

Turiang:

A Fourteenth-

Century

Shipwreck

in Southeast

Asian Waters

by Roxanna Brown *and* Sten Sjostrand



P A C I F I C A S I A M U S E U M

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Roxanna M. Brown
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Preface

THIS IS THE SECOND IN OUR SERIES of scholarly monographs shedding new light on various aspects of Asian and Pacific Island arts and culture. Our first monograph, *Enlightening Remarks on Painting* by Shih-T'ao, translated by Dr. Richard Strassberg, was published 11 years ago. In the ensuing years, we had hoped to continue this series on an annual basis, but were unable to do so. I am particularly pleased we can now continue the series with *Turiang: A Fourteenth-Century Shipwreck in Southeast Asian Waters*, a most interesting work by Roxanna Brown and Sten Sjostrand.

Roxanna Brown has written and lectured extensively on the ceramics of Southeast Asia. She is a world-recognized expert on Southeast Asian trade ceramics and the shipwrecks on which these ceramics have been found. She is currently a Ph.D. candidate in the art history department at the University of California, Los Angeles, and serves on the Board of Directors of the Maritime Archaeology Museum in Malacca, Malaysia. She has completed numerous research projects in Southeast Asia. Sten Sjostrand is an engineer who has spent 30 years of his professional life in Southeast Asia, primarily designing and engineering marine and offshore structures. Additionally, he is an expert on historical Asian maritime trade. He has discovered a number of wrecks dating from the 14th century through World War II.

Roxanna Brown is adjunct curator of Southeast Asian ceramics at Pacific Asia Museum and has been extremely helpful in curating our large collection of Southeast Asian ceramics, including the Ries Collection. When she approached me with the idea for this volume I was very enthusiastic. She has been particularly excited about the impact on the scholarly study of Southeast Asian ceramics by the contents of this shipwreck. We expect this monograph will make a major contribution to the understanding of trade within Southeast Asia during the 14th century.

On behalf of the authors, we would like to thank Andi Baumgartener, Johan Milton and Scott Sheehan, whose deep-water diving skills and conscientious work under strenuous conditions was invaluable. Johan Milton also devoted time to the registration and conservation of the artifacts. The support and assistance of Ong Choon Kwang, Duangta Thoetwangmuang and Khalid Yusop were also indispensable. The authors are grateful for all their individual contributions.

I wish to thank Roxanna Brown and Sten Sjostrand for the outstanding work they have done on this project and for providing us with this new and exciting information. I would also like to thank my assistant, Hilary Snow, for her diligent and excellent work in the preparation of this monograph. Finally, I would like to thank Dana Levy for the characteristically outstanding work he has done on the design of the monograph. This monograph was primarily funded by an anonymous donor, and partly by the Kelton Foundation. We greatly appreciate their generosity.

DAVID KAMANSKY
Executive Director and Senior Curator
Pacific Asia Museum



Plate 35. Chinese celadon covered jar. Height 28 cms.

Turiang:

A Fourteenth Century Shipwreck in Southeast Asian Waters

AMONG DOZENS OF OLD SHIPWRECKS discovered in the South China Sea since they began to be documented in 1975, the Turiang wreck is particularly intriguing. The ship itself, a Chinese vessel, and its cargo offer important new evidence for understanding 14th-century trade between China and Southeast Asia. The particular mixture of Thai ceramics within the cargo, moreover, also illuminates their development within a century that opened with a vigorous network of land and sea routes under the auspices of Yuan-dynasty China (AD 1279–1368). The century closed with the xenophobia of the early Ming dynasty (1368–1644), but this circumstance in fact allowed Southeast Asia a period of glory in its own right. The richness of international trade in a world united by the Mongol Yuan dynasty, with its conquests extending from the Middle East to China, has been documented by such travelers as Marco Polo and Ibn Battuta.¹ This trade, which was partly fueled by the beginnings of a European demand for spices from the Indonesian islands, led to a growth in regional trade within Southeast Asia as well. It also led to one of the greatest developments in the history of Chinese ceramics, the introduction of blue and white trade wares that were produced at Jingdezhen, Jiangxi province, in southern China.

The origins of blue and white ware in China are still shrouded in some mystery. There is evidence for decoration in underglaze blue in northern China during the ninth century, but there is no known connection between that short-lived production and the products of Jingdezhen in the early 14th century. Archaeological evidence is scarce regarding the very earliest blue and white ware from Jingdezhen, and a covered vase from a grave dated AD 1319 is exceptional.² While archaeological investigations continue, the most recent statement on this issue is that blue and white ware began to be traded abroad in 1328.³

A special significance of the Turiang shipwreck is that it may possibly date to the years before AD 1328. (At this point, however, the wreck is conservatively being assigned to the period 1305–1370.) Until the introduction of blue and white ware, Chinese trade wares were mostly glazed in

1. Marco Polo's travels to the Far East were in the years 1275–92, and Ibn Battuta went in the 14th century. See A. C. Moule and Paul Pelliot, editors, *Marco Polo The Description of the World*, 2 volumes, New York, AMS Press, 1976; and H. A. R. Gibb, *Travels in Asia and Africa 1325–1354*, London, Routledge & Kegan Paul, 1929. For summaries of the overall extent of sea trade in the Yuan dynasty, see the first two chapters in Louise Levathes, *When China Ruled the Seas*, 1994; and also John Miksic, 'Historical Background,' in William M. Mathers and Michael Flecker, *Archaeological Recovery of the Java Sea Wreck*, 1997, pages 5–30.
2. Rita C. Tan reviews the evidence for pre-Yuan dynasty blue and white ware in an introduction to Larry Gotuaco, Rita C. Tan and Allison I. Diem, *Chinese and Vietnamese Blue and White Wares Found in the Philippines*, Manila, Bookmark, Inc., 1997.
3. Liu Xinyuan, 'Imperial Export Porcelain from Late Yuan to Early Ming,' *Oriental Art*, Volume XLV/1 (Spring 1999) pages 98–100.

Map 1: Southeast Asia



monochrome colors. A small number of pottery centers in China made ceramics with designs painted in underglaze black beneath a clear glaze, but very few of this type were exported. The most popular ceramics overseas were green-glazed, white-glazed, brown- and black-glazed wares. If archaeology eventually shows that underglaze designs on ceramics from Thailand and Vietnam were already popular before the appearance of Chinese blue and white ware, this would add an unexpected dimension to understanding early market forces and trade competition in ancient Asia.

Sometime during the Yuan dynasty, underglaze painting in black appeared in both Vietnam and Thailand, and the Turiang shipwreck includes examples from both countries. Even more important historically, it includes examples from two rival centers in Thailand, the Sawankhalok and Old Sukhothai kiln sites. This is an exciting surprise. It is the first documented example of fish

plates from the Sawankhalok kilns found together with fish plates from the Old Sukhothai kilns. Sukhothai fish plates are well known in Southeast Asia, but Sawankhalok examples are extremely rare. At Sawankhalok this type of plate was made only for a short period, probably for less than 50 years, but at Sukhothai it seems they were made continuously for nearly 300 years.

The proportion of Sawankhalok to Sukhothai wares in the Turiang cargo is also surprising. Here is a unique instance in which Sawankhalok ceramics are in the minority. Normally, for the period of the 14th–16th centuries, Sawankhalok ceramics outnumber Sukhothai examples by 20 to one. Yet in the Turiang cargo only an estimated 11% of the ceramics are Sawankhalok, in contrast to 46% Sukhothai. This shows that the Sukhothai kilns were already in full production during the early stages of ceramic export from Thailand. It even suggests that the Sukhothai kilns were perhaps the first to export in volume. The wrecksite thus reintroduces an old question about which of the two Thai sites first introduced painted decoration. The cargo also establishes an early date for another Thai potting center, the one at Bang Rachan, Suphanburi province, in the region of Ayutthaya.⁴ (See Map 1.)

Altogether, evidence from the wrecksite suggests that the vessel sailed during the Yuan dynasty (AD 1279–1368). This date challenges the theory that Southeast Asian wares, specifically from Thailand and Vietnam, were first exported because of a shortage of Chinese ceramics caused by the first Ming emperor's ban on private overseas trade in 1369. It is possible, moreover, that the vessel sailed at a time before Chinese blue and white ware was being exported. No blue and white ware was discovered in the cargo, even though other types of Chinese ceramic wares were present.

DISCOVERY OF THE WRECKSITE

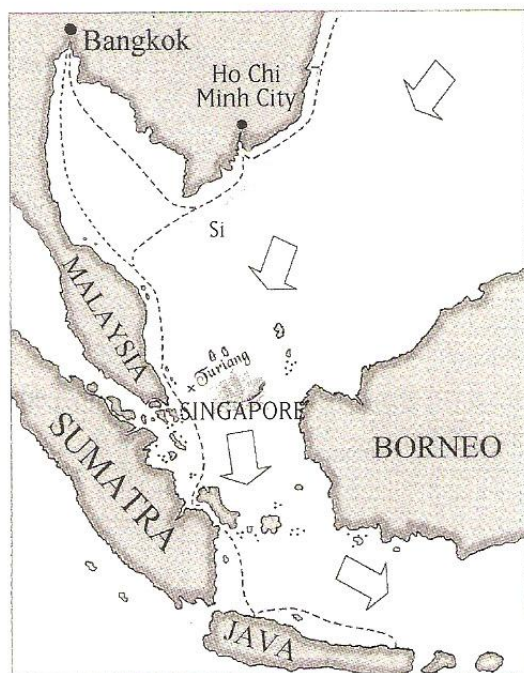
The shipwreck, which takes its name from a sign identifying the kilns at Old Sukhothai in Thailand, was discovered on May 13, 1998.⁵ Located in international waters in the southern part of the South China Sea more than 100 nautical miles from the nearest land, it lies on the seabed at a depth of 42 meters. Unfortunately this area of sea is heavily fished with deep-sea trawling nets that have disturbed the site. All the original surface material has been broken and scattered. There is no mound of ceramics, a usual feature of undisturbed sunken ships. The wrecksite is shaved almost flat, with perhaps as much as 30% of the original cargo missing. The only visible evidence for researchers in their earliest inspection was a few large storage jars with broken necks protruding from the seabed. The remaining artifacts, which were probably stowed below deck and sank into the seabed together with the ship's hull, are buried in a mixture of sand and mud.

The wrecksite was discovered during a survey using side-scan sonar, with the search area selected on the basis of fishermen's reports of ceramics caught in their nets. Three weeks were spent in the search before the sonar showed the shape of a sunken ship. Underwater researchers then confirmed the findings.

4. See Rosemary Harper, *The Bang Rachan Kilnsite*, Research Centre for Southeast Asian Ceramics Papers 3, Adelaide, 1987.

5. No one knows if old Asian ships discovered in the South China Sea originally had names. For research purposes the wrecks are given names that are usually based on their geographical location. Sten Sjostrand decided to name his sites using a reference to the type of cargo they carry. A sign at the site of the Old Sukhothai kilns calls them the 'Turiang' kilns.

MAP 2: Site of the Turiang wreck, with sailing routes. Sailing routes in the South China Sea are governed by the monsoon winds. The northeasterly winds make sailing south from China (and from Thailand) favorable from December through early March. The return trip can be made when the winds reverse their direction from July through September. The arrows on this map show how the northeasterly winds veer counterclockwise to the south as they reach the area between Sumatra and Borneo and then continue on in a southeasterly direction. The change in direction is caused by high mountains in Sumatra, and the same curve occurs in reverse when the winds change. The only favorable times for diving are April and October. Map by Sten Sjostrand.



The location of the wreck is unusual. It is outside the established 'Western Sailing Route' recommended in the Chinese Wubeizhi chart of the 1340s for trips to Malacca, Sumatra and Java.⁶ Yet its route must have been deliberate. A crippled, drifting ship, if it had been following the established route, could not have attained this location. Neither would a storm have carried it in this direction. Southwestern Borneo or South Sulawesi are the only plausible destinations. (See Maps 1 and 2.)

The ship appears to be Chinese, and this in itself suggests that it sailed in the Yuan rather than in the early Ming dynasty. Sometime in the 14th century there was a change in ship-building characteristics. Earlier ships clearly display either traditional Chinese construction or Southeast

Asian construction. Wrecks discovered in the South China Sea from the 15th and 16th centuries, however, reveal a hybrid design that incorporates special features from the two original types. Since no previous wrecks in Southeast Asia have been definitely dated to the 14th century, it is not certain exactly when this change occurred. Historically, it is likely that renegade Chinese merchants ordered vessels from Southeast Asian builders after 1369 when they began basing their businesses in Southeast Asian ports. It is also possible that some Chinese features were incorporated into Southeast Asian ships as early as the late 13th century after the Mongol fleet of Yuan-dynasty China appeared in the South China Sea.

One important feature of Chinese construction is the use of iron nails and/or iron clamps. The planks on Southeast Asian ships, instead, were either lashed or fit together with wooden dowels.⁷ The deteriorated condition of the Turiang's remains permit only limited investigation, but no evidence of dowels has been encountered so far. Instead, one section from a bulkhead reveals 14-millimeter square holes with reddish oxide stains, a confirmation that iron nails once held the timber in place. (See Figure 1.) No actual nails have survived.

Analysis of the wood also supports a Chinese origin for the vessel. A first attempt at identifying the wood failed because of the decomposed condition of the sample. A second attempt was made using another sample from the same section of bulkhead. (See Figure 2.) This confirmed that the wood belonged to one of four possible types of temperate climate softwood. Further analysis of cross and tangential sections, as well as investigation of the resin canals, showed with some certainty that the samples were *Pinus* sp., or pinewood.⁸ This type of tree

6. The Wubeizhi chart, which survives in a printed version from 1630, includes nautical data compiled during the voyages of Admiral Zhenghe to the Indian Ocean and beyond during the years 1403–33. Earlier versions were based on the Nanhai, or South China Sea, trade routes described by Ch'en Ta-chen in 1304. See Southeast Asian Ceramic Society, *A Ceramic Legacy of Asia's Maritime Trade*, Kuala Lumpur, 1985, page 58.

7. Pierre-Yves Manguin, 'Relationship and Cross-Influence Between South-East Asian and Chinese Shipbuilding Traditions,' *Final Report, SPAFA Workshop on Shipping and Trade Networks in Southeast Asia*, Bangkok, SPAFA, 1984, pages 197–212.



Figure 1. Wood fragment from a bulkhead, with strings through the empty nail holes. Turiang shipwreck. Photograph by Sten Sjostrand.

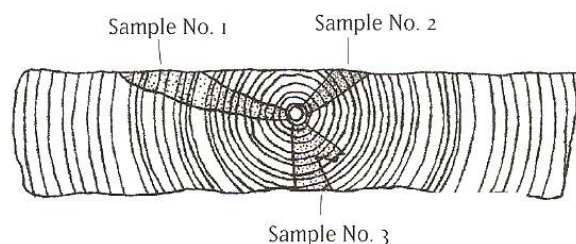


Figure 2. Turiang wood samples used for radiocarbon dating and tree identification. The three shaded sections are the remains of twigs that became incorporated into the timber as the tree grew. The radiocarbon-14 results were returned as Beta Analytic Inc. report No. 130708.

grows in China, Laos and northern Vietnam. It does not grow in Thailand or farther south. Chinese vessels were built from temperate climate trees such as this, while Southeast Asian vessels were made from tropical hardwood. Temperate climate softwood decomposes more rapidly than the traditional Southeast Asian hardwoods, and this may be a reason that very little wood, if any, remains from early Chinese shipwrecks.

ON-SITE SURVEY AND EXCAVATION

Initial observation on the site revealed the disturbance caused by fish trawling. A survey was then conducted in order to map the site as it appeared on discovery. (See Figure 3.) A numbered reference line, pegged to the seabed, was stretched longitudinally across the length of the wreck at roughly 220/040 degrees. Two visible *in situ* transverse bulkheads revealed a direction of 120 degrees, confirming that the vessel's longitudinal axis was 210/030 degrees. The bow appears to be in the 210-degree direction. Each meter along the numbered line was thoroughly surveyed, and all transversal measurements were taken with the line as reference. Following the establishment of the grid system and the mapping of visible features, representative ceramics were excavated from near surface level in each grid. These were numbered and brought to the surface for further study and photography. Each of the ceramic artifacts was engraved on the base with a serial number that corresponds to its recovery location.

One of the two transverse bulkheads observed had collapsed and so prevented accurate measurement of the compartment sizes. The distance between them, however, is between 1.10 and 1.25 meters. Each was 60 millimeters thick. Aft bottom planks examined in a shallow part of the wreck varied between 220 and 240 millimeters in width, and they were 60 millimeters thick. There was no sign of wooden dowels, the presence of which would indicate Southeast Asian construction. Sacrificial planks, which were periodically applied to the exterior of ships to compensate for attack by woodworms, were also absent. This suggests that the vessel was relatively new when it sank.

8. The report is from the Forest Research Institute Malaysia, No. 394/665/1/1Klt. (85).

Despite damage to the site, most of the vessel's starboard side revealed many longitudinal stacks of Old Sukhothai fish plates (Plates 1–7). Even though all of them had damaged mouthrims, their numbers were impressive. No organized cargo was at first noted on the port side, which was instead littered with the broken fragments of large storage jars. Later investigation of this area, however, revealed intact ceramics beginning at about 10 centimeters below the layer of sherds. At least half a dozen very large Sawankhalok storage jars were discovered. Forward of the large jars, Vietnamese bowls were encountered first, together with brown-glazed Chinese bowls. Below these were Chinese celadon dishes and plates, which were in turn above small and medium-sized brown-glazed Chinese jars (Plates 30–31). Other, larger Chinese celadon plates (Plates 36–40) were found stacked horizontally, upside down between large storage jars, resting on the shoulders of the jars.

One Chinese storage jar (Plate 33) on the port side, near the hull outline, was discovered filled with Chinese brown-glazed covered boxes. Other jars, closer to the bow but also on the port side, contained fish bones. One of the Thai jars, found in the northern area (C-01 area on Figure 3) of the site, where the cooking facilities may have been, contained broken eggshells. Amazingly, one intact eggshell was brought to the surface (Plate 47). Several other jars, outside the wreckage where they either fell or were pulled by fishing nets, contained a zinc sulfate material that was probably intended as a cosmetic powder (Plate 45).

It is notable that the Thai wares were generally loaded in compartments separate from the Chinese and Vietnamese wares, which were mixed together. The plates from Sawankhalok were all discovered in the aft section, while the smaller Sawankhalok jars and bottles were scattered throughout the wreck. This indicates that some sort of merchandise (probably including Chinese ceramics) had been off-loaded when the Thai ceramics were taken onboard. The ship could not have sailed successfully with these areas empty.

Iron was another component of the cargo. Several large iron oxide conglomerates were noted nearby the wreckage, all of them outside the original hull structure where they were probably pulled by fishing nets. The material appears to have been in a pellet or granular form when loaded and it is presently bound in conglomerates with ceramics engulfed in its matrix.⁹ Iron was a common export from China to Southeast Asia. No cannon were noted.¹⁰

Visual examination of the ship's remains, because of integration with the seabed, did not yield an estimate for the original size of the ship. Electronic mapping, which records hard reflectors on the seabed, indicates a vessel size of 5 by 18 meters. Experience with this method on submerged wrecks, however, shows that the measurements are generally less than actual size. If the remaining portion of wood, being the very bottom of the vessel, measures 5 by 18 meters, then the original size was probably closer to 7–8 meters in width and about 26 meters in length.

9. Traces of woven bamboo on similar iron lumps from the Royal Nanhai site (one of the shipwrecks discussed in the Appendix) suggest that the iron was originally stored in woven bamboo bags.

10. The subject of cannon needs more study. For the time being, the earliest shipwreck with what may be two firearms is the Pandanan wreck, which was discovered in the Philippines in 1993. This ship sank in the mid-15th century. Unfortunately, no one has been able to explain how the objects, which look like miniature cannon, were used. They are 27 and 30.5 centimeters in length, with a maximum diameter of 8 centimeters. They may have simply been signal devices. See Jesus T. Peralta, in Christophe Loviny, *The Pearl Road*, Makati City, Philippines, 1996, page 69.

