



# INTEGRAL STUDY OF THE SILK ROADS: ROADS OF DIALOGUE

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Maritime Trade during the 14th and the 17th Century:  
Evidence from the Underwater Archaeological Sites  
In the Gulf of Siam

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## Introduction

The catchword in today's transportation field is *convenience*. Journeys to distant continents which might be thousands of miles away can be made within hours in aircrafts that have been developed to achieve supersonic speed. However, the high cost of airfreight discourages merchants from using it to transport heavy and bulky cargo which is more economically moved by sea-faring vessels - a mode of transport which has been utilized by merchants for thousands of years. Ships can sail at much higher speeds and can carry tens of thousands of tons in this modern era, but they also continue to provide housing and office space for all of those who sail them in much the same way that they have in the past. All of the activities of man's daily life are still squeezed on board.

There is evidence to suggest that sea traders from afar were present on the river plains in central Thailand and along the coast of the Gulf of Siam down to the Malay Peninsula since the 4th or 5th century. During the 7th to the 11th centuries when human settlement had become more prominent, with the Dvaravati Kingdom controlling much of central Thailand and the Srivijaya Kingdom's territory covering the Malay Peninsula and the Indonesian Archipelago, evidence of maritime trade routes include ceramics from China, glass and stone beads from India and Persia, and cult icons, all of which had been carried to the region by these maritime traders and introduced to the indigenous people. These items were found in abundance, especially at settlements along the coasts such as U-Thong, Nakonchaisri, Kuboa in central Thailand and Chaiya, Nakcasrithammaraj and Yarang in the south. Recoveries of these exotic goods have so far all occurred on land and unfortunately no wreck sited dating to those periods have yet been discovered in these areas.

During the 12th and 13th centuries, Chinese merchants seemed to dominate the Southeast Asian market. There were many more junks travelling in Thai territorial water and even penetrating deeper in land through the main rivers. Chinese ceramics mainly from the Sung period were found in large quantities in Southeast Asian ports such as Vietnam, Malacca, Java, the Phillipinnes, Pattani and Nakonsrithammaraj etc., and in large settlements along the main rivers such as the Ta Chene River and the Mae Klong River. Chinese written records provide an account of maritime traffic.

Many traders settled in the region and spread knowledge of ship building technology and sailing techniques to the local people. Later, these foreign traders became important for their roles as foreign affairs officers and international commodity officers. Chinese documents recorded that during the years 1289 and 1290 there was an ambassador from Suwannapuma presented at court in Peking, China and that in the next year, 1291, the Mongol Court received an ambassador from the Sukhothai Kingdom. Subsequently, there were official commercial trips between the two countries from time to time. The documents also recorded many shipments of gifts to the Emperors of China in those years.

Following the inauguration of Ayudhaya City as the capital of Siam in 1351, there are more records indicating that the sea route merchandise exchanges: Siam imported ceramics, silk and satin from China on the one hand and on the other hand, she exported forest products, ivory, scented wood, Sappanwood; Acacia sp., leather, lead as well as Sankalok ceramics and other pottery to other Southeast Asian countries. Every junk had far to sail regardless of its exact destination. Not only trade goods but also life's necessities such as food and water, medicine and everyday use items such as cooking and storage containers as well as sources of recreation were on board.

There was no guarantee that as ship setting off on a sea voyage would ever reach its destination and the perils of sea travel in those days is reflected in the number of ship wrecks on the bottom of the sea. Some parts of these wrecks are still intact and are in relatively good condition because of the preserving nature of their watery resting places. Now, centuries later, they lie in wait for our generation and those who follow to reveal knowledge about the past.

### **Underwater Archaeological Sites in the Gulf of Siam**

The Gulf of Siam has been an important territorial waterway and the scene of much sea traffic for centuries. Geographically, gulfs have a good reputation for smooth sailings but it is impossible to predict every storm that invades them. Likewise, despite its popularity as a sea route since ancient times, the Gulf of Siam has also been the scene of such storms which have taken unlucky vessels to their unenviable end.

