PRELIMINARY REPORT ON CERAMICS RECOVERED FROM THE NORTHERN "LIBRARY" OF THE BAYON COMPLEX, ANGKOR THOM

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Introduction

The Japanese Government Team for Safeguarding Angkor (JSA) was organized in 1994 to carry out a concrete preservation and restoration project for the Angkor monuments. Like other monuments in the Angkor region, the Bayon, located at the center of Angkor Thom, has been suffering from physical deterioration. Above all, the northern "library" with its foundation subsided, roof lost and wall greatly inclined was in most critical condition. As the first aim of a more far-reaching project, JSA began restoration of the northern library in 1995, using a method of partial dismantling and reassembling. The restoration work was completed in September 1999. In the process of dismantling the foundation mass of the platform, archaeological investigations, divided into two excavation campaigns, were conducted at the northwestern corner of the library platform. These excavations aimed to confirm original conditions and investigate original methods of construction. In the excavations, unexpectedly profuse artifacts were recovered in the soil filling the interior foundation mass of the platform.[1]

Most of these artifacts consist of imported and locally-made ceramics. Although most are small sherds, they may be useful for extrapolating construction and/or remodeling dates of the library. Therefore, almost all of the sherds were carefully inspected and their stratigraphic trends explored. The results of the analyses are reported below.

The provenience of artifacts in the excavation was recorded with minute precision: even sub-layers of the rammed earth in the interior of the platform or stone blocks of the walls with which artifacts were associated were recorded. Nonetheless, such detailed provenience information is irrelevant to present analyses; the ceramics were sorted in accordance with the upper, middle and lower levels of the platform.[2]

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[1] In addition to the pottery mentioned here, some other artifacts were also uncovered in the interior foundation mass of the platform; metal artifacts (an iron chisel and an "I"-shaped steel cramp), two small glass items, four brick fragments, four shattered animal bones, two pieces of iron slag and more than ten pieces of charred wood were recovered.
For further detailed information about JSA's restoration work and archaeological excavations at the northern library of the Bayon, see the annual reports of JSA: JSA, *Annual Report on the Technical Survey of Angkor Monument*, JICE, Tokyo, 1996, 1998, 1999.

[2] A site plan of the Bayon is shown in figure 1, and a plan of the northern library with the location of the first and second investigation areas is shown in figure 2. Figure 3 shows a profile of each level of the platform and detected condition of the rammed earth in the foundation mass.

1. Earthenware Ceramics (See Pl. 15-16)

1.1 Classification

Locally-made earthenware ceramics include a variety of shape classes. However, most of the sherds are so fragmentary and heavily worn out that fine-grained classification is difficult. Thus, they were tentatively classified in accordance simply with probable usage:

Class a: storage pots - narrow mouthed jars
Class b: serving pots - cups, dishes, bowls, covered boxes
Class c: cooking pots - wide mouthed jars
Class d: building materials - roof tiles

1.2 Characteristics

Paste, firing and forming techniques differ between Classes a and c, both of which are major components of the earthenware ceramics recovered in the platform. Characteristics of these aspects apparent to the naked eye are as follows:

Class a: The paste is reddish orange to grayish brown to purple brown in color. It is sandy or powdery. Although some specimens are well-fired and solid, most of them are ill-fired and dissolve in water during cleaning. Broken edges are rounded. Some white, red, and black particles are included. The wall is 8 to 10 mm thick. Many of the sherds have paddle marks (beaten or pressed). We can not confirm the presence-absence of other decoration. We have found no specimens for which original full shape can be reliably reconstructed.

Class c: The paste is dark reddish brown to grayish brown to grayish black in color. It is sandy. Most of the specimens are not well fired, yet they are solid and less worn-out than Class a. White, red or black particles are visible on broken edges, which are bumpy due to the presence of these particles. Walls are only about 4 mm thick. The outer surface of many specimens is sooty. Some specimens have carved decor. Specimens are too fragmentary to allow for reliable reconstruction of original full shape.

1.3 Stratigraphic trend

Table 1 shows the number of each class of pots recovered in each level of the platform. The middle level is the richest in specimens simply because more interior soil was removed from this section than from others. The number of sherds found in the lower level is comparable to that of the upper level, although more soil was extracted from here than from the upper level. The proportion of sherds contained in the soil may be largest in the middle level, and smallest in the lower level. It should be noted that rubble is profuse in the middle level soil, especially in its upper half.