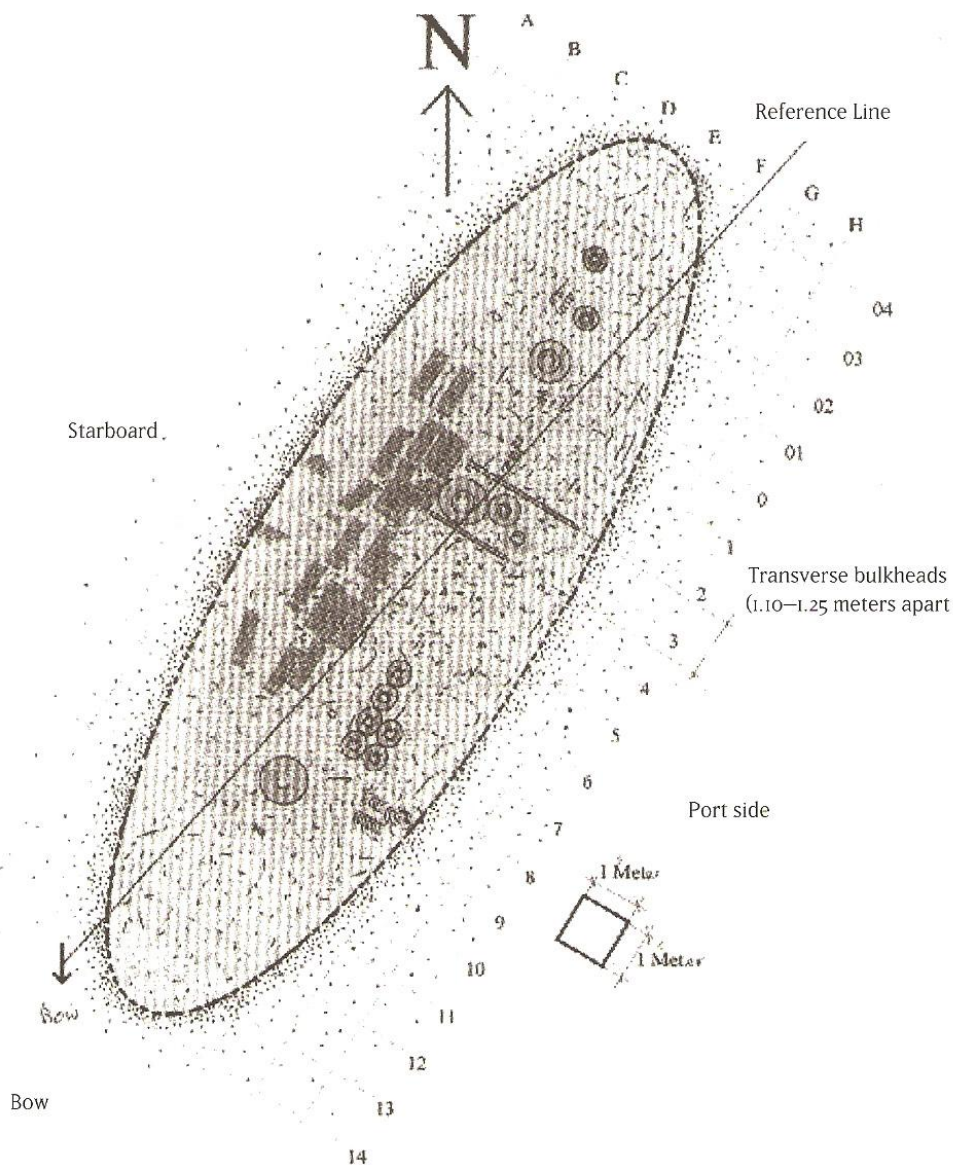


Figure 3. The Turiang wrecksite as it appeared when discovered in May 1998. Drawing by Sten Sjostrand.

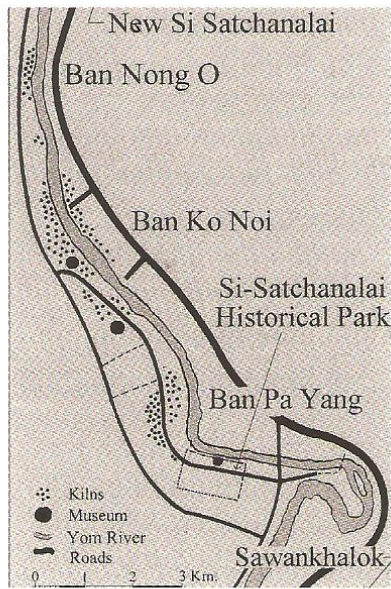
days. Before and after that time, the salt washes out at a slower rate. The most deteriorated ceramics are treated with a stabilizing agent to prevent further deterioration. They are submerged in the solution for a few minutes and then allowed to dry. (This process is reversible, and the stabilizer can be removed by submerging the objects in white spirit for four hours.) Tests made after 12 months and again after four years on objects from the Royal Nanhai shipwreck (Appendix) have shown no change in color or other negative affects from the stabilizing agent. Sometimes there is a minor gloss added to unglazed areas, but microscopic examination shows that surface particles are firmly bound. No further deterioration occurs.

SAILING ROUTES AND THE SHIP'S DEMISE

The reason for the ship's demise is open to speculation, with either accidental fire or heavy seas being the most probable cause. The ship would have sailed sometime between late December and early March when the northeast monsoon winds prevail in the area. The ocean currents at

CONSERVATION OF THE ARTIFACTS

The primary concern with artifacts from the sea is to remove absorbed salt. Because of the water pressure at great depths, most ceramics absorb some salt, and earthenware absorbs salt throughout its clay body. The ceramics are thus placed in vats of fresh water as soon as they are taken from the sea. On shore this desalination process continues by placing the ceramics in vats with running water. Salinity tests determine when the salt has been completely removed. The duration of the process varies for different types of ware but generally lasts four to six months. Unglazed wares yield their salt content more quickly than glazed ceramics. For celadon the peak time for salt leaching is about 90



Map 3: Sawankhalok kiln sites. The Sawankhalok kilns are clustered along the banks of the small Yom River. Today the ruins of the adjacent old city are called Sisatchanalai, although the Sukhothai period name may in fact have been Chaliang. Map by Sten Sjostrand.

Figure 4. Underwater photograph at the Turiang wrecksite by Ulrika Kroon.

that time follow the winds and could add 1.5–2 knots to the vessel's speed. Waves, however, can average 2–3 meters in height and reach 4–5 meters in squalls. If a rudder breaks in these conditions, the ship will turn toward the wind and remain in a heavy list parallel to the waves. If the sails are not reduced or lowered immediately, even a modern sailing craft is likely to flounder. With heavy sails and caught at 90 degrees to the wind, she will heel over at an angle. Then waves will break over the side, and the ship will capsize.

Judging from the proportion of ceramics in the cargo, the vessel set sail from Guangdong province in southern China. While only 35% of the ceramics are Chinese, 90% of that amount is from Guangdong. There is also the cargo of iron to indicate an original port of embarkation in China. (See Figure 5.)

HISTORICAL IMPLICATIONS

Since no contemporaneous records about the annual production and styles of wares produced at Thai pottery centers survive, the dates ascribed to factories and their products are decided from archaeological finds. Stylistic analysis can sometimes be employed but, in the end, theories must be confirmed by archaeology. There are some accounts of ceramics in China but few can be used to assign ages to specific examples of trade ware. Imperial Chinese wares (as opposed to trade wares), of course, have been the subject of voluminous writing and research. Happily, however, a number of Chinese archaeologists have recently begun to take an interest in the nonimperial kiln sites of their country. The Chinese ceramics known as trade wares in Southeast Asia are called *minyao*, or 'people's kilns' ceramics, in their homeland where they were available on the local market. Imperial wares are called *guanyao*.

Old mounds of ceramic debris together with actual kilns identify former potting centers. The debris, mostly misfired ceramics, is evidence for the actual types of pottery made at that location. Excavation of such sites, however, rarely provides conclusive evidence for assigning more than general dates for the lifetime of the production. Additional data often come from burial sites and, in China, from individual, dated tombs. In Southeast Asia, burial sites all over

Figure 5. Table showing the estimated numbers and percentages of ceramics present at the Turiang wrecksite when it was discovered. The numbers include 1,135 samples brought to the surface for study but not the objects that were pulled away from the site by trawl fishing nets in recent times. Probably as much as 30% of the original total cargo was missing.

Types of wares: Thai, Vietnamese and Chinese ceramics	Estimated pieces present	%
Thai (Sukhothai) Underglaze decorated plates	2,500	46 %
Thai (Sukhothai) Other underglaze decorated wares	500	
Thai (Sawankhalok) Early brown-glazed and black-glazed wares	100	11 %
Thai (Sawankhalok) Early underglaze decorated wares	100	
Thai (Sawankhalok) Early green-glazed wares	500	
Thai (Sawankhalok) Early glazed stoneware jars	30	
Thai (Suphanburi) Storage jars	5	
Vietnamese Underglaze decorated bowls	500	8 %
Chinese Monochrome bowls	500	35 %
Chinese Green-glazed saucers	700	
Chinese Celadon dishes and urns	200	
Chinese Brown-glazed storage jars and bottles	40	
Chinese Brown and black-glazed wares	800	
TOTAL ESTIMATED CERAMICS ONBOARD (1,135 pieces recovered)	6,475	100

the region contain ceramics. But since there are hardly ever any other, independent criteria for dating the burials, they rarely offer conclusive testimony about age. It has been particularly difficult to construct a definitive chronology of either Southeast Asian or Chinese trade wares for the period of the 14th–16th centuries. Since 1975, when the first report on a shipwreck in Southeast Asia appeared, ships' cargoes have become the single most important source for evidence in this task.

The two most important Thai potting centers—important because their products were traded all across the region—are Old Sukhothai and Sawankhalok, both of them located within the old Sukhothai kingdom of north-central Thailand. These two centers provided trade wares approximately in the period AD 1300–1584.¹¹ It was once thought that the Old Sukhothai site was earlier and that when better clay was discovered some 60 kilometers to the north, the potters moved and built new kilns in the Sawankhalok area. Excavation at Sawankhalok in the 1980s, however, revealed layers of debris and in-ground kilns that presently appear to predate the Old Sukhothai site.¹² No similar excavations, or even a thorough survey, have been conducted at Old Sukhothai so far, but the visible brick kilns there resemble those from the later periods at

11. There is evidence for 13th-century and perhaps earlier kilns but trade wares are probably no older than the 14th century. See Mike Barbetti and Don Hein, 'Paleomagnetism and High-Resolution Dating of Ceramic Kilns in Thailand, a progress report,' *World Archaeology*, Volume 21/1, 1989. It is in 1584 that the viceroy for the North ordered the evacuation of Sawankhalok. See Rong Syamananda, *A History of Thailand*, Bangkok, Thai Watana Panich Co., Ltd., page 57, who describes the evacuations of towns as a response to Burmese threats; and Mali Koksanthiya, *Guide to Old Sukhothai*, Bangkok: Fine Arts Department, 1972, page 28, who gives the date for the water oath that immediately preceded the evacuations as 1584.

12. See Don Hein, Peter Burns and Dick Richards, 'An Alternative View on the Origins of Ceramic Production at Sisatchanalai and Sukhothai, Thailand,' *SPAFA Digest*, Volume VIII/1, 1986.

13. Although only 51 kilns have been officially counted, Don Hein has estimated that a full survey of the Old Sukhothai site might yield as many as 100 kilns. See Hein, Burns and Richards, *ibid.*, 1986. The figure of about 1,000 kilns for Sawankhalok comes from Mike Barbetti and Don Hein, *op. cit.*, 1989, page 64. Pisit Charoenwongsa, a Thai archaeologist, has told the authors that in-ground kilns were documented at Old Sukhothai during a training survey many years ago.

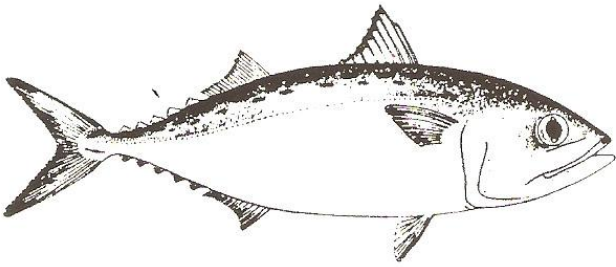


Figure 6. Fish bones that probably belong to the *Rastrelliger* genus were recovered from a Sawankhalok storage jar at the Turiang wrecksite.

Sawankhalok. There are perhaps a hundred kilns at Old Sukhothai, compared with an estimated 1,000 kilns at Sawankhalok.¹³

The nonceramic cargo is as interesting as the ceramics. Here, for instance, is evidence for a food processing industry already established in Thailand by the 14th century. A number of pottery jars contained fish bones, and these jars were originally

loaded beneath other, trade ceramics. Their position indicates they were a part of the commercial cargo. Through a microscope these bones appear identical to others collected from the Royal Nanhai shipwreck that have been identified as a mackerel belonging to the *Rastrelliger* genus (Figure 6).¹⁴ Three fish belong to this genus, all of which have been caught in the South China Sea, and the bones best fit the *Rastrelliger brachysoma* species. Their fork length is 16–18 centimeters. The fish remains do not include gills, which must have been removed in order to salt, dry or smoke the fish. This type of fish lives in schools of equal-sized individuals that feed chiefly on plankton organisms. They live in saltwater or the brackish water of river deltas rather than upstream in rivers or in lakes.

Another aspect of the historical significance of the shipwreck concerns its port of departure in Thailand. The kingdom of Ayutthaya, which controlled trade from central Thailand into the Gulf of Thailand for 400 years, was founded only in AD 1351. If the Turiang vessel sailed before that time, then there must have already been a commercial center of some sort in the vicinity of Ayutthaya. This early trade may have been an important factor in prompting the formal founding of a dynasty at Ayutthaya. In fact, there is evidence for Chinese commercial interests being an important element in early Ayutthaya.¹⁵

PREEMINENCE OF THE OLD SUKHOTHAI POTTING INDUSTRY

The Turiang wreck, which carried an overwhelming amount of Sukhothai material as compared with Sawankhalok, provides the first significant evidence for a larger production capacity, at least for a time, at the Old Sukhothai potteries. This is the first shipwreck, and the first archaeological context, in which Sukhothai wares outnumber Sawankhalok examples. The normal ratio of Sukhothai to Sawankhalok is estimated to be 1:20. Sukhothai ceramics on the whole are rare, yet in the Turiang cargo they outnumber Sawankhalok wares by 4:1.¹⁶

This recalls evidence from the Philippines that Old Sukhothai wares have been discovered in older sites than Sawankhalok.¹⁷ The types of Sawankhalok ware on this wreck are in fact extremely rare. Only isolated examples have been found in Cebu in the Philippines and in Indonesia. Others have been recovered from the Tak-Omkoi burial sites on the Thai-Burma

14. The Royal Nanhai is one of the shipwrecks discussed in the Appendix to this text. A special report on the bones was prepared by Arne Andersson, *Fish Remains from 'Royal Nanhai,'* Halmstad, Sweden, 1999.

15. See Charnvit Kasetsiri, *The Rise of Ayudhya: A History of Siam in the Fourteenth and Fifteenth Centuries*, Kuala Lumpur, Oxford University Press, 1976.

16. The Longquan, another shipwreck discussed in the Appendix, also seems to have a high percentage of Sukhothai wares. It is estimated to carry 40% Chinese ceramics, 40% Sawankhalok celadon, and 20% Sukhothai wares. This shows a Sukhothai to Sawankhalok proportion of 1:2.

17. Walter Robb, 'New Data on Chinese and Siamese Ceramic Wares of the 14th and 15th Centuries,' *Philippine Magazine*, Volume 27/3 & 4, August and September 1930.

border from graves that are generally from the period of the 14th–16th centuries. Even at these sites in Thailand, however, they comprise only a very small percentage of the total finds. The small numbers indicate a relatively short period of production.¹⁸

Incidentally, the reports about finds of Sukhothai wares in earlier sites in the Philippines caused an important misconception. It was thought that when the Sawankhalok kilns began production, those at Sukhothai closed. The technical superiority of most Sawankhalok wares also encouraged the idea that Sawankhalok followed Sukhothai.¹⁹ Eventually, however, archaeological evidence for a continued production at Sukhothai emerged from the waters of the Gulf of Thailand. In 1974–75 the Ko Khram shipwreck yielded Sukhothai underglaze black fish plates together with Sawankhalok celadon.²⁰ This shipwreck also introduced the idea that the production of underglaze black wares at Sawankhalok might have ceased for a while.

It is interesting to note, judging by their present condition, with the Old Sukhothai wares having a greater proportion of intact glaze, that at the time of sailing for the Turiang vessel, the Old Sukhothai potters were able to achieve higher firing temperatures than their counterparts at Sawankhalok. Later this was not the case.

CHRONOLOGY OF SAWANKHALOK CERAMICS

The type of Sawankhalok ware from the Turiang cargo is unique among shipwrecks thus far investigated. Informally, it is called 'Mon' ware. The only significant undisturbed deposit of sherds excavated at Sawankhalok involved Mon ware. This deposit, 'the Mon Pit,' yielded three radiocarbon dates that favor the mid-14th century: 1360+/-80, 1350+/-80 and 1340+/-80.²¹

The term *Mon* for these early glazed ceramics from Sawankhalok is borrowed from the local villagers. They recognize the differences between this type of ware, which they find at the lowest layers of their own digging, and the majority of ceramics from the site. Consequently they came to call it Mon ware, a reference to an earlier people who lived in the area before the Thai.²² Questions about the actual ethnicity of the potters, however, remain unresolved. It is believed that ethnic Thai have lived in the Sukhothai area since at least the 13th century when they gained

18. For a summary of the Tak-Omkoi sites, which were unearthed in the years 1984–86, see Roxanna M. Brown, *The Ceramics of South-East Asia, Their Dating and Identification*, Kuala Lumpur, Oxford University Press, 2nd edition, 1988, pages 2–5.

19. These ideas are expressed in William Willetts, *The Ceramic Art of Southeast Asia*, Southeast Asian Ceramic Society, Singapore, 1971.

20. Roxanna M. Brown, 'Preliminary Report on the Koh Khram Sunken Ship,' *Oriental Art*, Volume 21/4, Winter 1975, pages 356–370. This wreck probably belongs to the early 15th century. It has yielded a radiocarbon date of 1380+/-50, see Atkinson, Green, Harper and Intakosi, 'Joint Thai-Australian Underwater Archaeological Project 1987–88. Part I: Archaeological Survey of Wreck Sites in the Gulf of Thailand, 1987–88,' *International Journal of Nautical Archaeology and Underwater Exploration*, Volume 18/4, 1989, pages 299–315.

21. No excavation report has been published, but the types of ware involved are illustrated in Don Hein and Mike Barbetti, 'Sisatchanalai and the Development of Glazed Stoneware in Southeast Asia,' *Siam Society Newsletter*, Vol. 4/3 (September 1988), pages 8–18. The results of the radiocarbon tests are published in Mike Barbetti and Don Hein, *op. cit.*, 1989, page 64. One of the present authors, Roxanna Brown, during a short examination of the material from this excavation, noted that it also contained fragments from a Vietnamese underglaze black decorated bowl of the same type as included in the Turiang cargo.

22. The presence of ethnic Mon has been considered by Michael Vickery in 'Some New Evidence for the Cultural History of Central Thailand,' *Siam Society Newsletter*, Volume 2/3 (September 1986), pages 4–6. He notes that the local words for the kiln sites, *tau thuriang*, in fact mean 'saucer, dish' in the Old Mon language.

independence from Khmer rule. One legend that was recorded in later times credits the old potting industry to 500 Chinese brought into the area by an unspecified king of Sukhothai, Phra Ruang.²³

The absence of Sawankhalok celadon plates from the Turiang cargo is notable. Such plates are a primary component of cargoes from later shipwrecks (e.g., Plates 48, 62 and 81–84), and their glaze is thicker and more lustrous than the green glaze seen on upright vessels from the Turiang.²⁴

There seem to have been two different periods for the production of underglaze black decorated wares at Sawankhalok. In between these two periods, according to shipwreck evidence thus far, only celadon and other monochrome wares were produced. Plates decorated with fish and floral motifs belong to the earlier period. They were made in the 14th century, perhaps until the beginning of the Ming dynasty. This basic plate is the only Sawankhalok shape with underglaze black decoration from the Turiang (Plates 14–16). The various jars and other upright shapes display either green or blackish brown glaze. When the underglaze technique is re-introduced, the style of decoration is completely different, as are the shapes.²⁵ The designs are more abstract, with a predominance of geometric patterns. New forms include covered boxes, bottle-vases with a cuplike mouth, kendi and various figurines. In this later period dish shapes in underglaze black are relatively rare, and they are usually small. Larger plates and bowls of all sizes were made, instead, with celadon glaze. When exactly the later style was introduced requires further research. Present evidence suggests a date no earlier than sometime after AD 1450. Covered boxes and jars decorated in underglaze black are present in the Xuande cargo but the date of that shipwreck is uncertain. It could be any time between about the mid-15th and mid-16th centuries.²⁶

Meanwhile, it seems, no dramatic changes apparently occurred at the Old Sukhothai site where the potters happily went on producing fish plates for at least another 200 years. The Turiang cargo nonetheless presents solid evidence that the earliest of the Sukhothai plates predates the mature celadon phase at Sawankhalok. It also suggests that the Sukhothai center was the first to export ceramics in volume.

ABSENCE OF BLUE AND WHITE CERAMICS

One of the key aspects of the Turiang cargo is that it does not appear to include blue and white ceramics, from either China or northern Vietnam. (In Southeast Asia, northern Vietnam was the only source for blue and white wares until modern times.) Although the wrecksite is not completely excavated, the researchers feel certain that they retrieved samples of each type of ware represented. There is, of course, the possibility that any blue and white carried on deck

23. Phra Ruang is a title for all the Sukhothai kings rather than a name. For general background on Thai ceramics, see Roxanna M. Brown, *The Ceramics of South-East Asia*, *op. cit.*, 1988.

24. There has been heated academic debate about the use of the word *celadon*, with some scholars preferring to discard it altogether in favor of *green-glazed wares*. Within the scope of Sawankhalok pottery, however, the terms *green-glazed* for the earlier wares and *celadon* for the later ones are too useful to be ignored.

25. In books, catalogues and private collections, Sawankhalok underglaze black wares from this later phase are just as numerous as celadon ceramics. Shipwrecks, however, seem to show that many more celadon wares were exported.

26. The uncertainty in the age of the Xuande wrecksite, which included a large proportion of Chinese blue and white *minyao* ('people's kiln') ceramics, starkly illustrates the amount of archaeology still needed before nonimperial Chinese wares of the 15th and 16th centuries will be accurately dated. See Roxanna M. Brown, 'The Xuande Cargo and the Ming Gap,' and Sten Sjostrand, 'The Xuande Wreck Ceramics', both articles included in *Oriental Art*, Volume XLIII/2, Summer 1997, pages 2–14.

was swept away from the site by fishing nets. Further excavation might also reveal an unsuspected deposit. During the excavation of the Royal Nanhai shipwreck, Chinese and Vietnamese blue and white ceramics, which were not part of the main cargo, were discovered in a hidden compartment beneath a cargo deck (Plates 94–95).