The Underwater Archaeological Project, under the Archaeology Division, Fine Arts Department, has undertaken surveys, excavations, and other research on wreck sites off the coast of the Gulf of Siam since 1977. Eight ships dating to around the 14th to the 17th century were found namely, Sattahip Wreck, Rang Kwien Wreck, Pattaya Wreck, Ko Kradard Wreck, Si Chang Wreck No. 1, Si Chang Wreck No. 2, Si Chang Wreck No. 3, and Samui Wreck. Furthermore, there are six other sites which have been surveyed and which have yielded material evidence but the ships themselves have not yet been located namely Prasae Site, Bang Ka Chai Site, Ko Rin Site, Samae San Channel Site, Hin Lak Bet Site and Don Hal Site.

Archaeological objects and features from the sites mentioned above provide the most important evidence currently available for the study of the history of maritime trade between China and Southeast Asian countries. This tangible evidence, which can prove or disprove written records, also serve a possibly more useful purpose by shedding more light on the subject in the revelation of other aspects involved and the dimensions needed to synthesize the information in an attempt to uncover the realities of a previous time.

### **Evidence of the Sea Trade from the Gulf of Siam**

Types of evidence include the ship's structure, the merchandise and other artifacts as summarized below:

## 1. Ship

The most important clues are found in a study of the body of the ship itself. It is necessary to regard the ship as a mobile home, office, means of transportation, a conveyer of cargo and sometimes also as a factory. Evidence of the physical components of ships found in the Gulf of Siam can be described in summary:

### *1.1. Sattahip Wreck or Kram Wreck*

The ship is located at 38-43 metres (126-143 ft.) below sea level in the channel off Ko Krarn (Kram Island) which faces Sattahip Bay, Chonburi Province. This is the first underwater archaeological site that the Fine Arts Department with the cooperation of the Royal Thai Navy surveyed and excavated. It was undertaken during 1975 and 1977. The structural components such as wood planks from the hull, bulk-heads and ribs were discovered in the sand. The species of wood which were used to make this structure were identified as *Hopea odorata* sp., *Tectona grandis* sp. and *Cotilelobium lanceolatum* sp. while the wood pegs and bolts were made of *Terminalia mucronata* sp., *Terminalia* sp., and *Garcinia cornea* sp.

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 bottom junk and has no keel. The deck measures approximately 8 metres wide and 32 metres long.

### *1.2. Rang Kwien Wreck or Nga Chang Wreck*

This wreck became known among divers as *Chinese Coins Wreck*. It is located 21 metres (80 ft.) below sea level in the Khram Channel 10 kms West of Bang Sarea Bay and about 800 metres from Ko Rang Kwlen (Rang Kwien Islet).

Surveys and excavations of this wreck site were carried out over 4 successive years (1978-1981), however, only a few pieces of the ship's structure were found such as the keel, some wood planks from the hull, ribs and a carved decoration piece for the after deck. In addition, there is a Chinese bronze mirror piercing the keel as a lucky amulet to prevent disasters, reflecting a belief and a preference of the Chinese ship builders and sailors.

Even-edge-joined building technique was used in the construction of this vessel and the round-headed -wood pegs were used to fasten the planks to the ribs. The ship is presumably 25 metres long.

### *1.3 Pattaya Wreck*

This wreck is located 26 metres (90 ft.) below sea level in the channel between the south beach of Pattaya City and Ko Lan (Lan Island), Chonburi Province. The site is situated near the shore of the most popular beach in Thailand, therefore, it has often been disturbed by the tourists, amateur divers and treasure hunters over a long period of time. There are traces of the destruction of the site by means of explosions and most parts of the vessel were seriously damaged. Structural remains suggest that the Pattaya vessel had a triple-planked hull which

was fastened with wood pegs. The structure was constructed of Shorea sp. and Dipterocarpus sp. wood. The vessel contains multiple cargo holds, each of which was separated from the other by split bamboo walls.

#### *1.4 Ko Kradat Wreck*

This vessel sank in 3 metres (5-8 ft.) of water in the coral reef near Ko Kradat (Kradat Island), Trad Province. The wreck has often been disturbed by treasure hunters and is now in a badly damaged condition. Survey and excavation in 1978 yielded part of an even-edge-joined double planked hull, the planks of which were fastened by wood pegs and bolts made of Terminalis sp. wood. The junk at Ko Kradat (Kradat Island) was presumably a local Southeast Asian construction because the Terminalis sp. is found only in Southeast Asia and Africa.