1.4 Proportional composition

Classes a and c constitute the major component (95%) of earthenware sherds recovered in the platform. It is notable that very few serving pots (Class b) were found. This pattern is also true of earthenware ceramics recovered in the terrace of Prasat Suor Proat. This raises the intriguing question of what kinds of recipients were used for serving food and drink, instead of ceramics.

2. Khmer Glazed Ware (See Pl. 11-14)

2.1 Classification

Khmer glazed ware is generally divided into two classes; (1) storage jars with dark brown to liver brown iron glaze and (2) a variety of pots with transparent green ash glaze hued with grayish green. Both of these two classes of ware were recovered in the platform. Sherds are too fragmentary to allow for detailed classification of the ware. Therefore, each class has been tentatively subdivided into the following functional types:

(1) Dark glazed ware
  a. Jars and bottles
  b. Lidded vessels, e.g., covered cylinders
(2) Ash glazed ware
  a. Small to middle sized jars
  b. Lidded vessels, e.g., covered cylinders
  c. Bowls, cups and dishes
  d. Roof tiles

2.2 Characteristics

Khmer glazed ware can also be divided into three paste types:

Type 1: The paste is fine grained and solid. Grayish brown to dark purple brown in color. Pores are scarcely present. Broken edges are smooth. Most of the specimens are well-fired. Similar to glazed stoneware or unglazed stoneware such as Sue ware in the Kofun to Nara period, Japan.

Type 2: The paste is relatively coarse grained. Black (mica) and white (feldspar) particles are noticeable. Brown to grayish brown in color. Pores are profuse. Broken edges are bumpy. Both well-fired and ill-fired specimens are equally present. The paste characteristics are, as a whole, similar to those of the Middle Age ceramics fired at Tokoname kilns, central Japan.

Type 3: The paste is very fine grained. The clay appears to be sieved in water. Light grayish brown to grayish yellow in color. Some pores are present. Broken edges are smooth. Some specimens are well-fired and solid; others are ill-fired and powdery. The paste characteristics are, as a whole, similar to those of the Middle Age ceramics fired at Seto kilns, central Japan.

Most of the dark glazed ceramics are made of either Type 1 or Type 2 paste. Type 3 paste is very rare for this type of ware. In contrast, most of the ash glazed ceramics are made of Type 3 paste. Only some have Type 2 paste.

Glaze characteristics vary. Those with typical glaze characteristics of Khmer glazed ceramics are rare. Dark glazed ceramics are basically brown or dark brown and hued with gray, green, yellow. Some specimens are milky because glaze was not completely melted during firing. The glaze surface is not shiny. In many specimens, the glaze is exfoliated. Ash glazed ceramics are basically pale grayish green to pale yellowish brown in color. The glaze is normally not fully transparent. The surface of many specimens is milky and opaque. Cracks produced during firing and scars produced by use are also frequently found.

The specimens are too fragmentary to allow us to determine overall decoration. We can simply note that horizontal parallel lines are incised on the shoulder of many black glazed jar specimens, and on and around the lid of many ash glazed ware specimens.

2.3 Stratigraphic Trend

Table 2 shows the number of Khmer glazed ceramics recovered in each level of the platform. As for earthenware ceramics, Khmer glazed wares are also concentrated in the middle level of the platform: 63% of the dark glazed ware and 69% of the ash glazed ware were in fact recovered in the middle level. These percentages are similar to that of earthenware ceramics recovered in the same level (i.e., 64%).

Throughout the platform, dark glazed ware pieces number about two times ash glazed ware; the dark glazed ware would seem to have predominated production and consumption of Khmer glazed ware as a whole in the period when the northern library was built.

2.4 Proportional composition

Of the 183 recovered dark glazed sherds, only two belong to Class b (covered containers). All others belong to Class a (jars or bottles). In contrast, the ash glazed ware includes various shape classes; Class a constitutes 16%, Class b constitutes 19%, Class c (bowls) constitutes 46% and Class d (roof tiles) constitutes 19%. We do not know if this proportional composition is generally applicable to other proveniences in the period. It seems likely at least that the ash glazed ware included a larger percentage of serving vessels and had a greater variation in shape than the dark glazed ware.

It is noticeable that amongst the locally made ceramics (earthenware and glazed ware) those vessels other than storage and cooking pots were rare; storage vessels (narrow mouthed jars and bottles) constitute 59% of all finds (648/1096 sherds) and cooking vessels (wide mouthed jars) constitute 31% (340/1096 sherds). In contrast, serving vessels (bowls, plates, etc.) make up only 5% of finds (57/1096 sherds). It is unlikely that serving vessels are underrepresented only in the present sample; it is more likely that vessels other than locally-made ceramics were utilized for serving food and liquid.