The most recent estimate for the earliest trade in blue and white ceramics, from Liu Xinyuan of the Ceramics Archaeological Research Institute at Jingdezhen in China, is AD 1328.²⁷ Troubles at the end of Yuan dynasty, he believes, then disrupted this production in 1352. Presumably no blue and white was produced (or at least not traded overseas) from then until the imperial kilns were established in 1371 by the first Ming emperor, Hongwu (1368–98). Many questions about the early trade of blue and white ceramics from China remain unresolved at present.

The absence of blue and white ware in the Turiang cargo, which does contain other Yuan dynasty ceramics, immediately raises the possibility that it sailed prior to AD 1328. If so, then the beginnings of Thai and Vietnamese underglaze black decorated wares would predate Chinese blue and white trade ceramics.

If the vessel sailed later in the 14th century, during the Hongwu reign in China, one would expect to find Vietnamese blue and white wares. Instead, the Vietnamese bowls aboard the Turiang display underglaze decoration in black only. Although conclusive archaeological evidence is still missing, there is a general feeling among archaeologists in Vietnam that decoration in cobalt blue was introduced about the middle of the 14th century.²⁸ It is notable that, within China, except for a single short-lived 14th century site in Yunnan,²⁹ there is no evidence for any production of blue and white wares outside the Jingdezhen area until the late 16th century.

In all of Southeast Asia, until modern times, blue and white ceramics were made only in northern Vietnam. Why cobalt was never used in Thailand, which practiced the same technique in painting except to use iron black, is a mystery. The early introduction of underglaze blue ceramics in Vietnam, on the other hand, should have given those wares a market advantage. Yet an analysis of archaeological sites shows that the Thai supplied as much as 40% of the ceramics on the regional market in the late 14th to 16th centuries, as compared with 2–5% for Vietnam.

VIETNAMESE CERAMICS

All the Vietnamese ceramics included in the Turiang cargo are bowls. A small number are monochrome wares, with green glaze. The remainder are decorated in underglaze black. Both types are traditionally dated to the 14th century. Archaeological data in Japan indicate that the type with an underglaze black floral design had appeared there already by AD 1331.³⁰

27. Liu Xinyuan, *op. cit.*, 1999, pages 98–100. Liu implies that some blue and white was produced earlier than 1328 by saying "...excavations have shown that the patterns painted on this porcelain [trade ware] are not found before this period."

28. Trinh Cao Tuong, 'Vietnam and Vietnamese Ceramics in the 15th Century,' Asian Ceramics Conference, Field Museum of Natural History, October 23–25, 1998, page 10.

29. This mysterious site, at Yuxi in Yunnan, receives a brief mention in Penelope Hughes-Stanton and Rose Kerr, *Kiln Sites of Ancient China*, London, Oriental Ceramic Society, 1980, page 68.

30. Etsuko Miyata, '14th–16th Century Southeast Asian Ceramics,' a paper presented to the Asian Ceramics Conference, Chicago, Field Museum of Natural History, October 23–25, 1998, page 3. Ms. Miyata warns, in giving this particular date from excavations at Dazaifu, that it has not been unanimously accepted by Japanese archaeologists. There is no doubt, however, that this type was made sometime in the 14th century.

While it is believed that Vietnam began producing blue and white wares in the second half of the 14th century, there is still no solid archaeological evidence for a more specific date. Potters with sufficient technical knowledge could have migrated from China to Vietnam either at the time of the dynastic troubles beginning in the Jingdezhen area about AD 1352 mentioned by Liu Xinyuan (see Footnote 27), or soon after 1369 when the first Ming emperor outlawed private overseas trade. At any rate, if the Turiang wrecksite belonged to the period after 1369, then Vietnamese blue and white wares would be expected.

The Vietnamese wares in the cargo renew speculation about influences from Vietnam. It is possible that the technique of underglaze painted decoration was introduced to Thailand from Vietnam. The specific designs of a stylized chrysanthemum blossom and bands of calligraphic scroll seen on both the Vietnamese and Sukhothai pottery from the Turiang certainly suggest a connection. Either one ware was copying the other, or both borrowed the designs from a third source. Another characteristic shared between the Thai and Vietnamese wares is the use of disc-shaped firing supports that left spur marks, usually five in number, on the face of dish shapes. It should be noted that each of the scars left by the short feet of the Thai supports is circular in shape, while those from Vietnamese supports have a distinctive triangular shape.

AGE OF THE TURIANG WRECKSITE

In summary, a combination of factors has been considered in giving the Turiang wreck the provisional age of circa AD 1305–1370, with a chance that it belongs to the early part of that period, to 1305–1328. These factors include the structure and method of construction of the vessel and the ceramics themselves. A radiocarbon date of 620+/-50 BP (calibrated and adjusted to 1305–1440) from wood at the wrecksite unfortunately does not help in deciding if the vessel sank before or after 1328 when the first export of blue and white ware from China is believed to have begun. Nor does the radiocarbon result determine whether the ship sank before or after the beginning of the Ming dynasty in 1369. Another radiocarbon date of 1290+/-50 from the Ko Si Chang II shipwreck, which carried similar Thai fish and flower plates, does, however, support an early 14th-century date for the Turiang.³¹

The Ko Si Chang II wreck is also the only vessel from the Gulf of Thailand with iron nails. Later wrecks in this area display edge-joined planking with wooden dowels. Along with the lack of iron nails and/or iron clamps, the later wrecks are constructed from tropical hardwood. The fact that the Turiang vessel was constructed from a temperate climate wood, most probably pinewood, means that in all likelihood the vessel was constructed in China. Within the context of the South China Sea this type of construction disappears sometime in the 14th century.

31. See Atkinson, Green, Harper and Intakosi, *op. cit.*, pages 299–315. Only a small sampling of artifacts was collected, including early Thai plates with fish and floral designs, Chinese celadon bowls, earthenware jar covers and very large storage jars from Suphanburi. The article, which identifies the wares only as 'Thai,' includes a photograph of one plate center with the decoration of two fish, belly to belly, facing the same direction. In the present authors' opinion this is a Sawankhalok product. Another short summary of the Ko Si Chang II wreck survey is included in Jeremy Green and Rosemary Harper, *The Maritime Archaeology of Shipwrecks and Ceramics in Southeast Asia*, Australian Institute for Maritime Archaeology Special Publication No. 4, Perth, 1987, pages 7–8 and Figure 15. Figure 15 is a drawing of a plate with a floral decoration, with the clay body described as gray. This plate is probably also from Sawankhalok. The white specks in Sukhothai clay are so prominent that the researchers would surely have noted them. Otherwise this design did appear at both kiln centers.

As regards its ceramic cargo, the most important evidence for age comes from an excavation at the Sawankhalok kiln site, the Mon Pit, which has already been mentioned. Radiocarbon results from the deposit indicate a date of about the mid-14th century. As regards Sukhothai ceramics, the Turiang wreck itself is now one of the earliest verifiable archaeological contexts known.³²

For the Chinese wares, a 14th-century date is also certain. The large covered jar (Plate 35) would commonly be given a Yuan-dynasty date, or AD 1279–1368.³³ The remainder of the celadon pieces would generally be described as 14th-century without further qualification. None of the Guangdong wares can be dated any more precisely. In regard to the Vietnamese bowls, as already mentioned, these are found at Japanese sites as early as 1331. The same bowls, however, were probably produced at least to the end of the 14th century.

The fact that the Turiang cargo includes a good proportion of Chinese ceramics, other than blue and white ware, could argue for almost any date in the 14th century. With only three kilns known to have produced blue and white wares during the Yuan dynasty,³⁴ and hundreds of kilns elsewhere producing traditional monochrome wares, it is possible that many shipments of ceramics to Southeast Asia did not include blue and white ceramics.

Future research at other sites may one day provide a more specific age for the Turiang shipwreck than the date of AD 1305–1370 proposed in this report. Until then, the idea that Thai and Vietnamese underglaze decorated ceramics may have been traded earlier than 1328 when Chinese blue and white entered the overseas market remains an intriguing possibility.

32. This statement may seem to ignore the work of H. Otley Beyer in the Philippines (as summarized by Robb, *op. cit.*, 1930), but it should be noted that he never documented an actual excavation. His information came from the mass unearthing of burial sites. For the flavor of his times, see Wilhelm Solheim II, 'H. Otley Beyer,' *Asian Perspectives*, Volume XII, 1971, pages 1–18. Also, further investigation of the Koh Si Chang II shipwreck, which might be earlier than the Turiang, may reveal Sukhothai wares.

33. The jars from the Turiang cargo also have the same peculiar structure as do examples cited by Margaret Medley in *Yuan Porcelain and Stoneware*, Great Britain, Pitman Publishing, 1974, page 66. The base is formed by a saucer-shaped disc of clay laid over the opening from inside the vessel.

34. All three sites (Hutian, Luomaqiao and Zhushan) are located at Jingdezhen, Jiangxi, China. See Larry Gotuaco, Rita C. Tan and Allison I. Diem, *op. cit.*, 1997, page xiii.

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The estimated total of all ceramics remaining at the site when it was discovered is included in Figure 5. Only a small proportion was brought to the surface for study, and those numbers are included in the following inventory of the cargo. A number of pieces were donated to the Muzium Negara, Kuala Lumpur, and others are at Pacific Asia Museum, Pasadena.

GROUP I. OLD SUKHOTHAI KILN CERAMIC WARES

All of these display gritty gray clay with notable specks of whitish quartz impurities. The footring is cut sharply flat at the rim. Often the base inside the ring is carved very shallowly, which makes the clay of the base unusually thick. (See Figures 7 & 8.) The base and footring are unglazed and here the surface of the clay has sometimes fired to a dark reddish brown color. A cream whitish slip was applied to the pottery as a foundation for designs painted in underglaze black. This slip is often smeared onto the foot and base. The glaze is clear and often slightly greenish, with many small pinholes. Both the plates and deep bowls have five spur marks at the interior bottom. Only two examples show signs of firing supports on the base. Many of the pieces are slightly warped, a result of having slumped during the firing. Slight variations in the drawing style from one vessel to another reveal that a number of craftsmen must have been involved in decorating the ware.

A. Plates decorated with a fish motif. These, which range from 21–24 cms in diameter and 6.5–8 cms in height, are generally smaller and deeper than examples from later shipwrecks. The decoration consists of a single fish at the interior bottom, sometimes facing

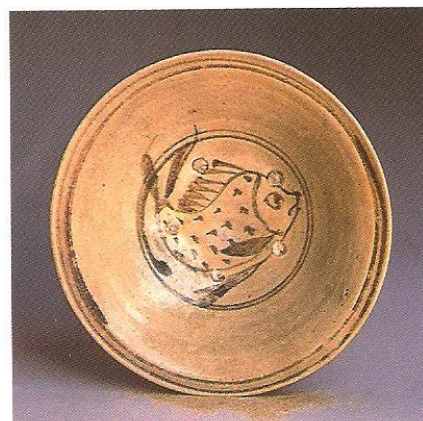


Plate 1. ARTIFACT T-093. Collection of the Muzium Negara, Kuala Lumpur.

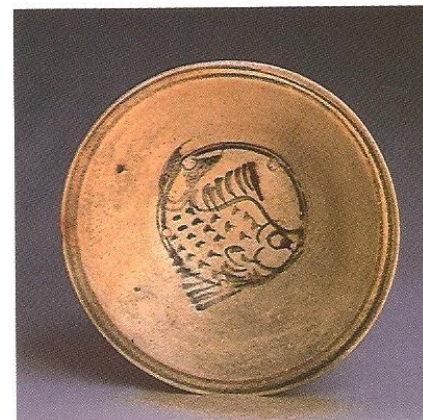


Plate 2



Plate 3

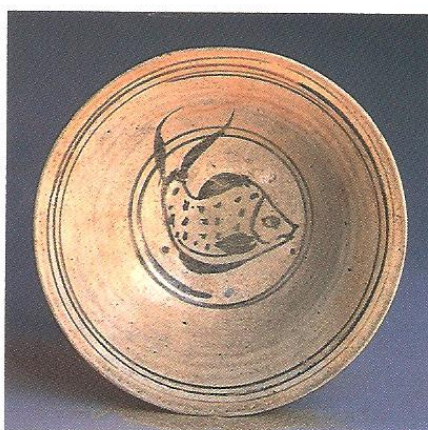


Plate 4

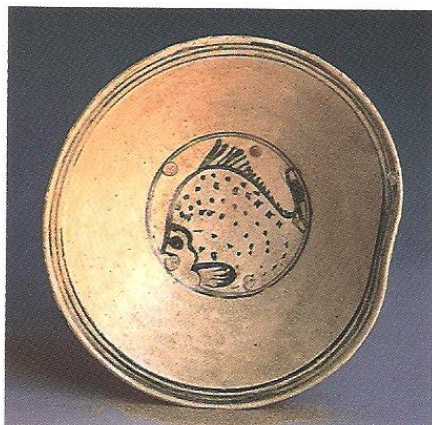


Plate 5

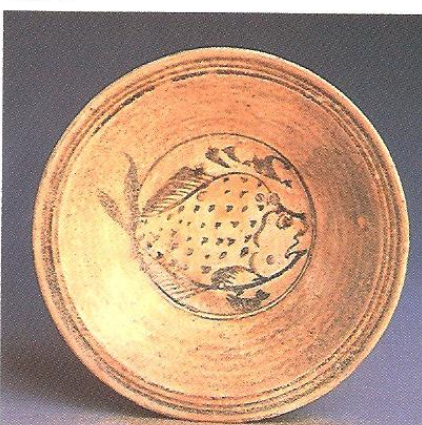
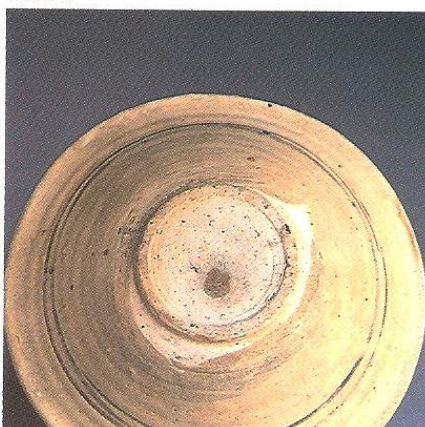


Plate 6



Plates 7A & B. Collection of Datuk Lim Chong Keat.



to the left and sometimes to the right. (In contrast, fish seen on similar plates from the Longquan wrecksite always face left.) It is usually depicted as leaping. This fish is encircled with two rings, with the tail of the fish often extending across this border. Other rings decorate the mouthrim and the upper exterior walls. When they encircle the fish motif, the ends of these rings almost never meet perfectly. Variations of design include an encircled band of chevrons as a mouthrim border, and occasionally the fish is accompanied by bits of vegetation coming from its mouth. The mouthrim is usually slightly flattened but it can also be simply everted and curved. The outer edge of the mouth is very slightly raised. 92 examples were recovered. See **Plates 1-7a & b**.

B. Plates decorated with a floral motif. These are essentially the same as the fish plates except a flower motif replaces the fish. The floral design consists of a single blossom with three or four stems and bits of foliage. The stylized blossom is probably a chrysanthemum. The design is practically identical to the floral design seen on the Vietnamese bowls recovered. Only two examples were recovered. See **Plate 8**.

C. Bowls with a fish or floral motif. These are large, deep bowls, 23–24.5 cms in diameter and 8.5–9.5 cms in height. Eight examples feature a fish in the central medallion, with a chevron scroll at the mouthrim, and a band of three rings round the exterior walls. One example features a stylized chrysanthemum in place of a fish design. Nine examples were recovered. See **Plates 9-10**.

D. Bottles with and without two ring handles. These show a band of painted

decoration above the mid-section of a globular body. When it can be discerned the design consists of a stylized calligraphic scroll within line borders. The largest bottle, with ring handles, is unusual for its very thin potting (Figure 7). Eighteen examples were recovered, 7–13 cms in height. See **Plates 11–12**.

E. Bottle vases. These are decorated with stylized floral designs in vertical panels within upper and lower ring borders. One of them is blackened on one side. One of the research divers reports that this came from some substance originally stored beneath the pottery, which he suspects was decomposed elephant tusks. Such ivory was noted but could not be brought to the surface. Three bottle-vases were recovered, 24–26 cms in height. (One example of this type has been donated to the Muzium Negara, Kuala Lumpur.) See **Plate 13**.

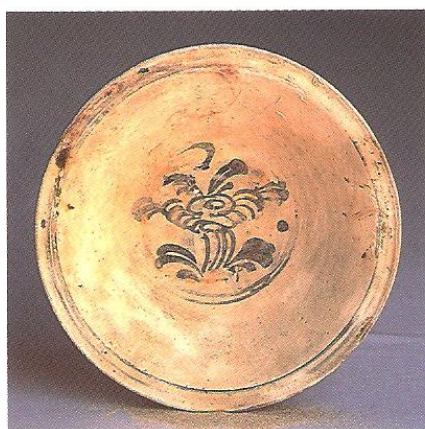


Plate 8

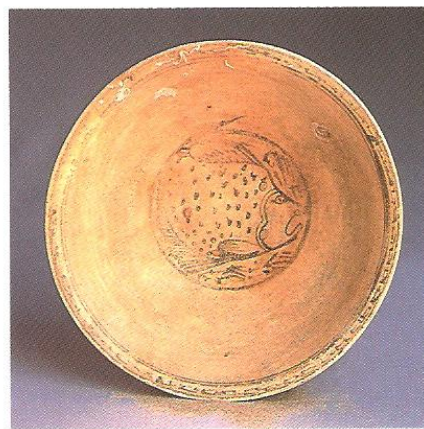


Plate 9

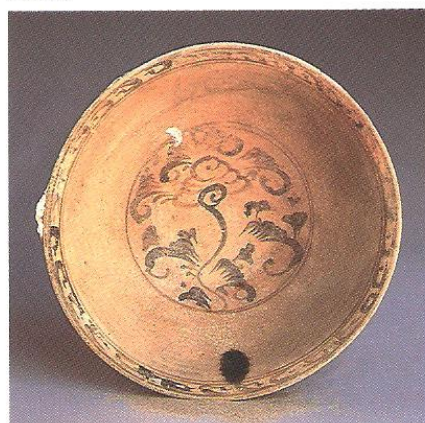


Plate 10

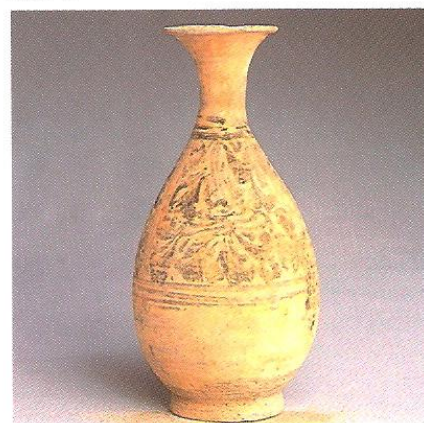


Plate 13



Plate 11. Two squat spherical bottles. The one at right with one of its two ring handles broken away and runny dark green glaze. Hts 7 & 8 cms.

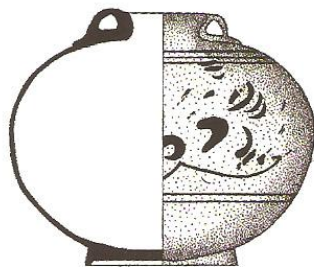


Figure 7. Structure of a Sukhothai ring-handled bottle. Note the thick base that results from carving a shallow footring. Artifact No. T-589. Drawing by Sten Sjostrand.



Plate 12. Two bottles with ring handles. The one at left has a spherical body and the other has a flattened shoulder. Hts 12 & 13 cms.

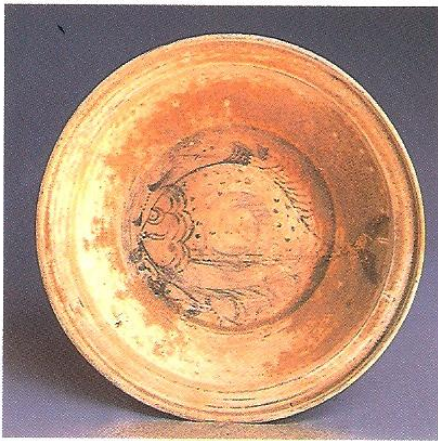


Plate 14



Plate 15a

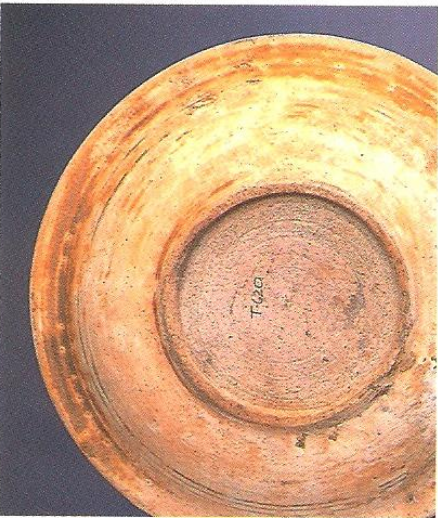


Plate 15b

GROUP II. SAWANKHALOK/ SISATCHANALAI CERAMICS

Two basic grades of clay are apparent among the Sawankhalok wares, one much darker than the other. The lighter-colored clay, which often has a yellowish cast, was used for the green-glazed and underglaze decorated wares, while the darker clay makes up the body of the monochrome brown- and black-glazed vessels. Both types, however, display prominent, tiny black speckling, as opposed to the larger white specks seen in Sukhothai clay. The clay of later Sawankhalok ceramics (except for storage jars), such as seen in the Longquan, Nanyang and Royal Nanhai cargoes (see Appendix), is more uniform in being pale to medium gray.