#### *1.5 Si Chang No. 1 Wreck*

This wreck is located 31 metres (100 ft.) below sea level, 3 kms west of Ko Si Chang (Si Chang Island), Chonburi Province. The Underwater Archaeological Project (Archaeology Division, Fine Arts Department) cooperated with the Institute for Maritime Archaeology and the Western Australian Museum undertook surveys and excavations of this wreck site from 1983-1985. The result of the research yielded many interesting aspects from the remains of the vessel including:

##### *- Keel*

A very long piece of 200 mm. thick wood with a trapezoidal cross section; the shorter side of the parallel sides is facing upward.

##### *- Wood planked floor*

Dipterocarpus sp. was cut into short planks measuring 800-850 mm. long and 150-300 mm. wide. These planks, found in the cargo holds, were presumably the floor lining.

##### *- Inner hull planks*

These planks are made of Shorea sp. and were fastened together with round-headed wood pegs in an even-edge-joined fashion.

##### *- Bottom lining planks*

Soft wood (pine) planks, each one measuring between 200-300 mm. wide, were used to line the bottom of the vessel between its ribs.

##### *- Ribs*

Only three pieces of ribs were found. They are made of Shorea sp. and Dipterocarpus sp. wood.

##### *- Bulkhead*

The bulkheads are made of Shorea sp. wood and were laid attached to the ribs.

The study of the structure of the Si Chang No. 1 Wreck suggests that this is a vessel with a keel and all parts of the vessel were fastened together with wood pegs and bolts which were made of Cassia fistula sp.. However, the nationality of the owner or where the ship was built cannot yet be started.

#### *1.6 Si Chang No. 2 Wreck*

The vessel is located 25-27 metres (85-90 ft.) beneath the water surface. The Underwater Archaeological Project, (Archaeology Division, Fine Arts Department), cooperated with the Institute for Maritime Archaeology and the Western Australian Maritime Museum in the undertaking of surveys of this wreck site in 1982, 1985 and 1986. The site was actually excavated in 1987. Only the parts of the vessel which were submerged in sand including sections of a double-planked hull and bottom planks which were fastened together with wood pegs and metal nails have survived. The keel of the vessel could not be found.

#### *1.7 Si Chang No. 3 Wreck*

This vessel is located 24 metres (80 ft.) under the water surface approximately 7 kms. Northwest of the northern end of Ko Si Chang (Si Chang Island). The Underwater Archaeological Project, (Archaeology Division, Fine Arts Department), cooperated with the Institute for Maritime Archaeology and the Western Australian Maritime Museum in the undertaking of surveys of this wreck site in 1986. The results of the research, yielding many interesting aspects of the vessel's remains include:

##### *- Keel*

The keel of this vessel is made of three pieces of wood which measures up to 15 metres long.

##### *- Hull planks*

The hull of the vessel was constructed using a double-planking technique in an even-edge-joined fashion. The inner hull planks were fastened together with round-headed wood pegs. Metal nails were used for the outer hull planks made of *Tarrietia* sp. and *Herietia* sp. and were also used to fasten both layers of the planks together. Ships built using this technique were widely distributed throughout Southeast Asia.

##### *-Bulkhead*

Nine bulkheads were found in situ tightly fastened above the ribs which are situated across the keel.

##### *- Maststep*

This is a very thick, rectangular piece of wood situated across the keel, fastened tightly to the bulkhead. On the upper surface of the bulkhead there are two rectangular dug out pits for fixing the mast support poles.

The Si Chang No. 3 Wreck is presumably a small vessel with a deck measuring approximately 6 metres wide and 24 metres long.

### *1.8 Samul Wreck*

This ship is located approximately 19 metres (60-65 ft.) beneath the water surface in the channel halfway between Ko Tean (Tean Island) and Ko Samui (Samui Island). The wreck has been plundered as have many of the sites mentioned above; however, the results of the excavation in 1984 yielded evidence for a double-planked wooden hull. Wood planks which are about 180-200 mm. thick were fastened directly to the ribs. The keel of the ship cannot be located. This ship is presumably a flat bottom junk, the deck of which measures about 18 metres long and approximately 4-5 metres wide.