Imported ceramics may have played this role. However, the trade ceramics recovered in the site do not appear to be abundant enough to confirm such a hypothesis. Wooden and metal vessels may also have been utilized. This possibility should be investigated in the future by comparing the ceramics recovered in other proveniences, such as the Terraces in the Northern Group of Prasat Suor Proat.

2.5 Manufacture Dates

The manufacture date of each class of Khmer ceramics is not unanimously agreed upon by scholars. It is, nonetheless, generally understood that ash glazed ware appeared at the end of the 9th century and faded out in the 11th and 12th centuries, while the dark glazed ware appeared in the beginning of the 11th century to culminate in the 12th to 13th centuries. Both of these wares disappeared with the decline of the Angkorian empire. As dark brown glazed ware is twice as abundant here as ash glazed ware, we can tentatively date the assemblage to sometime after the latter half of the 12th century or the beginning of the 13th century. This is, however, yet to be fully proven.

3. Trade Ceramics

A considerable number of trade ceramics was recovered in each level of the platform as shown in Table 3: 10 sherds of Chinese trade ceramics in the upper, 27 in the middle and 20 in the lower levels of the platform. Two sherds of Thai trade ceramics were also recovered in the upper level, while one sherd was found in the lower level. Trade ceramics from other areas are absent. As a whole, the proportion of trade

ceramics appears to be relatively large in the upper level compared with other levels of the platform.

Characteristics of each specimen are presented in Table 4. In the table, "C" stands for Chinese ware, "T" for Thai ware, "U" for the upper, "M" for the middle and "L" for the lower levels of the platform. The manufacture date of trade ceramics is generally determined in correlation with those recovered from dated contexts in China, the Korean peninsula and Japan.[3] It is not guaranteed that these dates are directly applicable to the Indochina peninsula. (Figures 4 and 5 are provided to facilitate understanding of chronological hypotheses based on comparative references to East Asian kilns and pottery types.)

3.1 Celadon (See Pl. 1-2)

Chinese celadon recovered in the platform includes Longquan (Xuejiang Province) kiln types and Dong-an (Fujien Province) kiln types or those made at kilns in the vicinity of Fujien Province. No specimens of Yue (Xuejiang Province) kiln types were found. It is known that mass production of the celadon at Longquan and other related kilns began in the Northern Sung Dynasty (11th century) and lasted to the Ming Dynasty (16th century). However, as CL.10 and 16 are bottom sherds of everted rim bowls or dishes and have peculiar shape and glaze characteristics, it is possible that they were made sometime between the end of the Southern Sung Dynasty (the end of the 13th century) and the Yuan Dynasty (14th century). It is generally understood that celadon was made at Dong-an kilns until the Sung Dynasty, and at related kilns in Fujien Province until the Yuan Dynasty. CM.7, 8 and 9 are body sherds of bowls with incised flower and combed decor. Their decor slightly simplified, these specimens are of relatively crude articles. They were probably manufactured between the end of the 12th century and the beginning of the 13th century.

3.2 White ware and bluish-white ware (See Pl. 3-6)

The white ware and the bluish-white ware recovered in the platform include Ding (Hepei Province), Jingdezhen (Jiangxi Province) and Tehua (Fujien Province) wares, and wares made at kilns in Fujien and Guangdong Provinces. Except for Ding ware, the manufacture loci (including those of the celadon and the brown glazed ware) are concentrated on the southern China coast (Fujien, Xuejiang, Jiangxi, and Guangdong Provinces); the majority of the wares traded across the world was produced in this area.

Ding kilns are considered to have operated in the middle to late 11th century (Northern Sung Dynasty). Some Ding ware such as CU.8 appears to have been manufactured into the period after the Southern Sung Dynasty. The precise ending date of the manufacture is not known. Ding ware seems to be infrequently found in Southeast Asia (especially in the Indochina Peninsula).