A. Underglaze black decorated

wares. This category contains only plates, and the decoration is painted over a thin yellowish white slip. The slip and glaze are generally carefully applied over the entire shape, including the exterior of the footring. The footrim and base are bare. The mouthrim is more prominently flattened than on the Sukhothai examples and the raised outer edge is more noticeable. The footring is carved with the outer side slanted inward toward the footrim. (See Figure 8.) The base tends to be shallow. The plates range in size from 25.5 to 27 cms in diameter and 4.5 to 6.5 cms in height. Most of them reveal the circular impression of a tubular firing support on the base and five spur marks on the interior bottom. Where it is intact, the glaze is clear and greenish. (The tubular support mark on the base of these wares is not as pronounced as on later Sawankhalok wares when the support appears to have been attached with some sort of glue. See for instance the celadon plates from the Royal Nanhai shipwreck, Plates 81b and 84b.)

1. Plates with a fish motif. A relatively large fish is drawn onto the flattened interior bottom of the plate within a border of two or three rings, with the tail of the fish extending beyond the rings. The exterior walls are decorated with a band of three rings around their circumference. Compared to the fish designs on Sukhothai wares, the basic Sawankhalok version is sober and more carefully drawn. Bits of foliage trail from the fish's mouth. The glaze, where it remains, is generally clear but with a definite green tinge. It is sometimes relatively thick and crackled and rather dark green. Two examples were recovered each with three spur marks on the interior bottom and with the circular impression from a tubular stacking support scar on the base. See **Plates 14–15a & b.**

2. Plates with a floral motif. These are simply a variation of the fish plates, with a flower design instead of a fish. The flower is also enclosed in ring borders, with further rings at the mouthrim and round the upper exterior walls. The blossom is extremely stylized and this particular depiction is unique to Sawankhalok. No other origin can be traced. Like other floral motifs on the Sukhothai and Vietnamese wares, the blossom does, however, display more than one stem. The usual number is three stems. Fourteen examples were recovered. See **Plate 16.**

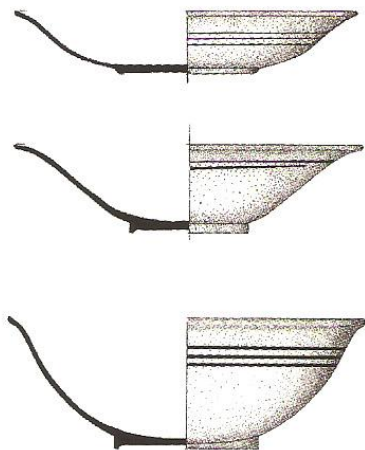


Figure 8. Comparison of footring carving styles. The upper example is a Sawankhalok flower plate, and the lower two are from Sukhothai dish shapes. Artifacts Nos. T-410, T-053 and T-380. Drawing by Sten Sjostrand.

B. Sawankhalok/Sisatchanalai

blackish brown-glazed wares. This category includes bottles and jars made with a gritty dark-colored clay that varies from dark gray to brick red. The majority of storage jars at the wrecksite are from the Sawankhalok kilns.

1. Bottles with two ring handles.

These are 12–14.5 cms in height. They have a flat foot that often displays curved concentric lines that are the result of being cut from a turning wheel with a fine cord. The mouth is flared. Sometimes one end of the ring handle trails down the shoulder of the vessel. The exact shape of these bottles varies considerably and some are decorated with wide vertical striations. Twenty-one examples were recovered. (One example is in the collection of the Muzium Negara, Kuala Lumpur.) See **Plate 17**.

2. Storage jars with four lug handles, bulbous body and flared mouth. One has a series of rings carved round the shoulder at the level of the handles, and another one is marred with a number of blisters from trapped air bubbles on its upper portion. The potting structure of the jars is interesting. The flat base is made from a distinct disc of clay with the walls, which were made from clay coils, begun around its perimeter. Many examples of this type of storage jar, most of them broken at the neck, remain buried in the seabed. They would hold about 12 liters of liquid. Three jars were recovered, 33 and 33.5 cms in height. See **Plate 18**.

3. Storage jars in a very large size.

These were too large to be retrieved. Similar jars from the Royal Nanhai shipwreck (which is discussed in the Appendix) have a liquid volume of 75 liters and contained fish bones.

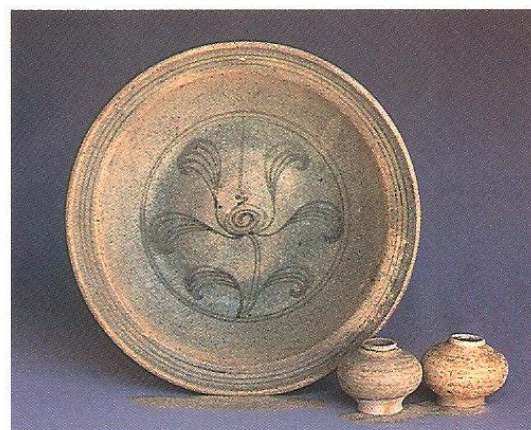


Plate 16

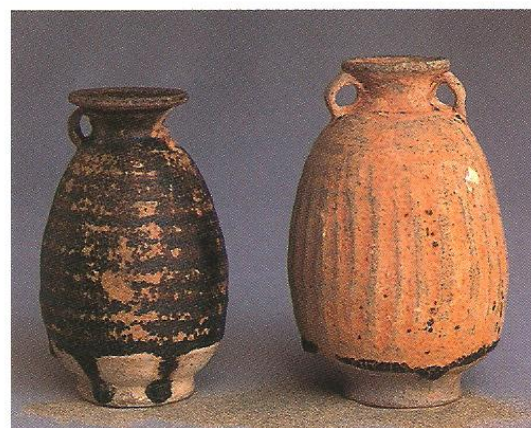


Plate 17

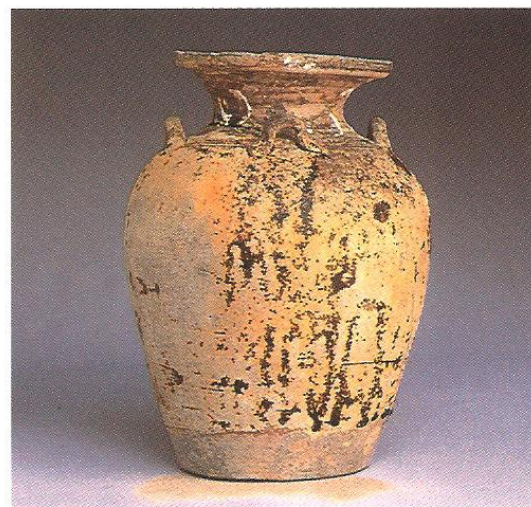


Plate 18



Plate 19. Jars without decoration.

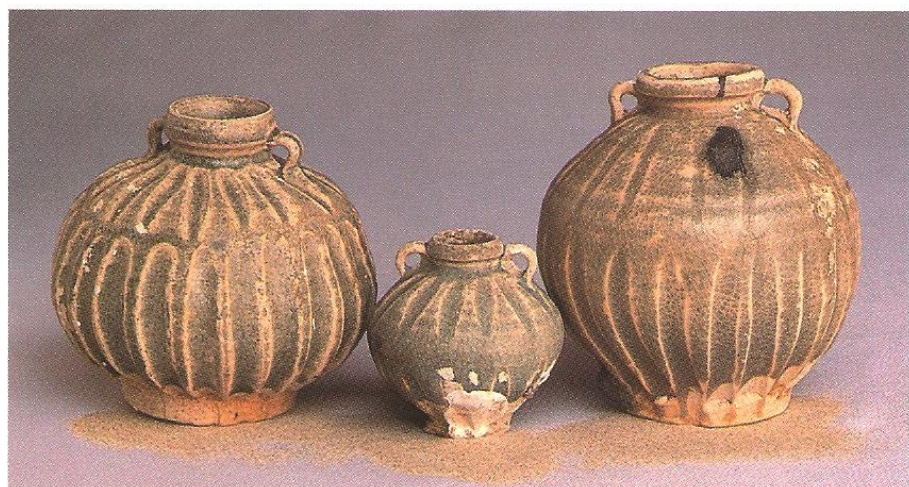


Plate 20. The jar at the left (artifact T-202) is in the collection of the Muzium Negara, Kuala Lumpur.

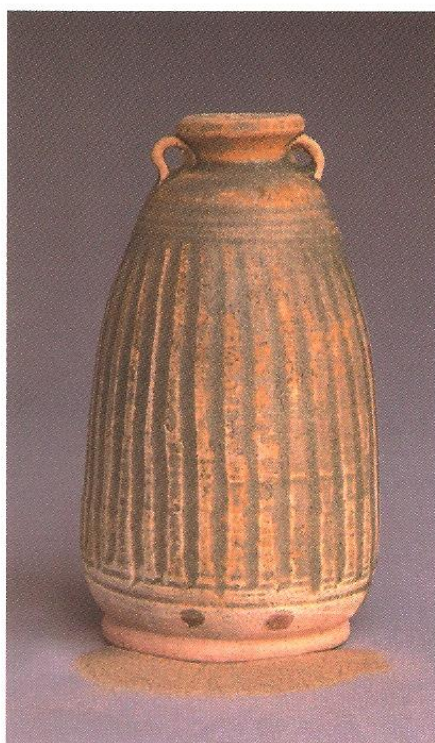


Plate 21

C. Sawankhalok/Sisatchanalai green-glazed wares. In contrast to later celadon wares, these early vessels have a rather thin glaze of which only traces generally remain. No slip was applied, and no dish shapes are included among the recovered examples.

1. Bottles in a globular shape with two ring handles. These come in a variety of sizes, some of them plain and others decorated with carved rings and/or wide striations. The smallest of these, which could be called jarlets, are 7–8.5 cms in height. The largest, which in this shape and size is often called a 'coconut' jar, is 15.5 cms tall. The smaller examples are decorated with upper and lower sets of wide carved striations and the largest ones are plain. The jars in medium size, about 10–12 cms tall, also have two rows of wide vertical striations. They are unglazed on the interior. Altogether, 33 examples were recovered. See **Plates 19–20**.

2. Bottles, tall, with vertical striations and two ring handles. They have either a flat foot or one that is carved with a very shallow base. The decoration consists of long, wide, carved striations within ring borders above and below. Three examples were recovered, 18.5–20 cms in height. **Plate 21**.

3. Bottle vases. This shape also appears among later Sawankhalok/Sisatchanalai underglaze decorated wares. There are two basic styles here. One group is decorated with vertical striations and/or carved rings. Another group, with noticeably lighter-colored clay, has incised decoration. One of these, with a flat base and 27 cms high, features a stylized peacock at one side between elaborate cloud collar motifs. Most of these vases have a flat foot while others, including the tallest example, have a shallow carved footring. Seven vessels were recovered, 23.5–28 cms in height. See **Plates 22 & 23**.

4. Covered jars. Four examples were recovered, in three sizes, 12–13.5, 15 and 18 cms (measured without the covers). The two smallest jars both have covers that are presently sealed, and they are both decorated with wide carved striations. The others feature carved rings at the shoulder. The covers each have a lotus bud-shaped handle. See **Plate 24**.

5. Jarlets, plain, without handles, each with a flat foot. Six examples were recovered, ranging 4.5–7 cms in height. See **Plate 16**.

GROUP III. VIETNAMESE CERAMICS

The only shape among the Vietnamese wares is a standard-sized bowl, 14.5–17 cms in diameter and 5–7.5 cms in height. With rare exceptions the bowls display five spur marks on their interior, with the individual marks generally showing a triangular outline. The clay is cream white in color and smooth enough that no slip was required. All of these have a carved footring with its inner side very slightly beveled. Seven of the 24 bowls recovered have a 'chocolate' brown slip applied to the base.

A. Underglaze black decorated bowls.

The decoration is all essentially the same. There is a stylized chrysanthemum within a ring at the interior bottom, a stylized calligraphic scroll within line borders around the everted mouthrim and a band of stylized scroll in line borders around the exterior walls. See **Plate 25**.

B. Monochrome glazed bowls. These have only traces of an original pale green glaze remaining. Four are plain, while another example has a foliate mouthrim and impressed decoration on the interior. The impressed decoration is faint but includes a rosette floral motif at the center with Buddhist symbols around the lower interior walls. Five examples were recovered. See **Plate 26**.

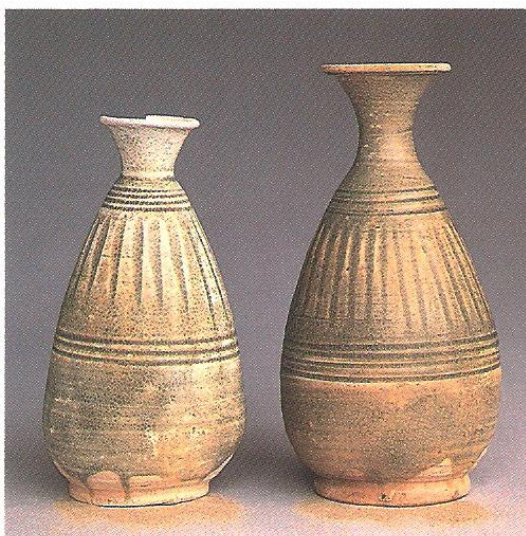


Plate 22

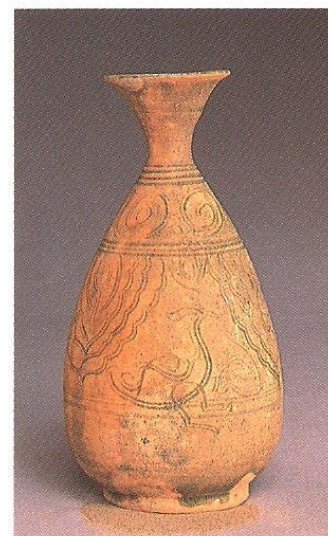


Plate 23

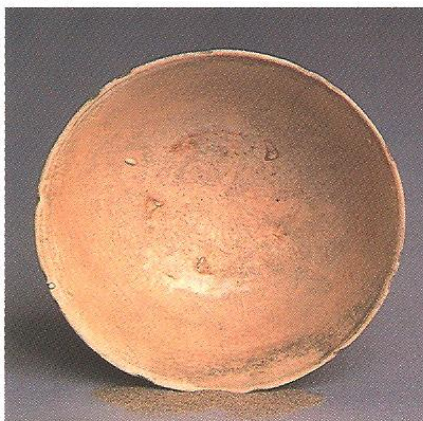


Plate 26

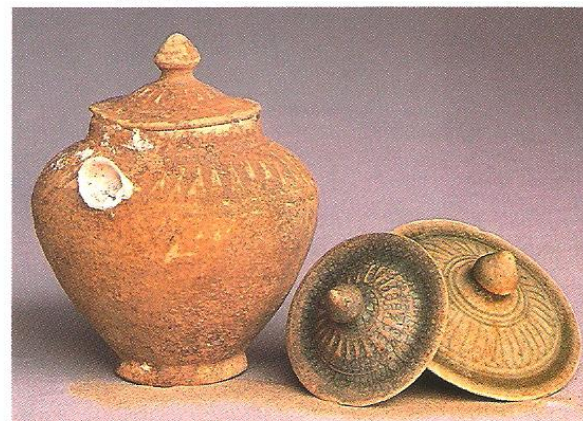


Plate 24. Covered jar, 18 cms high with its cover.



Plate 25. The Vietnamese bowl at the left (Artifact T-124) is in the collection of the Muzium Negara, Kuala Lumpur.



Plate 27



Plate 28



Plate 29

GROUP IV. CHINESE CERAMICS

The Chinese wares come from two sources. All except the celadon wares were made in Guangdong province. The celadon is from the Longquan kilns of Zhejiang province.

A. Brown-glazed wares. The clay is relatively lightweight and varies between pale gray to yellowish or brownish gray in color.

1. Covered boxes in three sizes, 5.5, 7.5 and 8 cms in diameter. These are circular, with an oval profile and flat foot. On some the brown glaze is also applied over the foot. Two of the covers are marked with an 'X' sign in a black glaze, over the dark brown glaze. Several are sealed as a result of glaze flowing from the cover onto the body. Fifty-two of the 58 examples were discovered inside a Chinese storage jar. (One of the illustrated boxes is in the collection of the Muzium Negara, Kuala Lumpur.) See **Plate 27**.

2. Jarlets with two ring handles. The glaze varies in quality and in color from dark brown to blackish brown. The height ranges from 5 to 6.5 cms. Four examples were recovered. See **Plate 28**.

3. Bowls, cup-shaped, with a flat foot that is often slightly concave, 8.5–10.5 cms in diameter. These bowls may have a slightly everted mouthrim or one that is pinched inward to make an S-profile at the mouth. Twenty-two examples were recovered. (Two of the illustrated examples, one of each type, are in the collection of the Muzium Negara, Kuala Lumpur.) See **Plate 29**.

4. Bowls, with everted or straight mouthrims, 14.5–16.5 cms in diameter and 6–7 cms in height. This group is notable for the distinctive way the foot is carved with a long straight bevel on the inner side of the footring. So few traces of glaze remain that it is possible that some of these bowls were originally unglazed. Sometimes there are rather large spur marks on the interior of the bowl. Twenty examples were recovered.

5. Jars with four lug handles, a wide rounded shoulder and narrow short neck, 15–20 cms in height. The shape of the mouthrim is varied in sometimes being rounded and sometimes flat. Thirty-four examples were recovered. See **Plates 30 & 31.**

6. Basins, thickly potted, with a straight flat mouthrim and concave base, glazed only on the interior. The mouth is unusual for being carved with an extra thickness on the exterior side. Two examples were recovered, 20 and 22 cms in diameter and 8.5 and 10.5 cms tall. See **Plate 32.**

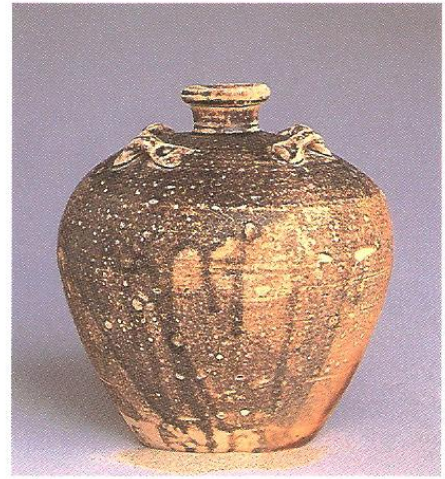


Plate 30

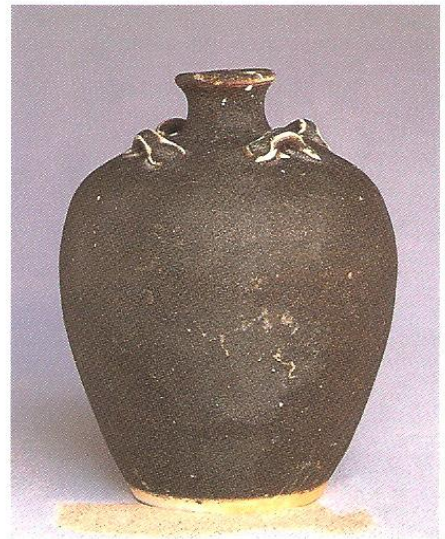


Plate 31. Chinese brown-glazed jar (Artifact T-315) in the collection of the Muzium Negara, Kuala Lumpur.

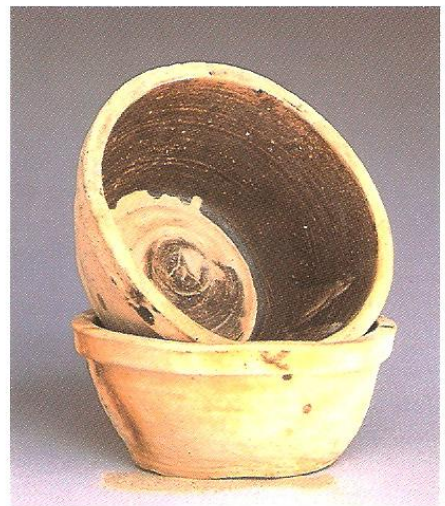


Plate 32



Plate 33



Plate 34

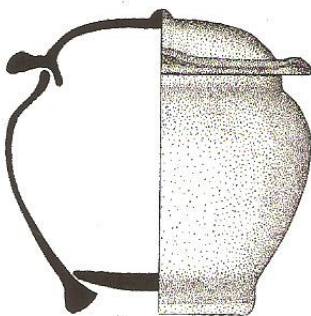


Figure 9. Structure of the Chinese celadon covered jars. Note the peculiar base, in which a separate disc of clay was inserted inside the vessel. Artifact No. T-092. Drawing, which artificially shows space between the base and the vessel walls, by Sten Sjostrand.

B. Olive-brown-glazed storage jars with four lug handles. Only traces of the glaze remain. The base is concave. One has a mouthrim fragment from another jar stuck to its base, an accidental result of firing such jars in stacks. Five examples were recovered, measuring 22, 24, 36.5 and 37 cms. One of these jars contained most of the brown-glazed covered boxes listed above. Most of the Chinese jars were empty, however. (The fish bones and eggs were contained in Thai jars.) See **Plate 33**.

C. Green-glazed dishes. All of the dishes have a carved footring that, however, varies in the specific way it is cut. The glaze varies from pale bluish green to gray green to dark green. The body color and texture also varies. Sometimes there is an unglazed stacking ring at the interior bottom, and sometimes there are spur marks. The wide variation in the appearance of the clay body and glaze, as well as in the specific cutting of the foot and kiln stacking method, is common among Guangdong wares. One can imagine large communities with innumerable family-sized workshops supplying the same types of ware. Eighty-six examples, 12–13 cms in diameter, were recovered. (One example is in the collection of the Muzium Negara, Kuala Lumpur.) See **Plate 34**.