## **2. Merchandise**

Merchandise provide us with important clues in the historical study of maritime trade because the items can often be traced to their place of origin, and sometimes suggest their intended destination. Orders from Western countries requesting their Southeast Asian representatives to purchase forest products and organic goods from ports in the Ayudhaya Kingdom regularly included rice, leather, sappan wood, buffalo horns, scented krishna (Eagle) wood, rattan, palm sugar, teak wood, lacquer sap, wax, ivory, honey, areca nuts, brown cane sugar, lead, tin, glazed stoneware, (Sankalok ware), and earthen utility wares.

Because these wrecks have been lying on the sea floor for many hundreds of years, most of the organic remains (which decay easily), have vanished from their sites. Although only minute fragments of this organic product remain in a most dilapidated state, conditions for preservation under the sea are much better than they are in the ground. This evidence is considered important for it is representative of the actual merchandise in the historical maritime trade. The remains of the merchandise discovered in the wreck sites in the Gulf of Siam are described below:

### *2.1 Organic materials*

#### *2.1.1 Ivory*

A large shipment of ivory (about 25-30 pieces) was found In the Rang Kwien Wreck in the 1981 excavation. Most of the ivory pieces are large. Diameters at the thick ends measure 1500-1700 mm. They were neatly laid in a group on round-headed tie supports. The condition of these ivory pieces is so badly deteriorated that salvage possibilities were not considered promising and the pieces were consequently left in situ. Furthermore, ivory was found in smaller amounts accompanying other products in the Sattahip Wreck and Si Chang No.2 Wreck.

#### *2.1.2 Sappanwood: Acacia sp.*

Samples of sappanwood were found in all of the Si Chang Group Wreck.

#### *2.1.3 Leather*

Only small pieces of leather were found in Rang Kwien Wreck; however, their dilapidated condition and the size of each piece provided samples which were inadequate for species-determination analysis.

## *2.2 Inorganic merchandise*

### *2.2.1 Ceramics*

The great quantity of items included in this category makes up the majority of the merchandise found. Moreover, ceramic products tell stories of their own when one considers factors such as source materials, potting techniques, decorations, kilns, and some pieces even state the name of the artist or the reign of the emperor who supported the industry. Ceramics found in the wreck site in the Gulf of Siam can be divided into four groups according to their place of manufacture.

#### *1. Thai ceramics*

Sankalok ware, celadon type of glaze applied in white-clay stoneware, produced by the Si-Satchanalai and Sukhothai kilns, northern central Thailand was the most common Thai ceramic type found in almost all the wreck sites. For example, large amounts were found in the Sattahip wreck, Prasae Site, the Ko Kradat Wreck and some pieces were also found in the Samui Wreck. Chaleang ceramics, celadon group glazed on dark-body stoneware, from the Ban Ko Noi Kilns, Si-Satchanalai, were found in the Rang Kwien Wreck. Many heavy storage containers and utility wares such as brown glazed four-ear jars, mortars, and large bowls from Mae Nam Noi Kiln Site were found in Sattahip Wreck, Si Chang Group Wrecks, Ko Kradat Wreck, Pattaya Wreck, Don Hal Site, and other coastal sites.

#### *2. Chinese ceramics*

Many grades of Chinese ceramics were exported. Those which were found in the wreck sites in the Gulf of Siam can be described as follows:

##### *- High quality blue and white porcelain known as Kraak ware*

This porcelain was produced by the royal Ching-Te Chen Kilns in Kiangsi Province, south China during the reign of Emperor Wan Li (1573-1619) at the end of Ming Dynasty. A large number of these wares were found in Si Chang No. 1 Wreck.

##### *- Middle to low quality blue and white wares known as Swatow ware*

Swatow ware is named after the town on the southeast coast of China, Chin Cheuw, in Kuangtung Province. Chinese ceramics in this category were dated from the Ming Dynasty, in the second half of 13th century, to the Ching Dynasty, the 18th century. This type of ware has been found throughout Southeast Asia and was found in the Samui Wreck, the Ko Kradat Wreck, the Si Chang No. 1 Wreck and at the Ko Rin Site.