Jingdezhen kilns are well known for manufacture of white ware and bluish-white ware from the Northern Sung Dynasty up until the present-day. Bluish-white ware (or Qingbai in Chinese) was exported in large quantities to Japan and Southeast Asia, especially from the Southern Sung Dynasty to the beginning of the Ming Dynasty. A total of 29 specimens of this ware was recovered in the platform, i.e., CU.1, 2, 5 and 10 from the upper level, CM.1, 5, 6, 11 to 19, 22, 24 to 26 from the middle level and CL.1 to 3, 5, 6, 8, 9, 11 to 13 from the lower level of the platform. This ware is the most abundant of all. Covered

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[3] Due to space limitations, only principal references are given here. Members of the Japan Society for the Study of Oriental Trade Ceramics provided advice on the dating of some trade ceramics. See Japan Society for the Study of Oriental Trade Ceramics (Nihon Boeki Toji Kenkyukai), *Trade ceramics studies (Boeki toji kenkyu)*, nos. 8, 10, 11, 12, Tokyo, 1988, 1990, 1991, 1992.

boxes are common, while some bowls and small jars are also present. The paste, forming, firing, glaze and decorations are of fair quality. In comparison with 12th- to early 13th-century specimens recovered in Japan, firing and glaze are not homogeneous and decor is simplified. It is probable that pieces recovered in the platform were produced in the period after mass production was intensified, i.e., from the middle of the 13th century to the middle of the 14th century, or during the 14th century.

According to recent studies, the bluish-white ware was manufactured not only in Jingdezhen kilns but also in other kilns located in Anhoi, Hepei, Fujien, Xuejiang, Jiangxi and Guangdong Provinces. It seems that the ware traded to Southeast Asia was mainly manufactured in Guangdong and Fujien Provinces. Because products from different kilns in the provinces cannot be differentiated, they have been grouped together as Jingdezhen kiln types. Jingdezhen kilns started to mass produce blue and white ware (or Qinghua in Chinese) from around the end of the 14th century for export to East and Southeast Asia. Yet, no blue and white ware sherds were recovered in the platform.

Tehua kilns already operated during the Northern Sung Dynasty. However, the mass production of trade ceramics started around the latter half of the 13th century, and continued through the 14th century. Large white ware covered boxes with stamped decorations produced at Tehua kilns were imported to Southeast Asia on a large scale. A total of 11 Tehua ware specimens were recovered in the platform (CU.3 and 4 in the upper level, CM.2 to 4, and 12 in the middle level and CL.4, 7, 14, 15 and 18 in the lower part of the platform). All of these specimens were covered boxes with stamped decor with the exception of one bowl.

White ware (or the bluish-white ware) other than those mentioned above are considered to come from miscellaneous kilns in Fujien and Guangdong Provinces. These kilns are understood to have operated for several centuries, from the Southern Sung to the Yuan Dynasty. Many of the products found in Southeast Asia are thought to have been manufactured between the earlier half of the 13th century and the latter half of the 14th century; it is however probable that the manufacture period differed slightly between types of ware, and that the use period varied slightly from area to area.

3.3 Brown glazed stoneware (See Pl. 7-8)

CU.16 and CL.17 are brown glazed stoneware jars possibly produced in southern China. From the 13th to the 15th centuries, kilns in Guangdong, Fujien, and Jiangxi Provinces and their vicinity manufactured brown glazed stoneware jars and bottles for export per se, or as containers of export items such as incense, perfume, medicine, tea, alcoholic beverages, water, oil and so forth. As for celadon and white ware, brown glazed stoneware is also found in abundance in East and Southeast Asia (especially in island and coastal areas). It is generally difficult to identify specific provenance of each specimen of the ware. Nonetheless, we can hypothesize that CU.16 was produced at Shao-zhou kilns, Jiangxi Province, because the paste is very fine-grained and solid, and the wall is very thin. On the other hand, with many white and black particles included in the paste, CL.17 is similar to products of Quan-zhou kilns, Fujien Province. It should be noted that some of the very small brown glazed stoneware sherds can be easily misidentified as Khmer glazed ware.

3.4 Thai ware (See Pl. 9-10)

TU.1 and 2 and TL.1 are stoneware with pale grayish green to transparent celadon glaze; they clearly differ from Chinese or Khmer ceramics, and are considered to be Thai. If specimens were produced at kilns around Sawankhalok or Sukhothai (Si Satchanalai), they would date from the 14th to the 15th centuries (the earliest such ware thus far known dates to the end of the 13th century, and the latest to the mid-

dle of the 16th century). Like Khmer ware, Thai ware is not yet reliably dated. The above specimens may in fact be products of northern Thai kilns, thought to date earlier than the others mentioned above.