D. Celadon. All these wares are heavily potted, with a thick opaque glaze that varies in color from brownish green to olive to medium green. The glaze is matte rather than glassy and shiny in appearance.

I. Covered jars, with two jar bodies and four covers recovered. Including the cover, they are 28 cms tall. They are very thickly potted and weigh between 6 and 7 kilos. One cover, perhaps from a

different type of jar, is small and plain, without a handle or decoration. The other covers have a lotus bud-shaped handle and wavy mouthrim, along with incised and carved decoration including floral designs. The base of the jars is unusual for being deep inside the footrim and formed with a separate dishlike disc of clay that was inserted into the bottom of the interior cavity (Figure 9). See **Plate 35**.

2. Dish with a straight mouthrim.

There is an unglazed stacking ring on the base with a circle of glaze at the center. The footring is rounded and tapered on its exterior side. The decoration consists of wide carved striations on the interior walls. Only one example of this type was recovered, 26 cms in diameter. See **Plate 36**.

3. Plates with a bracket-type

mouthrim, 23–24.5 cms in diameter. The brackets are accented with incised lines that follow their shape on the flattened part of the mouthrim. The carved footring is rounded and tapered inward. The glaze flows over the footring but leaves most of the center of the base bare. Five examples were recovered. (This type of plate, which usually features wide carved vertical striations on its interior walls, is almost identical to later Sawankhalok celadon plates, e.g., Plates 81–83. Similar Chinese celadon plates have also been noted in the Longquan cargo.) See **Plate 37**.

4. Plates with a plain mouthrim, 25–26 cms in diameter. Except for the mouthrim, these plates are essentially the same as those with a bracket-type mouthrim listed above. The rim is raised at its upper outer edge. There is often a relatively small, faintly impressed floral design at the center of the interior. Four examples were recovered. See **Plate 38**.

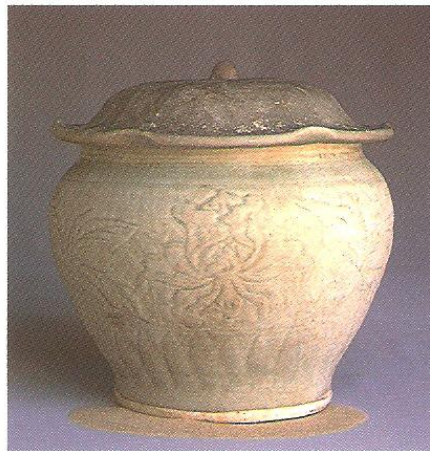


Plate 35

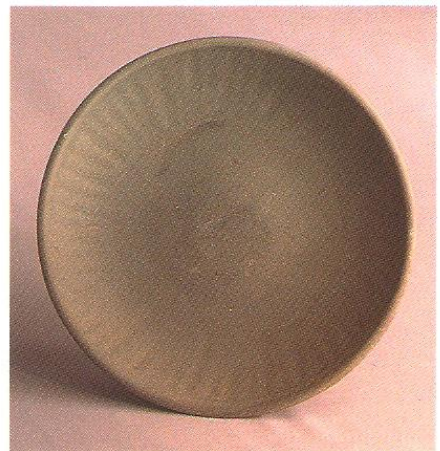


Plate 36



Plate 37



Plate 38

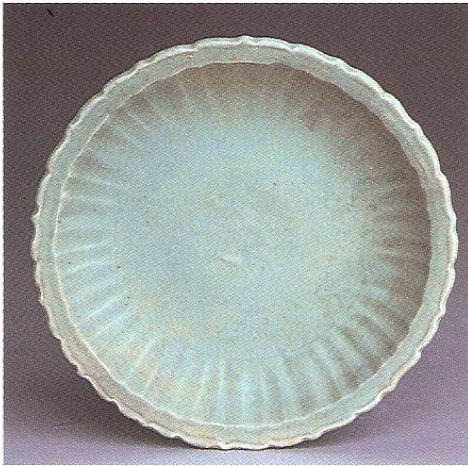


Plate 39



Plate 40a

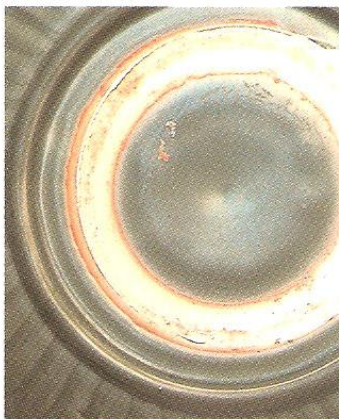


Plate 40b

Plates 40a & b. This is the largest and most beautiful of the Chinese celadon plates recovered. There is an unglazed stacking ring on the base with a black scar from a tubular stacking support within its diameter. The black ring of the scar is extremely fine. Although the support itself was wide, the edge in contact with the plate must have been very thin. The interior is decorated with peony sprays at the center and cavetto. Upright lotus petals are carved round the exterior walls. Diameter 41 cms.

5. Plates with a bracket-type mouthrim, 38–43.5 cms in diameter.

These are decorated with impressed and incised floral designs and wide striations at the walls. The footring is rounded and tapered inward, and the glaze covers the foot except for a fairly wide stacking ring, which often shows the scars of a stacking support. Three of these large plates were recovered. See **Plate 39**.

6. Plates with a plain flat mouthrim, ranging in size from 21.5 to 44.5 cms in diameter. The decoration includes carved and incised floral patterns that feature lotus and peony sprays. There are variations in the cutting of the footring. Some are rounded, some are taller and others are notably slanted inward. All of them feature an unglazed stacking ring on the base where the clay surface can be very white or fired to a reddish color. See **Plates 40a & b**.

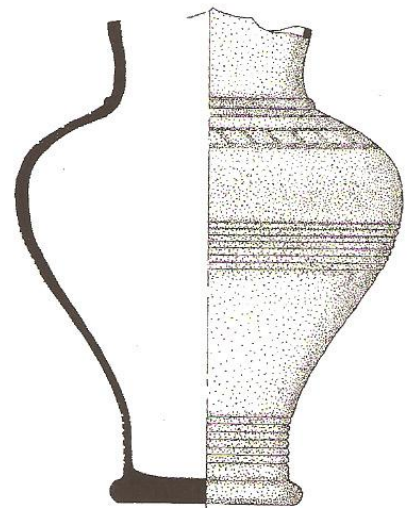


Figure 10. Structure of an unglazed jar from the Suphanburi kilns of Thailand. Artifact No T-411. Drawing by Sten Sjostrand.

**GROUP V. STORAGE JARS FROM THE
MENAM NOI, BANG RACHAN KILNS,
SUPHANBURI PROVINCE, THAILAND**

A. Jar with a disc-shaped foot. One example, 26 cms tall, broken at the neck, was recovered. The clay is blackish gray and coarse. It is decorated with horizontal grooves. One similar jar was retrieved from the Royal Nanhai shipwreck. (See **Figure 10.**)

B. Jar with a flat base. The everted mouthrim is carved with tiers, and there are four small token lug handles at the upper shoulder. The clay body is light gray. It is also very finely pitted, which may be the result of abrasion over time. Splashes of reddish-colored stain may come from the jar having been in contact with the iron in the original cargo. There is an impressed band of leaf like motifs round the shoulder and carved rings near the neck. One complete example, 46 cms tall, was recovered. See **Plates 41 a & b.**

C. Jars with a broad shoulder. The everted mouthrim has tiers on its outer side. Two fragments were recovered, one of them with a faint, impressed band of pointed leaflike motifs at the shoulder and two (of originally four) small token lug handles at carved rings just below the neck. The other comprises only part of the mouthrim and a portion of the neck. The mouthrim diameter of both is about 36 cms. The thickness of the clay is about 2.5 cms. At least four more jars of this very large size still lay buried in the seabed. The clay is dark gray and gritty. Their liquid volume would be about 260 liters. A similar large jar, completely intact, has been recovered from the Longquan wrecksite. See **Plate 42.**

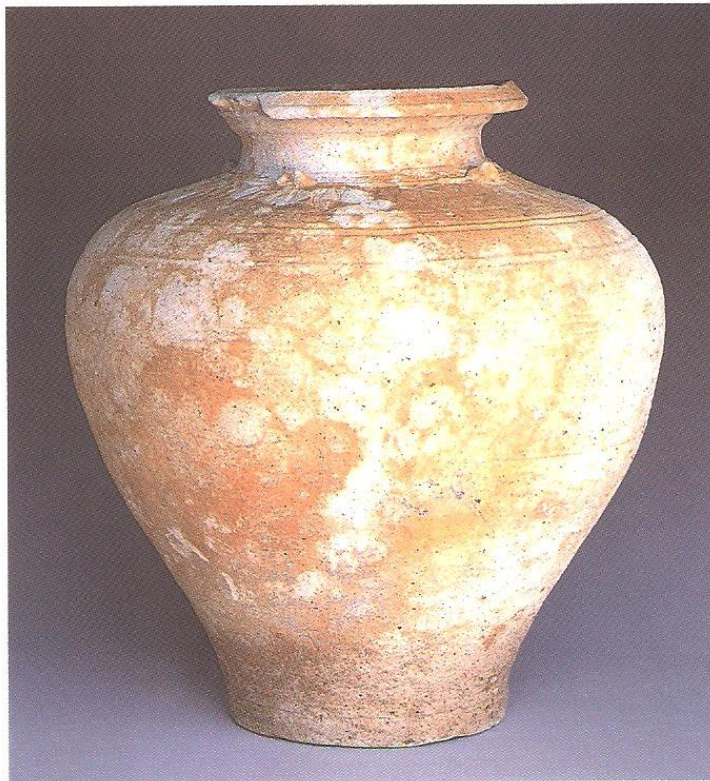


Plate 41a

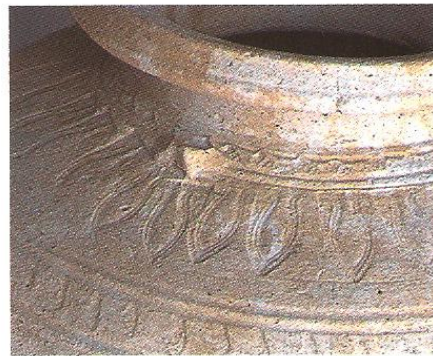


Plate 41b



Plate 42

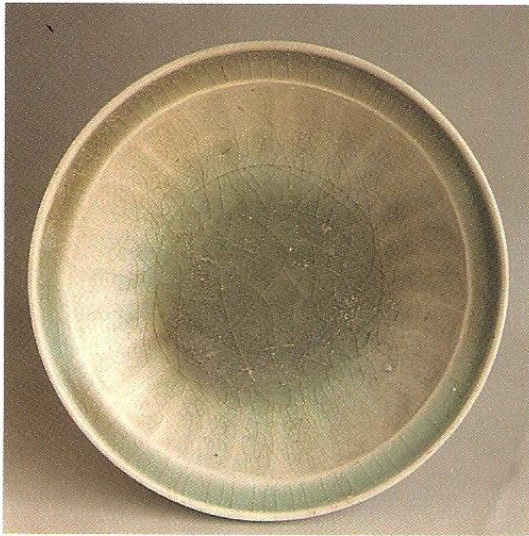


Plate 43a

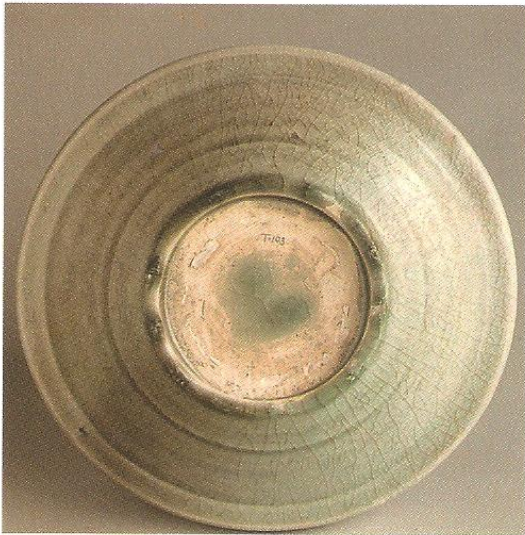


Plate 43b

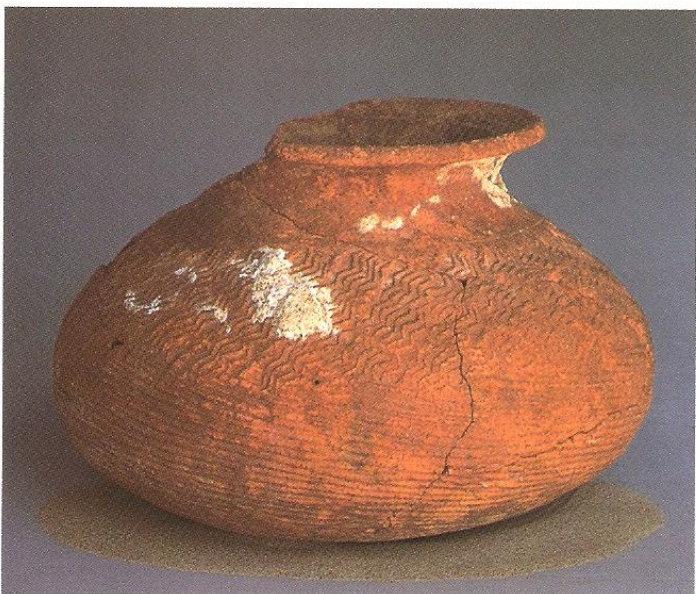


Plate 44

GROUP VI. CELADON PLATES FROM AN UNIDENTIFIED SOURCE.

These are undecorated and have a translucent glassy glaze similar to Sawankhalok celadon from later shipwrecks. No similar plates have been identified from known kiln sites in Thailand, although numbers of this type (including both plates and bowls) were found in the Tak-Omkoi burial sites of western Thailand. Two examples were recovered, but three other plates that are identical in size, shape and decoration except for having opaque celadon glaze were also found. These additional plates suggest a Chinese origin for the entire group. The location of these pieces among the Chinese and Vietnamese wares also suggests they were loaded before the vessel stopped in Thailand. The plates are 25.5 cms in diameter and about 5.5 cms high. The glaze extends down the exterior walls and over the footring. On the unglazed area of the base there is a thin circular scar from a tubular stacking support. The whitish clay is more smooth and compact than seen on Thai ceramics, and the mouthrim is bent to be more horizontal. The lip of the mouthrim, however, has the same raised edge as seen on Sawankhalok plates. See **Plates 43 a & b.**

GROUP VII. EARTHENWARE, POT WITH RED SLIP

This single example is impressed with circular cord marks that begin at the center of the rounded but relatively flat base. There are impressed vertical zigzag lines at the shoulder. This vessel was probably used by the crew to boil rice. It is 23 cms wide and 16 cms tall. See **Plate 44.**

GROUP VIII. NONCERAMIC ARTIFACTS

A. Fish bones. Similar bones from the Royal Nanhai shipwreck have been identified as belonging to a member of the mackerel family, *Rastrelliger brachysoma* (see Footnote 14 and Figure 6). This is a saltwater fish. The bones were discovered inside a large Thai Sawankhalok storage jar.

B. Sphalerite, or zinc blende. Discovered in small chunks, this substance contains zinc sulfide (ZnS), an ore mined in many parts of the world. It is still mined in northern Thailand today. Samples of the material were taken from 10 storage jars, all similar to the jar shown in Plate 41a, which were discovered some distance outside the original hull structure of the wreck. It has been suggested that the powder, which can be obtained by simply crumbling the material, was a form of makeup. (The identification of this substance was made by Anders B. Kallner, a gemologist at Kurt Ribbhagen AB in Stockholm, Sweden. Mr. Kallner also mentioned that the substance has been known for centuries.) See **Plate 45**.

C. Shaped stone. This was probably used for the sharpening of knives, 23.5 cms long and 15 cms wide. See **Plate 46**.

D. Eggs. These were discovered inside a storage jar, and one unbroken example, marred only by two pinholes, was brought to the surface. See **Plate 47**.

E. Elephant tusks. At least three or four tusks could be discerned in the wreckage. They were too fragile to be brought to the surface.

F. Lumps of iron oxide. These were perhaps originally iron in a granular form. In many cases the substance has expanded in such a way that it has enveloped ceramics within its matrix. All the lumps are outside the wreckage where they were probably pulled and deposited by present-day fishing nets. Similar iron oxide conglomerate masses were discovered on the Royal Nanhai wrecks.

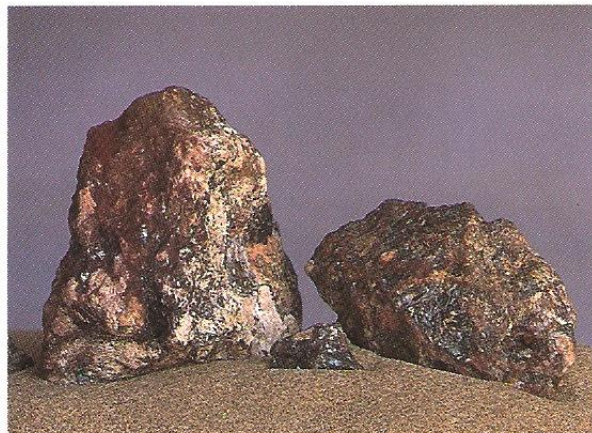


Plate 45



Plate 46

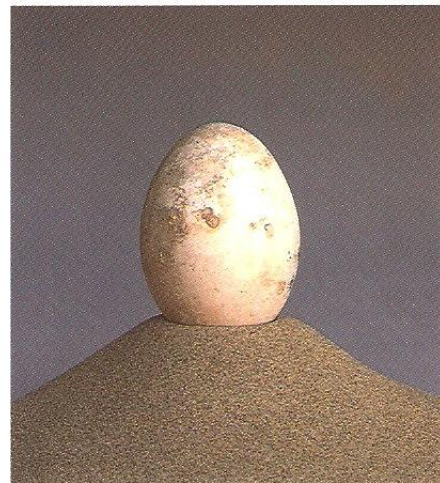


Plate 47

Appendix: Three Further Shipwrecks with Thai Ceramics

NANYANG, LONGQUAN AND ROYAL NANHAI WRECKSITES

For comparison, ceramics from three additional shipwrecks in the South China Sea are presented here. In a chronological order proposed by the authors, they are the Nanyang (circa 1370–1400), Longquan (circa 1370–1440), and Royal Nanhai (circa 1470) shipwrecks. All three sites are recent discoveries off the east coast of peninsular Malaysia. The Royal Nanhai and Nanyang were discovered in 1995 and the Longquan was found a year later. (See Figure A5 on page 58 for a diagram of the proposed chronology.)

Thai ceramics from the Sukhothai and Sawankhalok kilns, it seems, were exported only in the 14th–16th centuries. Two important shipwrecks from the 13th century, for example, do not contain glazed stoneware from either Thailand or Vietnam. These are the Breaker Reef and Java Sea Wreck, which both had cargoes of Chinese ceramics from Fujian province.¹ No archaeological sites from the 13th century and earlier anywhere in Southeast Asia, indeed, have yielded any glazed ceramics from Vietnam or Thailand.

Shipwrecks from the early 17th century, such as the *Witte Leuwe* (1613), often yield storage jars from the Singburi kilns of Thailand but no other Thai ceramics.² Sunken ships from the 14th–16th centuries in Southeast Asia, by contrast, do include significant cargoes of Thai

ceramics, particularly from the Sawankhalok kilns. The Turiang and Ko Si Chang II are the earliest known shipwrecks with Thai ceramics, and the Ko Kradat wreck is probably the latest. The Ko Kradat yielded a Chinese blue and white bowl fragment with a Jiajing reign mark (1522–66) together with Sawankhalok wares. Other Chinese blue and white wares from the same wreck may date to the Wanli reign (1573–1619).³

Unless there are unexpected finds in the future, it may generally be said that if a shipwreck has Sukhothai and/or Sawankhalok wares, then it belongs to the period of the 14th–16th centuries. The problem is distinguishing which shipwrecks belong to the 14th century or the 15th century or the 16th. No certain chronology has yet been established.

The most striking difference between the Turiang and the later wrecks presented here is the change in style among Sawankhalok ceramics. After an initial production of plates decorated in underglaze black, the underglaze painting technique seems to have been discarded for perhaps a century. (This period without underglaze wares may have extended from about 1360 or so until perhaps 1450.) In the meantime, a more accomplished style of celadon glazed wares

became the major export. Plates with an average diameter of 28–30 cms became the single most common shape in celadon glaze. The second most common shape is a spherical jar with two ring handles, which is sometimes called a 'coconut.' (See, for example, Plates 53–55.)

The Turiang shipwreck carried underglaze decorated plates and green-glazed vessels from the earlier phase of production at Sawankhalok. None of the three additional shipwrecks presented here carried Sawankhalok underglaze wares. They did all have cargoes of the later Sawankhalok celadon that comes after the Turiang cargo. At the same time there is no change in one particular type of Chinese celadon plate discovered at both the Turiang and Longquan wrecksites. This plate provides a rather convincing prototype for the development at Sawankhalok. It was already being exported at the time of sailing for the Turiang, and it was still being exported, unchanged, when the Longquan sailed. The Chinese version has a bracket-type mouthrim, usually accented with an incised line, wide carved striations on the walls, and an inward slanted footring with a shallow base. (Compare Plates 37 & 82.)