##### *- Celadon ware*

These ceramics were popular export goods from the Lung-ch'uan Kilns in Chekiang Province, south China, during the Yuan Dynasty. Celadon ware was found in abundance in the Rang Kwien Wreck and some also in the Samul Wreck.

### *3. Vietnamese ceramics or Annamese ware*

Most of the Annamese ware was glazed stoneware, however, many types of ceramics originating from Vietnam can be categorized as follows

#### *- Brownish celadon glaze ceramics*

Hundreds of this type of Annamese ware, comprised of plates and bowls, were found in the Sattahip Wreck. Colours range from brownish green to yellowish green. One can see the rings left on the inner bottom of these bowls when the glaze was wiped off to prevent it from fusing to the one above it during the firing process.

#### *- Under-glazed blue and white design on a buff body stone-ware*

This type of ware was found in abundance in the Rang Kwien Wreck and some in the Si Chang No. 3 Wreck.

#### *- Buff colour glazed ceramic*

This type of ware was found in abundance in the Rang Kwien Wreck.

### *4. Pottery from unknown origin*

Fluted Kendis were found in large amounts in the Si Chang No. 1 Wreck, and some were also found in the Sattahip and the Ko Rin Site.

## *2.2.2 Metal*

Artifacts made of metal include:

### *1. Lead*

Lead was found in the form of ingots. These ingots take many shapes, the most common of which is a short cone. However, cylindrical and lime-sized, spherical ingots were also found. Ingots were discovered in abundance in the Pattaya Wreck, the Sattahip Wreck and the Si Chang Nos. 1 and 3 Wrecks. The ancient lead production sites were found in Sisawat District, Tong Pa Pume District, and Sangkla-buri District, Kanchanaburi Province. Lead ingots found at these sites and in the wrecks are similar in shape and size.

### *2. Iron*

Iron was imported both as raw material and as finished products. Large cooking pans were found in the Rang Kwien Wreck and knives were excavated from the Don Hai Site. Heaps of smelt iron were located in the Pattaya Wreck's cargo holds.

### *3. Chinese Coins*

Thousands of coins which weigh many tons were discovered in the Rang Kwien Wreck. Many of them were fused together in lumps while many others retain their original shape, indicating that they were once tied together with silk cords. The coins were cast from an alloy of copper/tin bronze and contain a high percentage of lead. Each coin has a reign mark and the coins found in the Rang Kwien Wreck date from the Tang to the Chiang Dynasties. Despite the fact that the majority of the coins have Sung Dynasty marks, there are contradictions from the results of carbon 14 dating tests on other artifacts. Money exchanges in the ancient maritime trade are a proposed hypothesis. Due to the fact that the sheer number of recovered coins is so enormous (quite apart from their value), and given the fact that from the 13th century to the reign of King Rama IV of the Ratanakosin Period in the 19th century, the most acceptable form of currency for maritime trade in Southeast Asia was Chinese coins, the possibility exists that the Rang Kwien vessel was carrying these coins to trade.

### **3. Other archaeological evidence**

Another missing piece of our puzzle is that the sites are devoid of any evidence of the skeletons of the sailors or maritime merchants who must have died many hundreds of years ago. Unlike today's ships, the junk, with less super structure, had an open deck so that if the vessel seemed to be doomed, the passengers would have been able to jump clear of the ship in time to save their lives. If individuals then failed to survive, their corpses would have been carried away by current or have been eaten by sea creatures.

#### *3.1 Food*

A round-bottomed pot filled with eggs was found in the Si Chang No. 3 Wreck. A medium size four-ear storage jar containing fish products was found in the Si Chang No. 1 Wreck. In the Pattaya Wreck a storage jar containing rice was discovered. Poultry bones were found in the Samui Wreck. In many wrecks we found many areca nuts and round-bottomed pots containing palm sugar. Sugar is considered to have been a staple food for the seamen and also a trade item. Furthermore, a couple of bronze fish hooks were found in the Rang Kwien Wreck and presumably they were used to catch fish during the voyage.