4. Dating the Platform

Chinese trade ceramics recovered in the platform are mainly products of the 13th to 14th centuries, dating more specifically from the middle of the 13th century to the latter half of the 14th century. Dates of the specimens are polarized to the 14th century and the earlier half of the 13th century. No specimens of the 15th century were found. As the dating of Thai and Khmer wares is not yet reliable, we can not yet take them into consideration in our efforts to date the platform.

Assuming that the youngest specimens indicate the construction date of a structure with which the specimens are associated, we can date the platform construction from the middle to the latter half of the 14th century. Considering the time lag between the deposition of the specimens in the soil and the use of the soil in the construction of the platform, it is possible that the platform was constructed later than the above-proposed date.

The proposed construction date of the platform differs significantly from the generally accepted construction date of the Bayon Complex, believed to have been built by Jayavarman VII (1181 to 1201). The earliest specimens of Chinese trade ceramics recovered in the platform (i.e., those of the earlier half of the 13th century) are closer to this generally accepted construction date of the Bayon. Nonetheless, it is more likely that the library was not originally associated with the Bayon temple, but was added later to the temple complex as has been previously proposed.[4] After the original construction, the temple is known to have undergone several phases of remodeling. The library is likely to have been constructed and reformed in these remodeling events. The ceramic date of the middle to latter half of the 14th century may indicate the last of these remodeling episodes of the temple complex.

As all of the trade ceramics associated with the structure are too fragmentary to allow for reliable identification of production loci and dates, the construction date of the platform proposed here should be regarded as tentative. Also, archaeological studies on Chinese and other trade ceramics imported to Southeast Asia have started only recently, such that it remains difficult to identify origin and production periods with precision. Thus, it may be premature to ceramically date the structure. More reliable dating may become possible once advances are made in chronological studies of trade ceramics, and as better specimens are made available in future excavations of the area in and around the Bayon Complex.

[4] According to Jacques Dumarçay's studies, the Bayon complex underwent four phases of modifications and extensions before becoming what it is today, and the northern library was constructed at the final fourth phase (J. Dumarçay and B.-Ph. Groslier, *Le Bayon, Histoire Architecturale du temple. Inscriptions du Bayon*, PEFEO, Mémoires archéologiques II et III, 2, Paris, 1967 and 1973.)