There are some minor differences in the Sawankhalok

celadon between the various shipwrecks. The body clay of the examples recovered from the Nanyang and Longquan wrecks is unusually whitish. It has a 'bleached' appearance that is quite unlike the standard Sawankhalok clay, which usually features tiny black speckling. The plates aboard the Royal Nanhai seem to reflect a change in pre-firing potting practice. Compared to earlier plates, which show only an impression of a stacking scar on their base, the scar on the Royal Nanhai plates is black. Sometimes it is more than a scar. It can be thick, as though part of the support became attached to the plate. Careful study of the Royal Nanhai plates reveals that the black scar is in fact an unidentified glue. The supports, it seems, were glued to the base of the plates. Once the glue dried, the support could be used as a handle for dipping the plates into vats of glaze, which is a thick liquid when it is applied. There are many cases in which it can be seen that the glaze (at the time it was applied) ran over the footring, onto the base and then down the side of the support rather than onto the area protected by the support. (See Figure A1.) With this system, the upper end of the support did not need a wide diameter, and the marks on plates from the Royal Nanhai are considerably more narrow than on earlier wares.



Figure A1. Tubular and disc-shaped stacking supports, which were used at both the Sukhothai and Sawankhalok kilns.

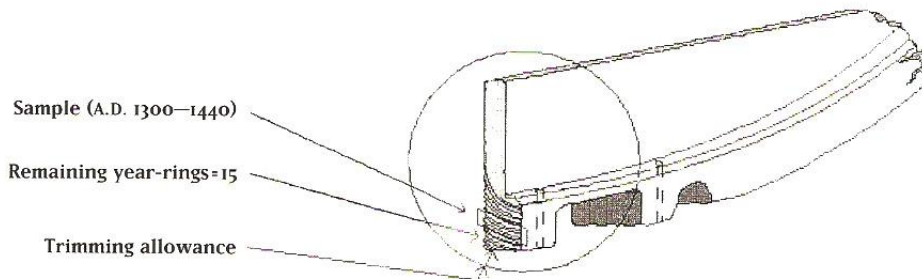


Figure A2. Wood from a bulkhead, Royal Nanhai shipwreck. The profile shows that the timber was originally thicker but part was carved away. The original thickness, left along the edge that fit against the hull, serves as a support frame. Usually the frame is a separate piece of wood.



Figure A3. Impression of a Chinese moon hare, made by the elephant-shaped seal, (Plates 93a and b) from the Royal Nanhai wrecksite.

Another change in production techniques involved a disc-shaped firing support with spurs. This type of support was used to stack the plates aboard the Turiang, but it was gradually phased out over time. The spur marks seen on the face of early Sawankhalok underglaze plates can also be seen on most of the celadon plates from the Nanyang, but on only five examples from the Royal Nanhai.

It is not certain exactly when painting in underglaze black came back into use at Sawankhalok, but it was probably in the period 1450–1500. The problem always is that none of the shipwrecks can be precisely dated. Radiocarbon tests at best offer a time range of about 100 years for the construction of a ship, with any one of those years being as likely as any other. In comparing the carbon-14 results for the Turiang and Royal Nanhai sites, for instance, the Turiang most likely belongs to the earlier years in the time range, while the

Royal Nanhai falls into the later years of its given range. In these two cases, the range is narrowed by reference to the ceramic cargo.

Wood samples give conventional radiocarbon dates of 560 \pm 50 BP for the Royal Nanhai and 620 \pm 50 BP for the Turiang wrecksites. The calibrated, adjusted age for the Royal Nanhai becomes AD 1320–1460. The Chinese blue and white ceramics, however, suggest an age no earlier than the Interregnum years of 1436–64. The range for the Turiang is AD 1305–1440 but other evidence makes the period of 1305–70 most likely. For the other wrecksites, the Nanyang and Longquan, no samples have yet been sent for carbon-14 analysis.

The most important summary of shipwrecks in Southeast Asia involves the investigation of shipwrecks in the Gulf of Thailand by the Thai Ceramics Archaeological Project (TCAP), a joint Thai-Australian endeavor set up in 1980.⁴ A number of important wrecks have been discovered since then, but the information is scattered through numerous publications. In regard to Thai ceramics, the most important of these (other than the wrecks presented here) are the Pandanan wreck in the Philippines and the Xuande wreck off Malaysia.⁵

1. For these two sites, respectively, see Marie-France Dupouzat, 'The Ceramic Cargo of a Song Dynasty Junk Found in the Philippines and Its Significance in the China-South East Asia Trade,' in *South East Asia & China: Art, Interaction & Commerce*, London, Percival David Foundation of Chinese Art, 1995, pages 205–224; and William Mathers and Michael Flecker, editors, *Archaeological Recovery of the Java Sea Wreck*, Annapolis, Pacific Sea Resources, 1997.
2. C. L. van der Pijl-Ketel, editor, *The Ceramic Load of the Witte Leeuw 1613*, Amsterdam, Rijksmuseum, 1982.
3. Jeremy Green and Rosemary Harper, *The Maritime Archaeology of Shipwrecks and Ceramics in Southeast Asia*, Perth, Australian Institute for Maritime Archaeology Special Publication No. 4, 1987, page 9.
4. Jeremy Green and Rosemary Harper, 1987, *ibid.* Another invaluable study, including extensive photography, was published in Thai with many sections summarized in English. See Pisit Charoenwongsa and Sayan Prishanchit, editors, *Underwater Archaeology in Thailand II: Ceramics from the Gulf of Thailand*, Bangkok, Department of Fine Arts, 1990.
5. For the Pandanan shipwreck, which was discovered in 1993, see Christophe Loviny, *The Pearl Road, Tales of Treasure Ships in the Philippines*, Manila, Christophe Loviny, 1996; and Allison I. Diem, 'The Pandanan Wreck 1414: Centuries of Regional Interchange,' *Oriental Art*, Volume XLIII/2, Spring 1997, pages 45–48. The Xuande shipwreck is documented in Sten Sjostrand, 'The Xuande Wreck Ceramics,' *Oriental Art*, Volume XLIII/2, Summer 1997, pages 8–14.

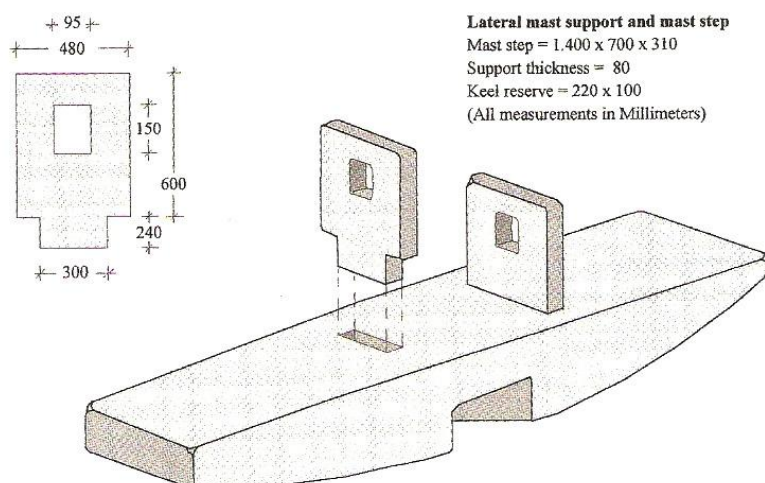


Figure A4. Mast step, Royal Nanhai shipwreck.

NANYANG SHIPWRECK

Discovered in October 1995 off the east coast of peninsular Malaysia, the Nanyang cargo appears to belong to the years AD 1370–1400, a time that corresponds to the reign of the first Ming emperor, Hongwu (1368–98). Sawankhalok celadon is the primary cargo, and this may be one of the earliest shipments including celadon plates. They are unusual for displaying spur marks on their face. Spur marks are also seen on the earlier, underglaze decorated plates, but on celadon the practice of stacking with disc-shaped supports caused more noticeable marring, and it soon fell into disuse at Sawankhalok. (See Plate 48a) By the time the Royal Nanhai sailed in the mid-15th century, celadon with spur marks is rare. Only five examples among thousands of plates recovered from the Royal Nanhai cargo display them. Among the 420 ceramics recovered from the Nanyang, almost all the plates show spur marks.⁶ At the same time very few of the Nanyang plates show a circular scar on their base from tubular stacking supports. Such scars are common on the base of plates from the Royal Nanhai cargo. When they are present on Nanyang plates, they have a larger diameter than on Royal Nanhai examples.

Another notable characteristic of the Nanyang Sawankhalok

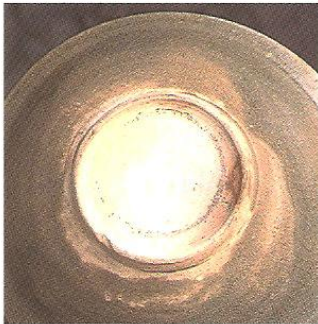
celadon plates is that the carved footring is tapered inward and shorter than on later wares. This slanted footring resembles the peculiar footring of the earlier underglaze black decorated plates such as seen on the Turiang wreck. In general, celadon plates from the Nanyang are undecorated on their exterior, and most of them have a plain (rather than foliate or bracket-type) mouthrim. The Sawankhalok celadon wares of the Nanyang wreck seem to form a stylistic bridge between the earlier ceramics from the Turiang and those seen on the Longquan wreck.

The total cargo of the Nanyang is estimated to include about 10,000–15,000 pieces of Sawankhalok celadon. It does not appear to have any other types of ceramics. The wrecksite is located 11 nautical miles from shore in 53 meters of water. The vessel itself is largely deteriorated and awaits further excavation before details about its construction or origin will be known. Neither the Nanyang nor the Longquan is completely surveyed.

6. Most of these, 402 ceramics altogether, were donated by Sten Sjostrand to the Malacca Museum Corporation at Melaka, Malaysia, as a study collection.



Plates 48a & b. Sawankhalok plate with medium-green celadon glaze. The incised decoration includes an encircled floral motif at the center and three 'onion-skin' medallions around the cavetto. The mouthrim is plain with a raised outer edge. The exterior is plain, and the carved footring is tapered inward. There are three spur marks on the interior



and the base shows an 8-cm wide circular scar from a tubular stacking support. The way one layer of glaze appears to flow over another, especially evident on the exterior of the plate, probably means that the plate was dipped twice into the liquid glaze mixture. Diameter 27.5 cms.

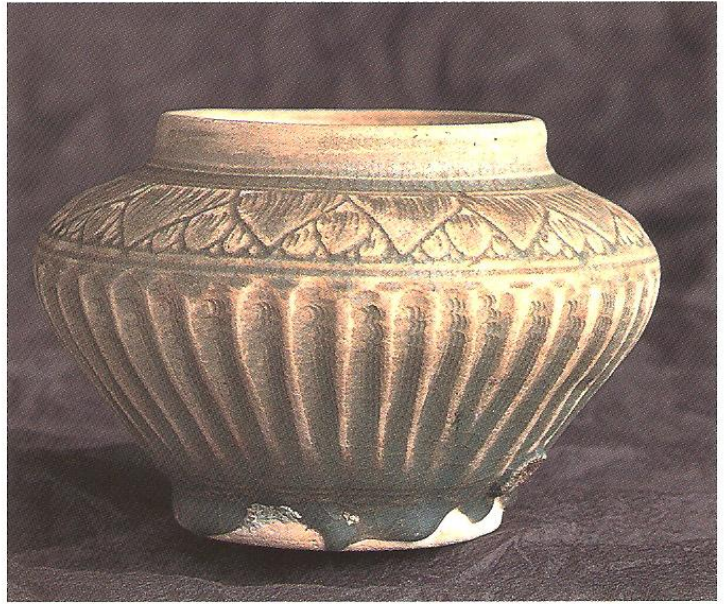
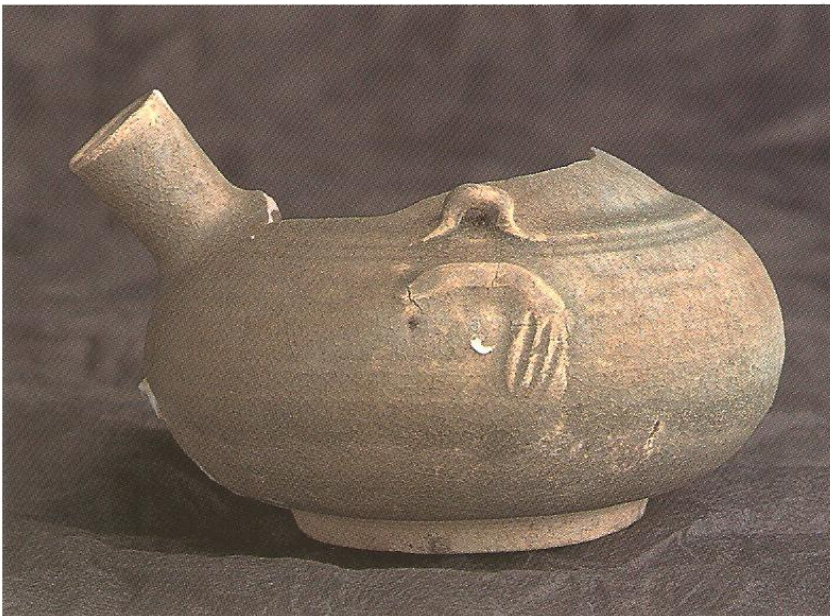
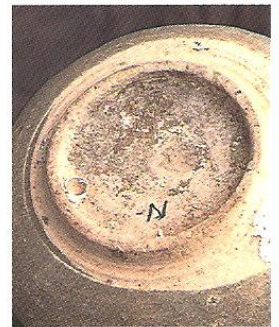


Plate 49. Sawankhalok covered jar body (cover missing) with thick bluish green celadon glaze. It is decorated with wide carved striations around the body below elaborately incised overlapping flower petals at the shoulder. Glaze covers the lower portion of the interior. There is no support scar on the unglazed base. It is interesting to note that in places where the glaze has flowed into thick drops at the lower body, the drops were broken away where they extended beyond the footring. This must have been done as part of the original production process. The practice is evident on a number of other examples of Sawankhalok celadon besides this specific jar. Height 13 cms.



Plates 50a & b. Sawankhalok jar with spout, broken on top, with muted bluish green celadon glaze. Only one of two original lug handles remains at the shoulder. Below the handles, at each side of the body, are what appear to be frog feet. There are two prominent grooves at the lower walls just above the wide carved footring. Note the flow of one layer over another at the lower body that suggests the vessel was dipped twice into the glaze mixture. It is not known whether this shape was used as a pouring vessel or perhaps as a lamp. Diameter 17.5 cms.



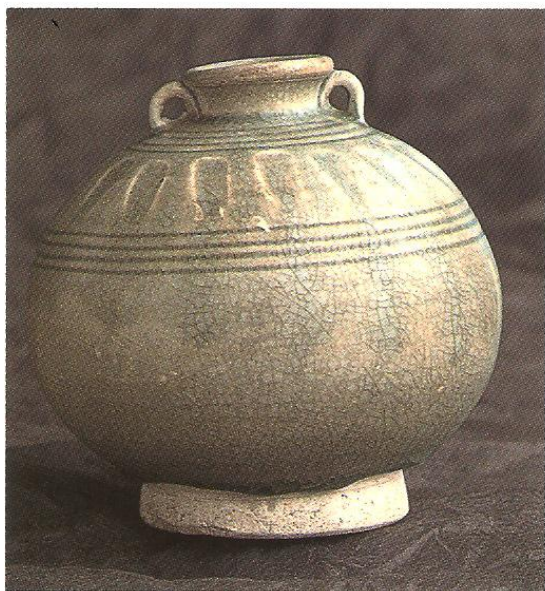


Plate 53. Sawankhalok jar, bulbous and spherical in shape, with two ring handles and medium-green celadon glaze. The shoulder is decorated with short, wide carved striations between line borders. The tall foot is carved with a thick, shallow base. The glaze flows in one layer over another. Height 15 cms.

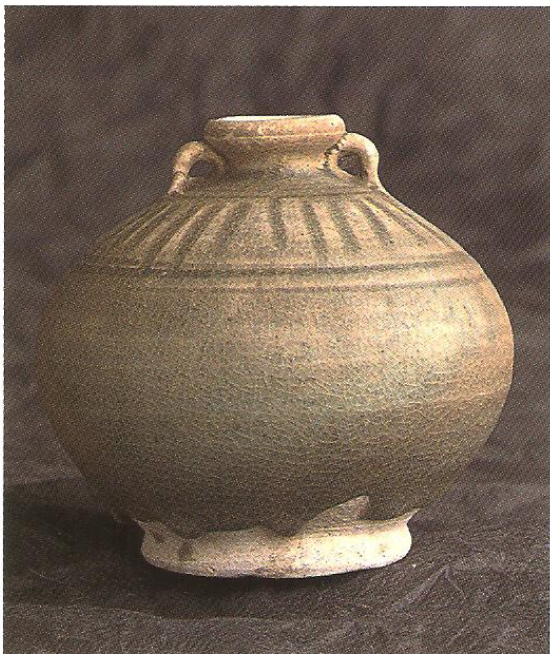


Plate 55. Sawankhalok jar, bulbous and spherical in shape, with two ring handles and yellowish green celadon glaze. There are carved striations between line borders at the upper shoulder. This jar, as well as others in this shape, is unglazed on the interior. Height 14 cms.

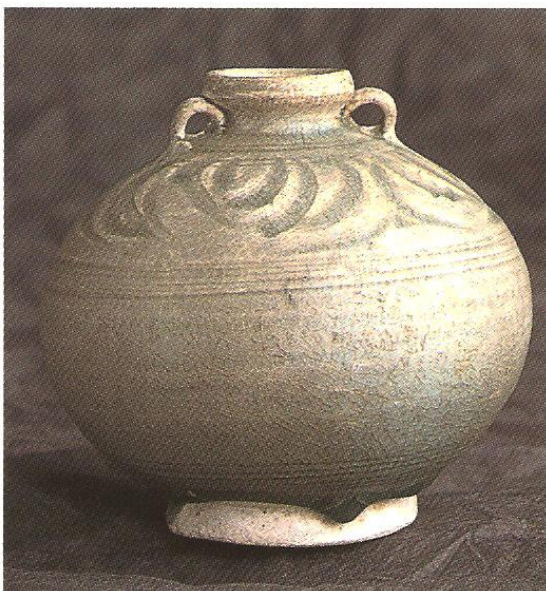


Plate 54. Sawankhalok jar, bulbous and spherical in shape, with two ring handles and pale bluish green celadon glaze, decorated with carved 'onion-skin' medallions at the shoulder. The tall foot is carved with a thick, shallow base that shows a very wide tubular support scar. Height 14.5 cms.

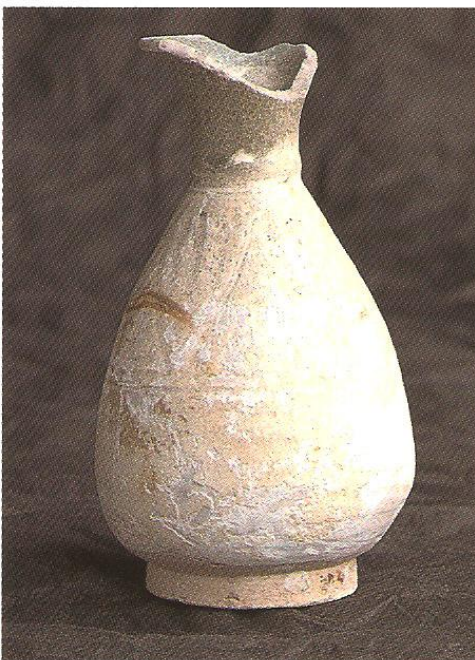


Plate 51. Sawankhalok bottle vase with degraded gray-green celadon glaze and medium-gray body. The upper walls are incised with a wide band of flower petals, their tips pointed downward. The shape includes a distinctive ripple in the clay at the lower neck, and the base shows a stacking support scar of relatively narrow diameter. It is interesting to note one small area, at the neck of this vessel, where the original pristine glaze surface is preserved. The shell of a marine organism that must have attached itself soon after the ship sank protected it. Height 19.5 cms.

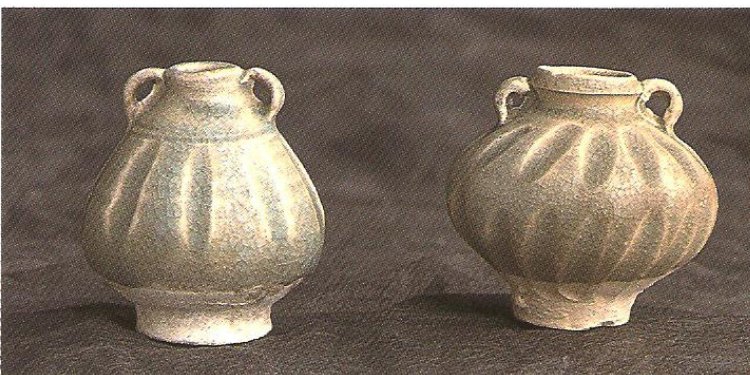


Plate 52. Sawankhalok jarlets with two ring handles, pale gray-green celadon glaze, carved striations and a flat foot. Heights 7 and 7.5 cms.

LONGQUAN SHIPWRECK

Discovered in June 1996, the Longquan appears to be one of the largest old trading vessels ever discovered. Judging from the size of the mound of debris on the seabed, this wrecksite may yield as many as 100,000 ceramics, about 15 times more than the Turiang. At 63 meters, it is also one of the deepest known sites. Initial observations of the material suggest the ship sank in the late 14th or early 15th century, circa 1370–1440. Because at such extreme depth the bottom time for divers is only about 15 minutes per dive, with only two dives allowed per day, the surface investigation for this wrecksite is not yet complete.

Various types of Chinese and Thai ceramics have been identified. A large proportion of the ceramics visible are Sawankhalok celadon wares. The shapes include various dish shapes and jars. No jarlets have been seen. The Longquan pieces are distinctive for the strong bluish shade

of the Sawankhalok celadon glaze. Examples of Sawankhalok celadon from the Nanyang and Royal Nanhai sites are never quite this bluish.