#### *3.2 Kitchen utensils*

Many round-bottomed earthenware cook ware and wood/charcoal stoves were found in all of the wrecks and their associated sites. Earthenware pottery which can shrink and expand while cooking over the fire, is brittle and easily damaged, therefore, a good supply had to be carried in stock especially because of the added hazard of the rocking motion of the ship. Mortars, mixing bowls, and whetstones which are utensils used in every Southeast Asian household were also found in the wreck.

#### *3.3 Music and signaling instruments*

A bronze gong and a bell as well as a tuning peg for a string instrument were found in the Rang Kwien Wreck. A pair of cymbals was found in the Samui Wreck.

The bronze gong and bell were presumably used as signaling instruments to communicate on the vessel.

### *3.4 Jewelry*

A pair of gold bracelets decorated with precious stones made by an artisan of the early Ayudhya period, a straight jeweled hair pin and an ivory ring was found in the Rang Kwlen Wreck. A gold pendant decorated with rubies was found in the Sattahip Wreck.

### *3.5 Games*

Three chessmen were found in the Si Chang No. 1 Wreck.

### *3.6 Miscellaneous*

The excavation at the wreck site recovered many other daily use items and personal belongings of both sailors and merchants of the past, for example, bronze key sets, musket rifles, and bronze lime jars.

## **Analysis and summary**

Underwater archaeological sites and wreck sites are considered one of the most important sources of information for the history of our nation and for that of all mankind. The amount of information depends on the circumstances of recovered wrecks and objects: a wreck is able to provide its own history, its age, how many times and where it docked. We are able to study the life styles, technology beliefs, means of communication and especially the maritime trade of our forefathers through the examination of personal items such as clothing and jewels, cult icons, everyday use items such as fishing tackle, storage containers and cooking utensils, food, weapons and Merchandise.

At present we can comprehend the story of the maritime trade from archaeological evidence as given in the following summary:

### **1. Ship**

There were two types of cargo junks being sailed in Southeast Asian seas during the 14th to the 17th centuries: the flat bottom junk and the keeled junk. The techniques and materials used in ship building indicate that these ships, which are not very large, were locally built Southeast Asian vessels and they are not real Chinese junks.

### **2. Merchandise**

Artifacts revealed, during excavation, such as ivory, leather, lead ingots, sappanwood, Chinese ceramics, Annamese wares, Sankalok wares and iron cooking wares and utensils are among the categories mentioned in the documentation records.

This materials evidence from the Gulf of Siam provide a comprehensive, if not yet clear, knowledge of maritime trade in Southeast Asia from the 14th to the 17th centuries. Gaps occur in the information for many reasons: only a few wrecks and sites have been discovered. The survey and excavation process progressed slowly and with great difficulty

and risks to those involved to this environment so unfamiliar to man. Perhaps more serious is the result of looting and destruction by treasure hunters who are stimulated by antique dealers, collectors and now interior decorators. The pieces which are the most difficult to obtain bring the highest price. Artifacts from archaeological sites, both under water and underground can be found in many hotel lobbies, well-appointed homes, or antique, furniture or gift shops. The smuggler approaches a site without any respect and other artifacts and features without a high market value are intentionally destroyed in the plunder to ease the way to his ultimate prey, in many cases by means of explosives.

This aspect of social values must be discouraged. Just to have an antique piece to show off the affluent status of its owners, in effect, an encouragement to lose an archaeological site. At this time, there is no available wreck sites in adequate condition for our successors to study. As an archaeologist who also works in the conservation field, the author would like to mention that wreck sites, as a source of cultural heritage, have a value which goes beyond the reconstruction of Thai history; in fact, the history of mankind is at stake. Although these wrecks were found in Thai territorial water, the movable nature of the crafts themselves and the many places from which their cargo originated means that we can be certain neither of the nationalities of the owners and the crew on board nor of their last port of call or destinations.

The public is now being made aware of the destruction of the natural environment. Many agencies are promoting and attempting to balance the natural ecological system. The coral reefs which represent another resource in critical condition under the sea are at present under the protection of legislation and active agencies. The concept of cultural environment has not yet been realized. However, ethnical values should be promoted because archaeological artifacts and features are individually very significant. Time and tide cannot return; however, they leave us evidence. If the evidence is destroyed, it will be impossible to replace.

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