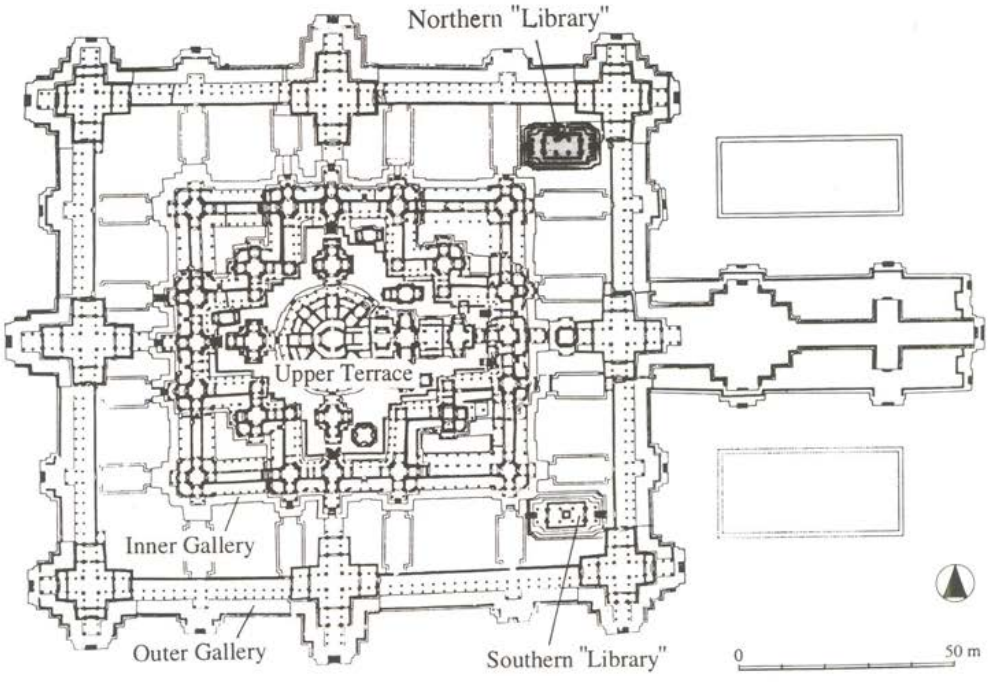


Figure 1. Site plan of the Bayon

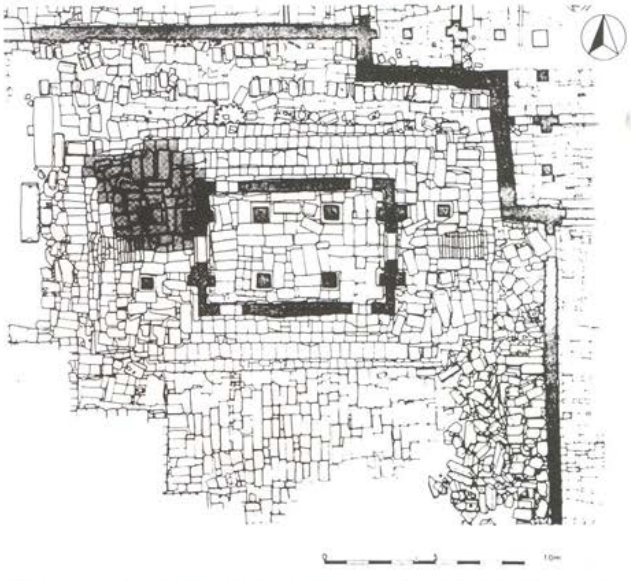


Figure 2. Plan of the "northern library" showing the dismantled and excavated area in the first and second investigations

