activities and the government's inability to stop this very lucrative trade especially during the late fifteenth century (Tan 2001). Second, there is a reference in the Chinese chronicles (Ming shilu or the Veritable Records of the Ming) for January 1521 regarding the investigation of a maritime official who had been allowing foreign ships to trade in China despite the trade ban (Wade 1994).

2.4.3.2 Other Cargo

Non-ceramic items found in the above-mentioned shipwrecks included a wide assortment of raw and manufactured metals, glass and stone objects that were either used for trade or utility.

The Rang Kwien carried an exceptional amount of Chinese coins in its holds. The early excavation activities recovered more than 200 kg and additional coins were collected on the succeeding excavations. The earliest coins dated back to the fourth century CE but the majority belong to the Hongwu reign (1368–1398 CE) of the Ming Dynasty. The Pandanan shipwreck revealed a Chinese coin dated to the Yongle reign and was instrumental in ascribing a relative date for the ship. The Lena Shoal and the Santa Cruz yielded a few Chinese coins; three Lena Shoal coins were identified as being made during the Hongwu reign while the Santa Cruz coins were too corroded for definite identification. Southeast Asian polities have been known to use money in its different forms including coinage since the third century BC (Wicks 1992).

Bronze gongs were found in the Pandanan, Lena Shoal and Santa Cruz shipwrecks in limited quantities except for the Santa Cruz (12) that rule them out from being trade items and may have been used as musical instruments or signalling devices. Weapons in the form of small cannons or *lantakas* were recovered in the Pandanan, Lena Shoal, Santa Cruz shipwrecks as a form of protection. However, typological and provenance studies of the gongs and *lantakas* have yet to be studied in detail. A number of metal spiral bracelets (brass and copper) were found in the Lena Shoal and Santa Cruz shipwrecks. These have been found in fifteenth century-dated terrestrial contexts in the Philippines (e.g. Calatagan, Batangas in the Philippines) as part of burial furniture and are suggested to reflect status of the buried individual (Fox 1959; Barretto-Tesoro 2008).

The Pandanan, Lena Shoal and Santa Cruz shipwrecks contained iron cooking cauldrons or *woks*. In the case of the Santa Cruz, the cauldrons were still found in their original position in the bulkheads. These are thought to have been produced in China, probably loaded in one of the still undetermined maritime ports in the Zhejiang province and may have been destined for Southeast Asian markets. Copper ingots were recovered from the Rang Kwien while tin ingots in truncated forms numbering more than a hundred were present in the Lena Shoal and Santa Cruz shipwrecks. In addition, lead and iron ingots were present in the Santa Cruz shipwreck. These metals are clearly intended for trade. Tins are important components in the making of bronze, an alloy of copper and tin and may have been sourced in the Malaya Peninsula or to eastern Sumatra (Goddio 2002).

Green-coloured glass bracelets were also found in the Lena Shoal and Santa Cruz shipwrecks. Similar bracelets were found in a shipwreck in Brunei and analysed as containing aluminium and sodium that is common with Asian glass. The green colour is derived from the iron content of the glass (L'Hour 2001). The fifteenth century burial sites at Calatagan, Batangas, used green-coloured glass bracelets as status markers (Fox 1959, Barretto-Tesoro 2008). There have been a wide variety of monochrome and polychrome glass and stone beads in most of the shipwrecks. The beads are mostly round in shape with different colours (yellow, red, black, dark blue, and brown). Provenance studies have yet to be carried out but beads generally come from India, China, and parts of Southeast Asia at different periods. The beads have been amply documented in terrestrial sites around Southeast Asia and used for religious, social and economic purposes.

Different types and forms of earthenware were recovered in all of the shipwrecks as part of crew and passenger use but do not reach proportions that would suggest they are cargo items. To date, analysis into the earthenwares suggest that they are of local origin, depending on the location of the ship. The stones recovered were mostly grinding stones.

The Nanyang and Royal Nanhai shipwrecks were unfortunately investigated mainly for their ceramic content thus no information on non-ceramic items can be gleaned.

2.5 Conclusion

This paper has laid out the historical narrative of fifteenth century Southeast Asia with emphasis on major maritime ports and polities as background for the shipwreck analysis. Southeast Asian texts describe the intra-regional maritime trading as a multi-layered and complex historical phenomenon that seems to be supported by the shipwreck evidence.

Wooden remains of the investigated hulls show the appearance of a new type of trading vessel, the South China Sea Shipbuilding Tradition that dominated the Southeast Asian maritime routes during the fifteenth century. The hybrid characteristics of the ship indicate the cross-influence of the Southeast Asian and Chinese shipbuilders.

From the cargo perspective, the trade ware ceramics tells an interesting story of the interplay between the Chinese and Southeast Asian ceramics. It indicates that during the early and middle fifteenth century, there was a marked decline of Chinese trade wares that coincided with the rise of Southeast Asian ceramics. However, the late fifteenth century shows the reappearance of the Chinese ceramics in great numbers and the decline of Southeast Asian wares. Metals in the form of ingots, woks, and possibly gongs were also trade items along with glass bracelets and glass and stone beads. It is logical to assume that organic materials such as spices, textiles among others constitute a substantial part of the trade cargo but these do not survive the archaeological record.

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