The Longquan cargo also contains Sukhothai wares. There are various dish shapes as well as jars and bottles. The underglaze decoration includes two of the three standard Sukhothai designs, the fish and flower motifs, but not the *cakra* (or 'solar whorl'), which does not appear to have been used before about the mid-15th century. Bowls with the *cakra* motif were recovered from the Xuande wreck, which did not yield wares decorated with a fish or flower. Among the Chinese wares there are many celadons, along with monochrome grayish white glazed bowls. The estimated total proportion of wares, based on initial survey, is Sukhothai 20%, Sawankhalok celadon 40% and Chinese wares 40%. No Vietnamese wares have thus far been encountered.



Plate 56. Sukhothai plate, with a flower motif at the center and two rings round the exterior walls. The footring is carved with a shallow base and the footring itself is slightly beveled on its inner side. The underglaze black appears faded in color. There are five spur marks on the interior bottom, and many pinholes in the slightly greenish clear glaze. Diameter 25 cms, height 6–7 cms. (The variation in height is due to a slight warping of the shape.)



Plate 58. Sukhothai bowl, decorated in underglaze black with a fish on the interior and a leaf scroll in line borders round the exterior. Somewhat warped in shape, with five spur marks on the interior, and a medium-gray body with white speckling. The interior bottom is notably flat, and the footring is slightly splayed and carved with a deep base. Diameter 15 cms.

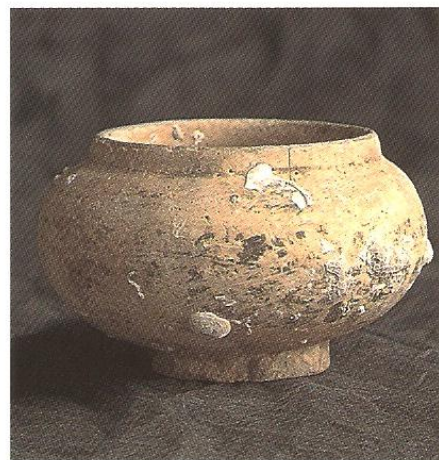


Plate 60. Sukhothai covered jar, missing its cover, with traces of a floral scroll on its exterior. The glaze is completely abraded away. Height 8.5 cms.



Plate 57. Sukhothai plate, decorated in underglaze black with a fish at the center and two rings round the exterior walls. The footring is carved with a shallow base, and there are five spur marks on the interior bottom. Diameter 26 cms.



Plate 59. Sukhothai bowl, decorated simply with pairs of rings at the everted mouthrim, round the interior bottom and on the exterior. There are five tiny spur marks on the interior, many pinholes in the mostly abraded glaze and dark reddish brown clay. The footring is carved with a slightly splayed rim and rather deep base. Diameter 16 cms.

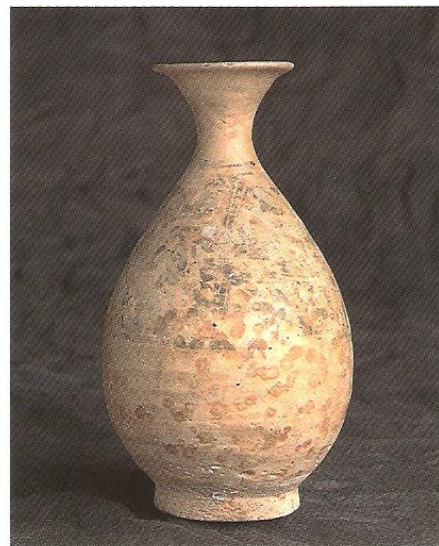


Plate 61. Sukhothai bottle vase decorated with four vertical floral panels within ring borders above and below. The footring is carved with a shallow base. Height 12 cms. (Note the shortness of the neck on this shape as compared with Sawankhalok examples.)

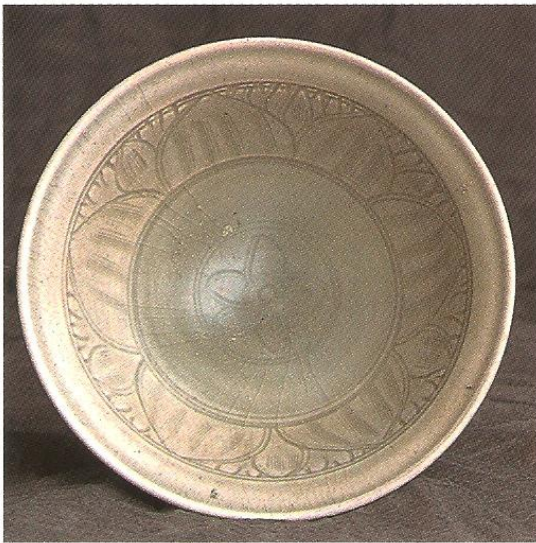


Plate 62a & b. Sawankhalok plate, with muted thick gray-green celadon glaze. It is decorated with an incised floral motif at the center and overlapping petals at the cavetto. The exterior is plain. There is a wide tubular support scar on the base where the clay body is compact and whitish with a 'bleached' look. Diameter 24.5 cms, height 8 cms.

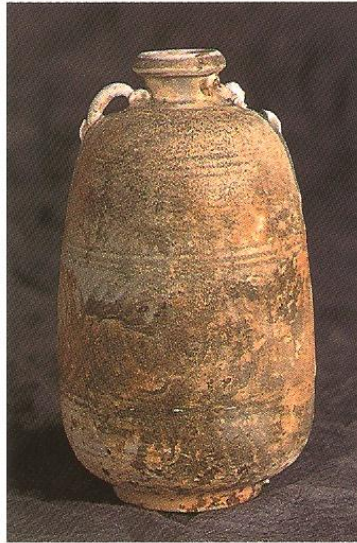


Plate 64. Sawankhalok bottle vase with two ring handles and pale lime-green celadon glaze. It is decorated with vertical striations within line borders above and below. The foot is carved with a shallow base, and the clay body has a 'bleached' whitish look. Height 20 cms.

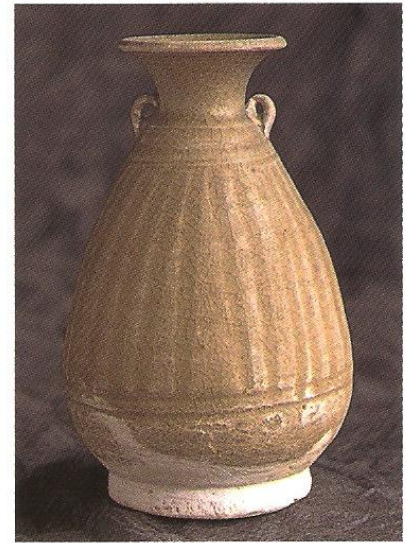


Plate 66. Sawankhalok bottle with two ring handles (one of them broken away) and the remains of dark bluish green celadon glaze. It is decorated with three sets of horizontal rings. Height 19.5 cms.

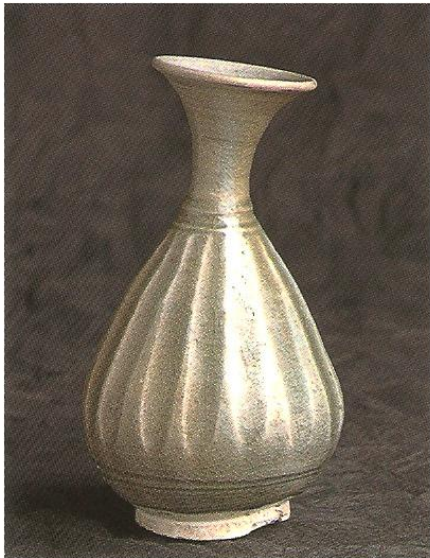


Plate 63. Sawankhalok bottle vase, with vertical striations and grayish green celadon glaze. It is slightly warped from the firing, with the neck leaning to one side. The shape includes a slight bulge in the clay at the lower neck, just above carved horizontal rings. The footring is carved very shallowly so that the base is unusually thick. The clay body is compact and whitish. Height 24.5 cms.

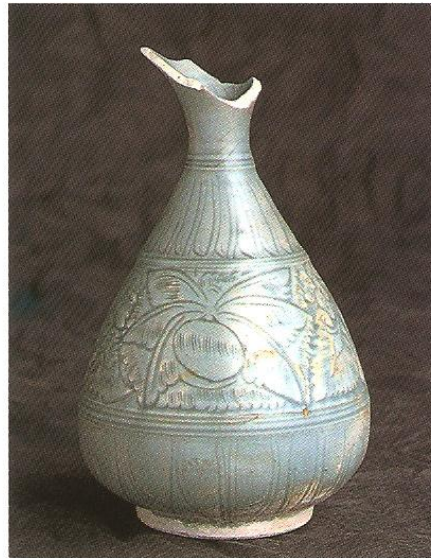


Plate 65. Sawankhalok bottle vase, with pale bluish green celadon glaze. It is decorated with a band of peony sprays, finely carved in low relief and accented with combing, round the midbody, with bands of stylized flower petals above and below. The medium-gray clay body has a 'bleached' look. Height to the broken neck, 25 cms.

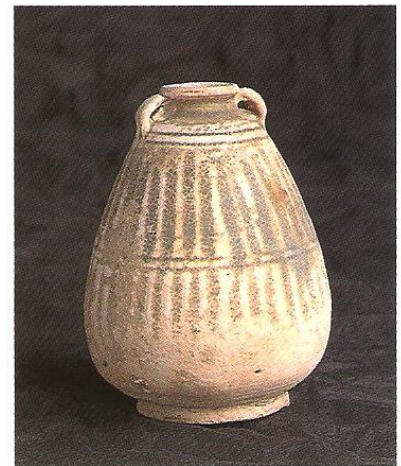


Plate 67. Sawankhalok bottle with two ring handles, a low-slung belly, and bluish green celadon glaze. It is decorated with two bands of vertical striations separated by ring borders. The carved footring is short and slightly splayed. Height 16.5 cms.

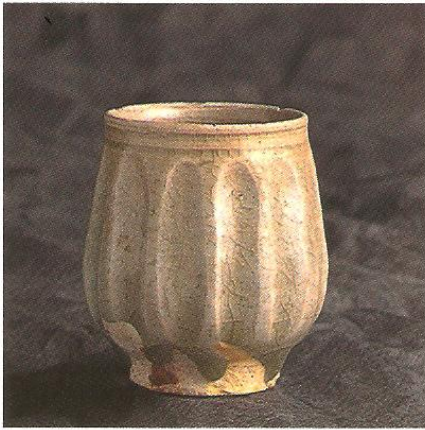


Plate 68. Sawankhalok cup with striations and pale bluish green celadon glaze. The flat foot is cord-cut and the clay body has a 'bleached' look. Height 8 cms.

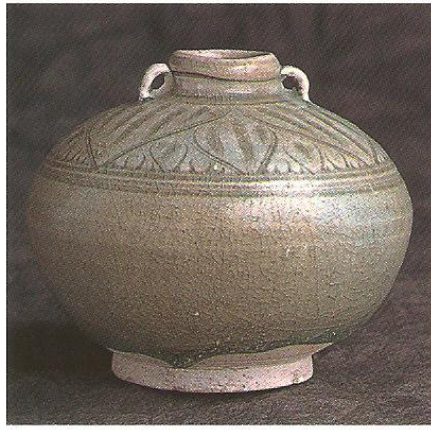
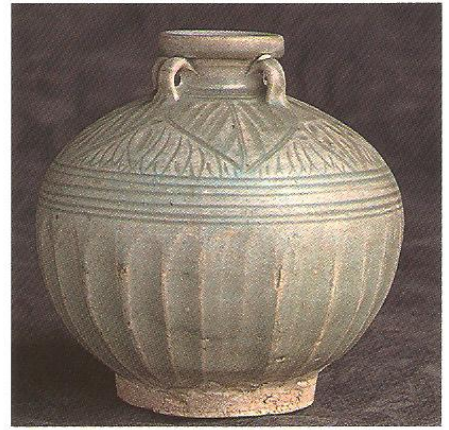


Plate 70. Sawankhalok jar with two ring handles and bluish green celadon glaze. It is decorated with overlapping flower petals at the shoulder, and the tall foot is carved with a shallow base. The clay body in this case shows a minor amount of tiny black speckling in its matrix. Height 16 cms.



Plates 72a & b. Sawankhalok jar with four ring handles and pale bluish green celadon glaze. It is decorated with elaborate incised and combed overlapping peony leaves at the shoulder and with wide carved vertical striations round the lower walls. The tall foot is carved with a shallow base that displays a wide tubular support scar. Height 20.5 cms. Collection of the Asian Art Museum, San Francisco.

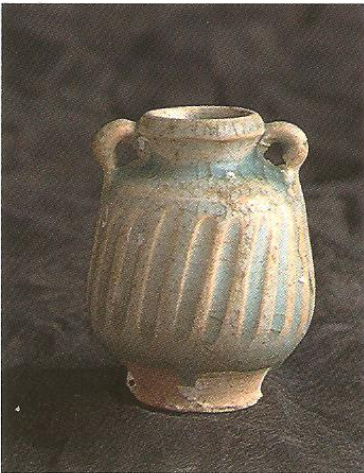


Plate 69. Sawankhalok jarlet, with two ring handles, carved striations, and a flat cord-cut foot. Height 7 cms.

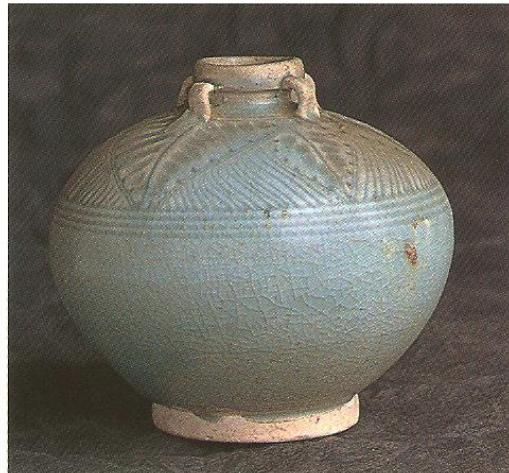


Plate 71. Sawankhalok jar with four ring handles and bluish green celadon glaze. It is decorated in a wide band at the shoulder with incised peony leaves. The tall foot is carved with a shallow base. Height 18 cms.



Plate 73. Chinese jarlet, wide and short, with a concave base and mottled dark brown glaze. Diameter 10 cms, height 4.5 cms.

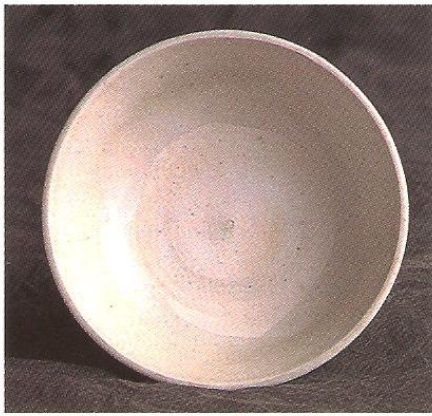


Plate 74. Chinese bowl with monochrome grayish white glaze and pale gray clay body. It is unglazed at the interior bottom and also at the wide carved footrim and slightly recessed base. Diameter 16 cms.

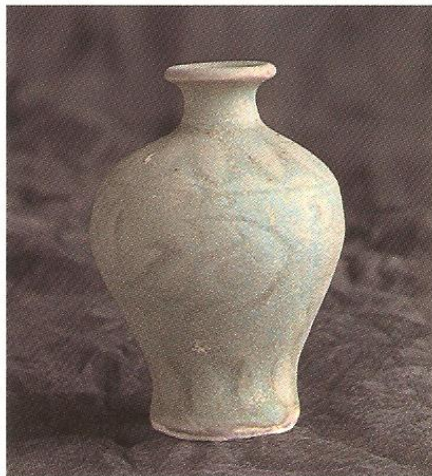


Plate 75. Chinese jar with thick matte emerald green celadon glaze and recessed base. It is carved with peony sprays at the mid section and with flower petals at the shoulder. The base is glazed but the footrim is bare. Height 11 cms.

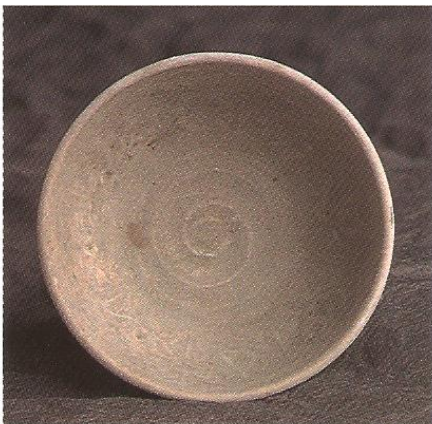


Plate 76

Plate 76. Chinese bowl with straight mouthrim and thick dark green celadon glaze. It is decorated with impressed floral designs on the interior walls. The exterior is plain. The glaze extends over a rounded footrim but leaves an unglazed stacking ring on base. Diameter 14.5 cms, height 7 cms.



Plate 77. Chinese plate with thick brownish green celadon glaze, its bracket-type mouthrim accented with an incised line. The decoration includes a small impressed floral spray at the center and wide carved striations on the interior walls. The exterior is plain. The glaze extends over an inward slanting footrim. The unglazed central portion of the slightly recessed base shows discoloration from a tubular stacking support. Diameter 22.5 cms.

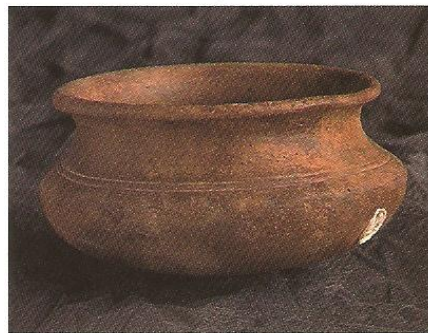


Plate 78. Earthenware pot with a wide mouth, rounded lower portion and reddish brown clay body. This is a utilitarian vessel that was probably used by the crew to cook rice. Its exact origin is unknown. It could be Chinese, Vietnamese or Thai. Diameter 19 cms.

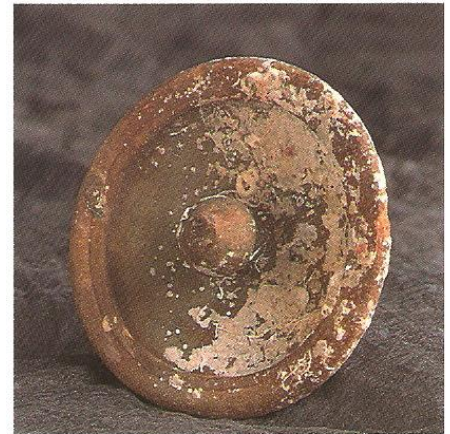


Plate 79. Cover with a curved convex base and lotus bud handle. This type of cover was used primarily for storage jars. They are a very common find on wrecks in the South China Sea but their kiln origin is unknown. No sherds from this shape have ever been found at the Old Sukhothai or Sawankhalok kilns. Diameter 10.5 cms. (The photograph shows the upper side of the cover, looking down at the tip of the lotus bud-shaped handle that is set inside the concave surface of the shape.)

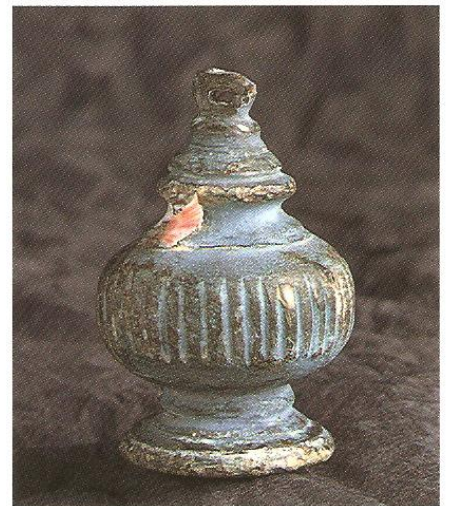


Plate 80. Bronze weight in the form of a covered jar, with a ring handle at the top. (There is a small marine shell attached at the shoulder.) With a line tied through the ring, the weight was perhaps used for testing water depth. Height 12 cms. Weight 2,150 grams. Another weight made in tin, also with a flat base and also 2,150 grams, was recovered from the Royal Nanhai shipwreck. The Royal Nanhai example is made in a shape somewhat like the upper portion of a pumpkin with a stem through which a hole is pierced.

ROYAL NANHAI SHIPWRECK

The Royal Nanhai shipwreck was discovered in the spring of 1995, and the excavation was completed in May 1998. It lies in international waters, 46 meters deep, 40 nautical miles off the east coast of peninsular Malaysia. The estimated original size of the vessel is 7–8 meters by 28 meters. Transverse bulkheads were found throughout the length of the vessel, spaced 1.35 meters apart. These bulkheads and the remaining hull planking near the keel were edge-joined by wooden dowels, an element from Southeast Asian ship construction. The hull planks, applied in a single layer, were 8 cms thick.⁷

The vessel's cargo of Sawankhalok celadon and its position at sea suggest that it had departed from Ayutthaya and was en route to either Sumatra or Java. Radiocarbon tests on one of its timbers gives a conventional date of 560 +/- 50 BP, which is calibrated and adjusted to AD 1320–1460. Four examples of Chinese blue and white ware in a hidden compartment next to the hull, however, suggest that the vessel sank no earlier than about 1460. Similar Chinese ceramics have been dated to the Jingtai/Tianshun years of the Interregnum period of Chinese history, 1450–64.⁸ Two Vietnamese blue and white covered boxes, also discovered in the hidden compartment, cannot be assigned an age more specific

than generally the 15th–16th centuries. Altogether the ship carried 21,332 ceramics.