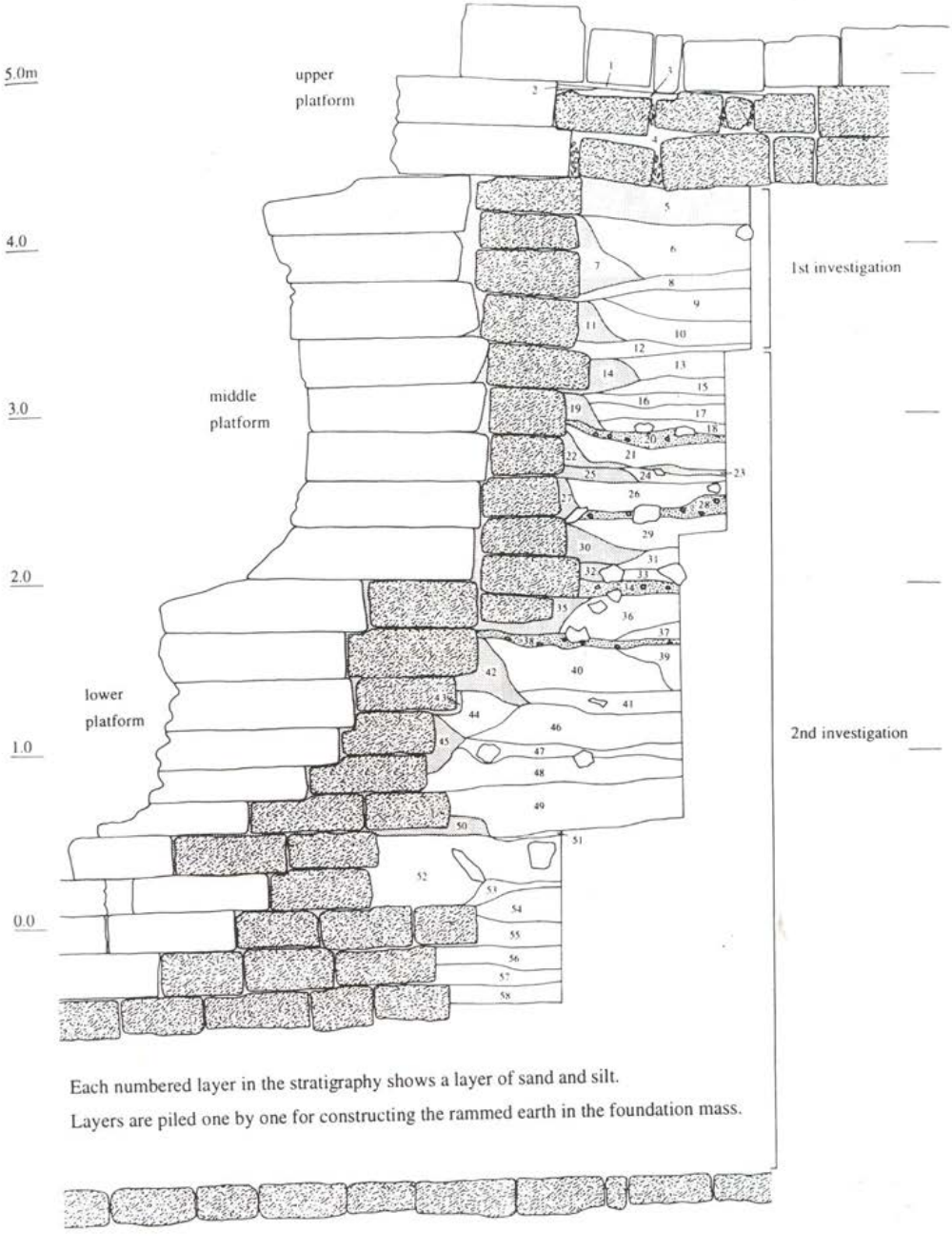


Figure 3. Profile of the platform showing stratigraphy of the rammed earth in the foundation

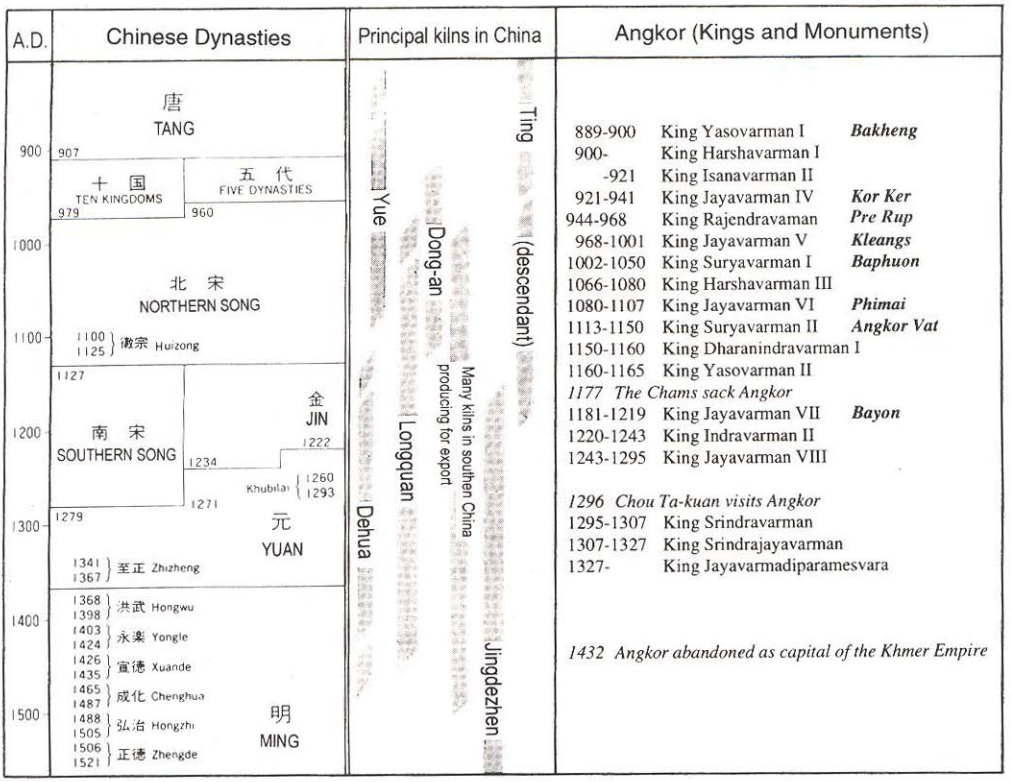
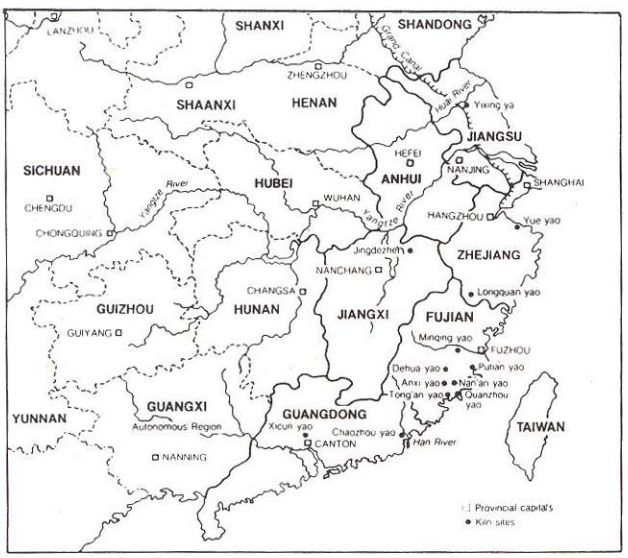
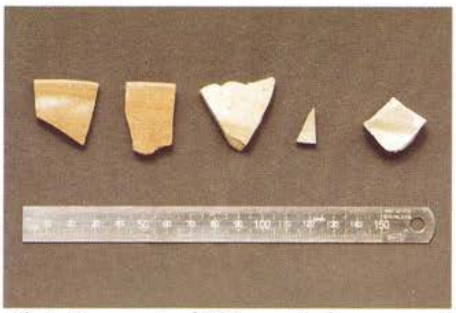