It is useful to note that the Royal Nanhai is about the same age as the Pandanan wreck, which was discovered in Philippine waters in 1993.⁹ Both carried Chinese blue and white wares from the Interregnum period and, while the Pandanan carried greater numbers of pieces, the Chinese pieces still formed only a small percentage of the total cargo. Instead of Thai ceramics, the Pandanan carried central Vietnamese ceramics, which comprised about 75% of the cargo. Thus far, there are no earlier shipwrecks with documented finds of Chinese blue and white ceramics. The four 14th-century Chinese ceramics, two of them blue and white, aboard the Pandanan are exceptional, and they must have been part of an early antiques trade. From the time it first entered the export trade in 1328 until about the middle of the 15th century, Chinese blue and white ware seems to have been a rare and precious commodity.¹⁰

Besides the Sawankhalok celadon and black-glazed storage jars, and various Chinese blackish brown glazed jars, a variety of earthenware pots that were utilitarian vessels probably used by the crew was recovered from the Royal Nanhai. Surprisingly, there

were no Sukhothai wares, which, however, were included in the cargo of the Pandanan.

Nonceramic artifacts included both iron and lead ingots, along with the single items in the hidden compartment. In addition to the cast iron, there were four large concretions of iron, which appears to have been shipped in a loose granular form, spaced along the centerline of the wreckage. Altogether the iron shipment must have weighed at least 20 tonnes. Traces and imprints of woven bamboo on the iron ore indicate that it was packed inside bags. Only 20 iron ingots were discovered. One hundred and ten lead ingots were recovered.

The hidden cache of articles was discovered in compartment 13, beneath deck planking next to the keel. Besides ceramics, it contained several other objects. One is a cylindrical black lacquer box and cover incised with floral designs on a body of woven bamboo. There was also a carved ivory sword handle, 15 cms long and 2 cms wide. The blade had completely eroded away. Finally there was a small, exquisite seal made in the shape of an elephant. The base is made so that the impression shows a Chinese moon hare. (Plates 93a and b). The reason for this mysterious cache is unknown. The

objects were perhaps hidden because they were especially valuable and/or they were specially placed for 'luck,' possibly during construction of the vessel.

7. Sten Sjostrand has completed two extensive reports on this site, *The Royal Nanhai Shipwreck and Its Ceramic Cargo Including a Preliminary Report on the Excavations to Date*, unpublished manuscript, 1996; and *The Ceramic Cargo of the Royal Nanhai*, unpublished manuscript, 1998.
8. The characteristic of decoration to note is the use of figures in landscape in scenes separated by cloud outline borders. See, for instance, Larry Gotuaco, Rita C. Tan and Allison I. Diem, *Chinese and Vietnamese Blue and White Wares found in the Philippines*, Manila, Bookmark, Inc., 1997, page 126.
9. Loviny, 1996, *op. cit.* This book contains chapters by several specialists on various aspects of the shipwreck, but it omits a complete inventory of the artifacts. Such an inventory would have revealed that the Vietnamese blue and white wares outnumbered the Chinese examples.
10. The subject of early Chinese blue and white ware is vast and will not be tackled here. It can be noted, however, that the date of 1328 is a recent finding. See Liu Xinyuan, 'Imperial Export Porcelain from Late Yuan to Early Ming,' *Oriental Art*, Volume XLV/1, Spring 1999, pages 98–100.

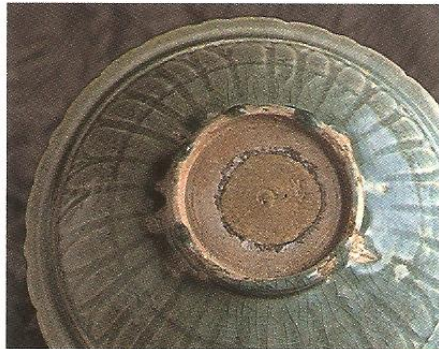
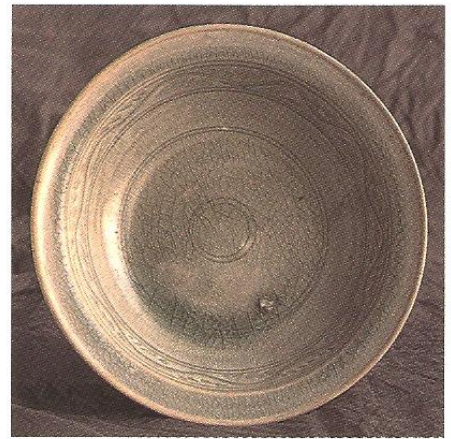
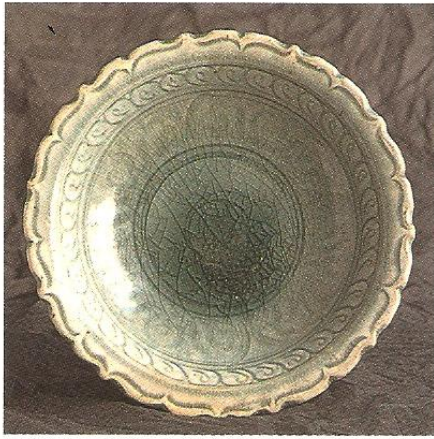
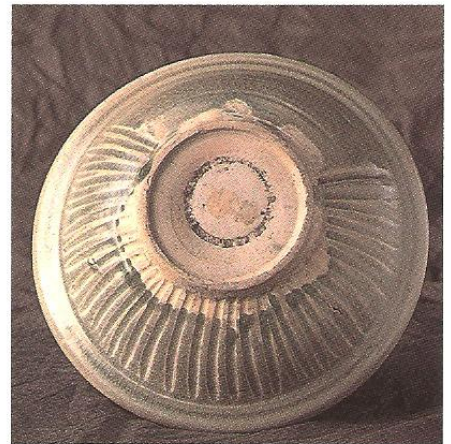


Plate 82. Sawankhalok plate with a bracket-type mouthrim and glassy translucent bluish green glaze. The incised decoration includes a floral motif at the center and three lotus sprays round the cavetto. The exterior features wide carved striations. The carved footring slants inward toward a shallow base that shows a tubular support scar only 4.5 cms in diameter. Diameter of the plate is 23 cms.



Plates 81a & b. Sawankhalok plate with a finely carved bracket-type mouthrim and glassy, translucent, bluish green celadon glaze. White slip beneath the glaze at the outer portion of the mouthrim accents the bracket design. There are sets of double rings incised on the interior bottom and a band of stylized, combed flower petals at the lower walls below a ring of curls, with incised upright flower petals round the exterior. The carved footring is thick and rounded at the rim, while the gray body of the unglazed base shows reddish flashes of color at the surface. Thick drops of glaze have flowed onto the footring and one that was apparently too large was chipped away (lower right side in Plate 81b). Diameter 29.5 cms. Some 4,446 celadon plates were recovered, 3,415 of them intact. They were found in stacks extending lengthwise between bulkheads with an average 32 pieces in each stack. There were two main sizes, 24–28 cms in diameter and 28–32 cms in diameter. There were 110 examples of the small size, with 50 of them intact.



Plate 83. Sawankhalok plate with a bracket-type rim accented with white slip, and muted green celadon glaze. The craftsman had begun to add incised lines to the upper outer edge of the mouthrim but completed only about half the work. Elsewhere the incised decoration includes two sets of rings at the center and an undulating vine in borders at the upper walls, with combed lotus petals round the exterior. (The most common decoration on the exterior of plates from the Royal Nanhai cargo is wide carved striations or lotus petals with a carved outline. The use of combed lines here is unusual.) The tubular support scar on the base is rather small at only 5.5 cms in diameter. The diameter of the plate is 29.5 cms

Plates 84a & b. Sawankhalok plate with a plain mouthrim that is raised at its outer edge, and medium-green celadon glaze. There are sets of rings on the interior bottom, and a band of undulating vine at the upper walls. The exterior, with carved striations covering only about three-fourths of the circumference, is unfinished. The foot is carved with a relatively shallow base that displays a tubular support scar. The diameter of the plate is 29 cms.



Plate 85. Sawankhalok jarlets, all with two ring handles, a flat foot and muted, sometimes bluish green celadon glaze. The shapes show a wide range of variation, with carved striations being the most common decoration. Only the larger, wide jarlets have incised decoration at the shoulder. Heights about 6–7 cms. Altogether 10,221 jarlets were recovered, and they were scattered throughout the wrecksite at all levels, with some of them contained inside storage jars. In general the jarlets from the Royal Nanhai are less bulbous than similar jarlets in the Nanyang cargo.

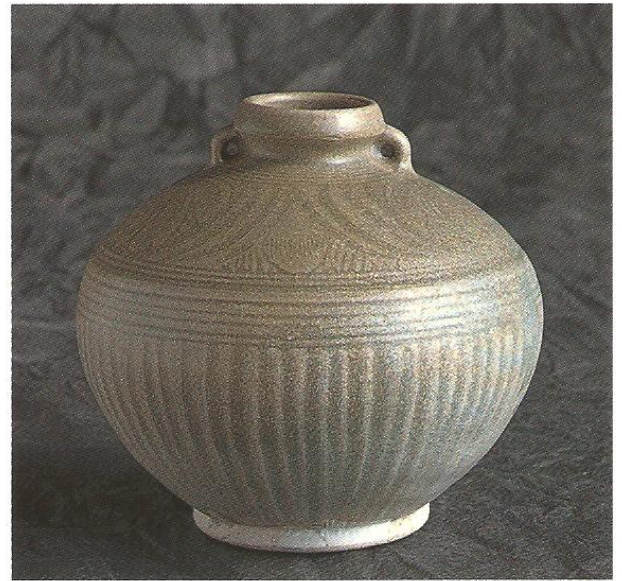


Plate 87. Sawankhalok jar, spherical in shape, with two ring handles and opaque, grayish green celadon glaze. The decoration includes stylized 'onion-skin' medallions at the shoulder and vertical striations on the lower body. There is a tubular support scar on the base. Height 17.5 cms. Since these were discovered throughout the upper layer of the wreckage, they were probably stored on deck. The shape is often called a 'coconut,' and 125 pieces were recovered, with 121 of them intact.



Plate 86. Sawankhalok jars with two ring handles and bluish green celadon glaze, decorated with carved striations. Heights 10.5–13 cms. Eight hundred and four of these were recovered, with 628 of them intact.



Plate 89. Chinese jarlets with warm dark brown glaze, one of them with two ring handles and another with vertical striations. They have a lightweight, pale yellowish gray clay body, and a flat foot carved so that the base is often slightly concave. Diameters 3 and 7–8 cms, heights 2.5 and 5–6 cms. These jarlets, 140 in number, were recovered from a single bulkhead compartment. All of them are more or less intact.

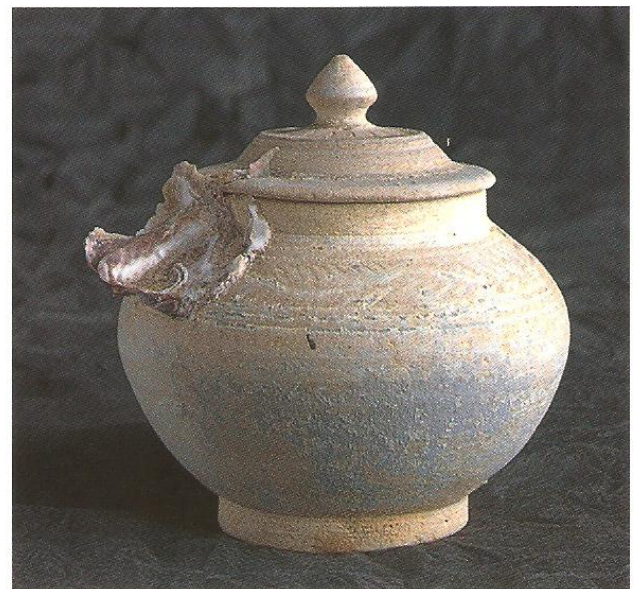


Plate 88. Sawankhalok covered jar with badly abraded celadon glaze, a band of incised decoration at the shoulder and a stacking support scar on the base. The cover, with its lotus bud-shaped handle, is sealed onto the jar. Height, with cover, 18.5 cms. Only a small number of these were contained in the cargo.



Plate 90. Chinese jars with three ring handles, a wide cuplike mouthrim and traces of a thin, monochrome olive-brown glaze. The glaze is largely eroded away. The bare clay body is dark gray and relatively lightweight. The potting of the flat foot is distinctive in that the base was made from a single disc of clay while the walls of the vessel were formed from coils that begin at the perimeter of the base disc. Heights 10, 16.5 and 18 cms.

Plate 91. Sawankhalok storage jar, tall and ovoid in shape, with four lug handles and blackish brown glaze that is partially abraded away. On storage jars of this shape the glaze often ends in artful waves at the lower body. Whether the waves were intentional or perhaps simply a



result of some special technique for applying the glaze, they are a common characteristic of Sawankhalok storage jars. The gray clay body is coarse and the base is cut perfectly flat. Height 29.5 cms. A hundred of these jars were discovered throughout the wreck. In a re-firing experiment it was discovered that their glaze re-melts at only about 700 degrees Centigrade. This makes them a form of high-fired earthenware. The Sawankhalok celadon plates show an average firing temperature of 1,140 degrees C.

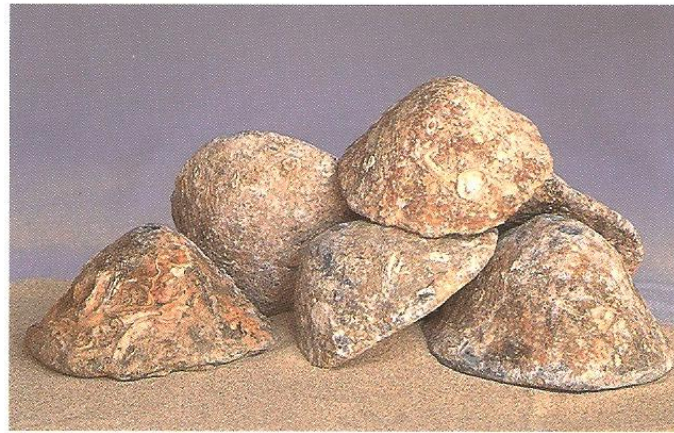
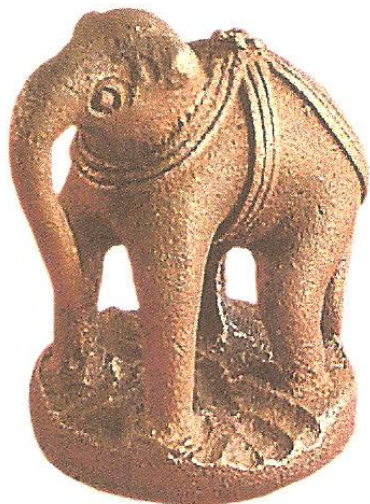
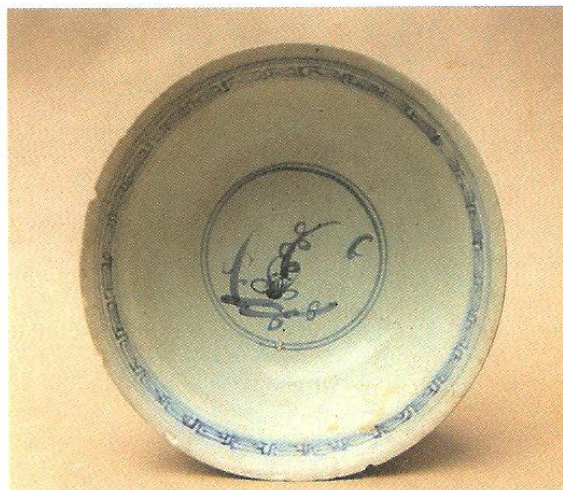
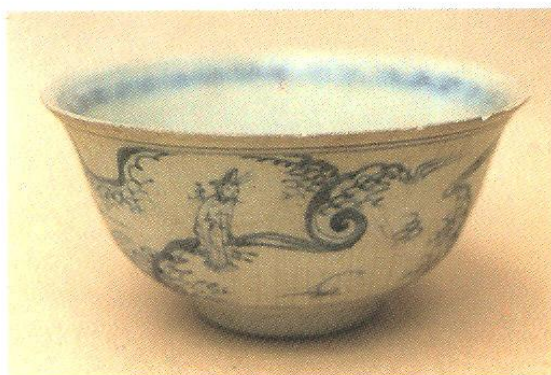


Plate 92. Ingots, pyramidal in shape, made from lead. Scattered over a wide area and atop the ceramics, the 110 ingots recovered had probably been kept on deck. The average dimension is 7.5 cms wide and 4.5 cms high, and the average weight is 1.511 grams. Similar ingots have been recovered from the Nanyang and Longquan shipwreck sites. It is perhaps interesting to note that the Malaysian bidor currency, in widespread use during the 14th–18th centuries, had the same form but was made from tin. There was also a smaller number of iron ingots in the Royal Nanhai cargo, and these were formed into a barlike shape, with two slanted sides and the base wider than the top. (No ingots of any type were discovered at the Turiang wrecksite.)



Plates 93a & b. Bronze seal modeled in the shape of an elephant. The base makes a circular impression showing a Chinese moon hare (Figure A3). Height 3.5 cms. This unusual artifact was discovered hidden in a secret place beneath floor planking next to the keel. The secret compartment also included a variety of other objects, including a lacquer box and a carved ivory sword handle (its blade eroded away). There were also six blue and white ceramics and one Chinese celadon dish. Two of the ceramics are Vietnamese covered boxes, and four are Chinese bowls decorated in a style from the period of the Jingtai and Tianshun reigns (1450–64).



Plates 94a & b. Chinese blue and white bowl recovered from the hidden compartment beside the keel of the Royal Nanhai shipwreck. Scenes such as painted here, separated by cloud borders, are common during the Jingtai and Tianshun reigns (1450–64).



Plate 95. Lacquer box and cover from the hidden compartment beside the keel of the Royal Nanhai shipwreck. The base for the lacquer is woven bamboo and there are remains of incised decoration.

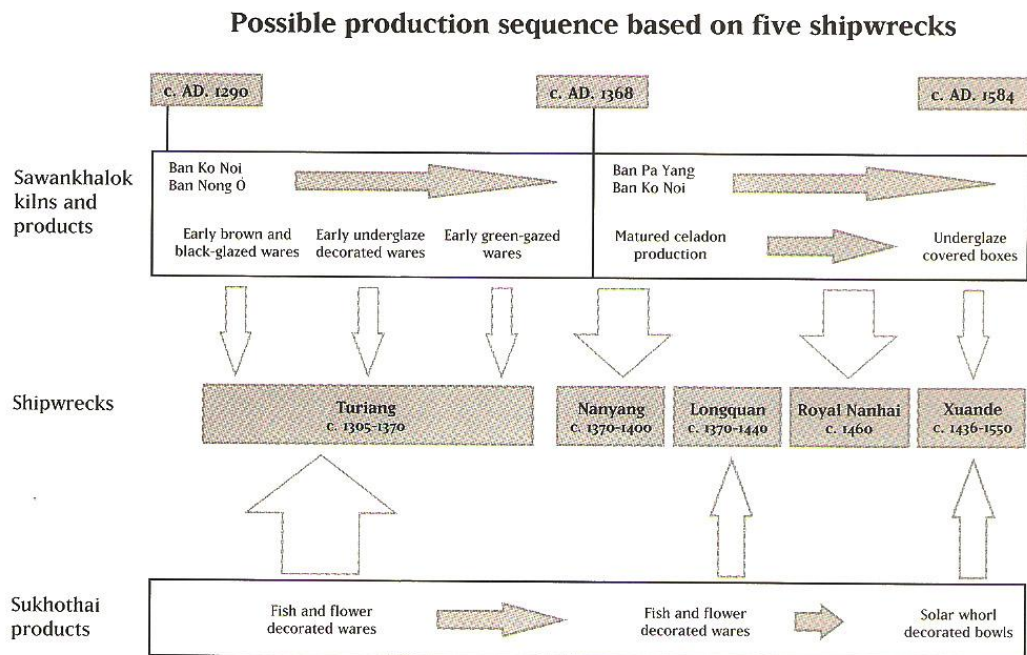


Figure A5. Chart showing a proposed chronology for five shipwrecks with Thai ceramics, including the Turiang, Nanyang, Longquan, Royal Nanhai and Xuande wrecksites. For ceramics from the Xuande site, see Sten Sjostrand, 'The Xuande

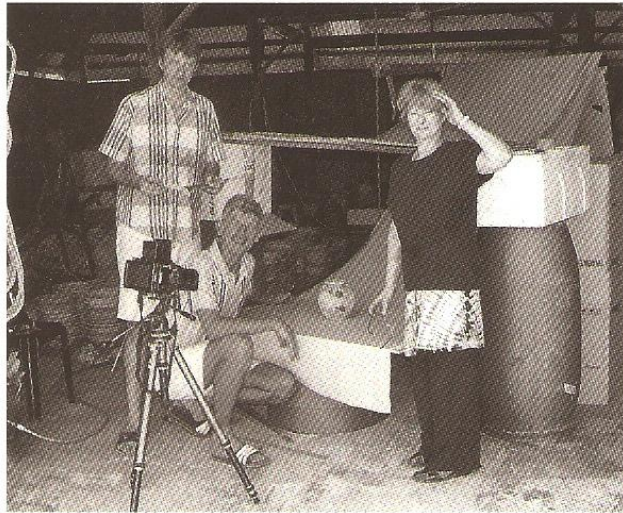
Wreck Ceramics,' *Oriental Art*, Volume XLIII/2 (Summer 1997), pages 8-14. Ban Ko Noi, Ban Nong O, and Ban Pa Yang are distinctive groups of kilns at the Sawankhalok manufacturing center. Chart designed by Sten Sjostrand.

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Photographer Robert McLeod (standing) with authors Sten Sjostrand and Roxanna Brown at work in Endau, Malaysia.

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