Figure 4 . Comparative chronology of dynasties and kilns in China and Angkor



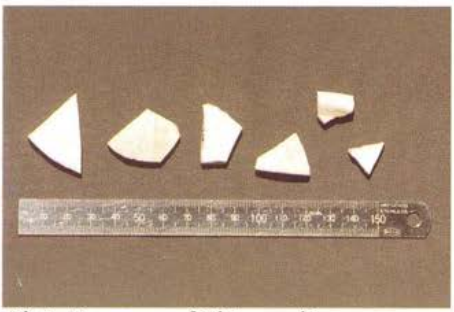
The capital of the Tang dynasty was Xi-an in Shanxi province.
The capital of the Northern Song dynasty was Kaifeng in Henan province.
The capital of the Southern Song dynasty was Hangzhou in Zhejiang province.
The main capital of the Jin, Yuan and Ming dynasties was Beijing (Peking).

Figure 5. Provinces and principal kiln sites in southern China



Pl. 1. Fragments of Chinese celadon recovered in the platform

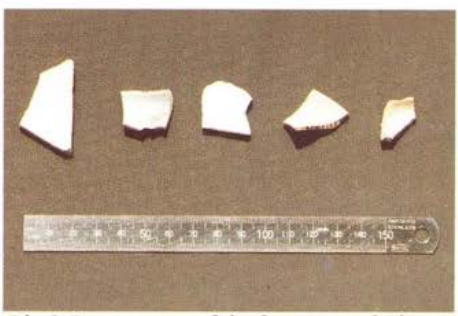
Pl. 2. Reverse view of the fragments of Chinese celadon



Pl. 3. Fragments of Chinese white ware recovered in the platform

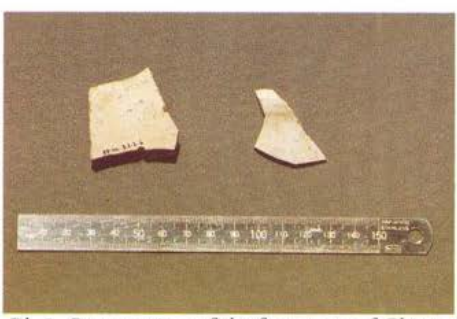
Pl. 4. Reverse view of the fragments of Chinese white ware

Pl. 5. Fragments of Chinese bluish-white (Qingbai) ware recovered in the platform



Pl. 6. Reverse view of the fragments of Chinese bluish-white ware

Pl. 7. Fragments of Chinese brown glazed stoneware recovered in the platform



Pl. 8. Reverse view of the fragments of Chinese brown glazed stoneware

Pl. 9. Fragments of Thai ware recovered in the platform

Pl. 10. Reverse view of the fragments of Thai ware

Pl. 11. Fragments of Khmer ash glazed ware recovered in the platform

Pl. 12. Reverse view of the fragments of Khmer ash glazed ware

Pl. 13. Fragments of Khmer dark glazed ware recovered in the platform

Pl. 14. Reverse view of the fragments of Khmer dark glazed ware

Pl. 15. Fragments of Khmer earthenware recovered in the platform

Pl. 16. Reverse view of the fragments of Khmer earthenware

Type	a	b	c	d	Total
Upper Platform	77	1	58	2	138
Middle Platform	289	9	217	12	527
Lower Platform	86	3	65	3	157
Total	452	13	340	17	822

Table 1. Sherd Counts of unearthed earthenware

Ware	Brown glazed ware		Ash glazed ware				
Type	a	b	a	b	c	d	Total
Upper Platform	29	0	4	2	8	1	44
Middle Platform	117	2	10	11	30	12	182
Lower Platform	35	0	1	4	4	4	48
Total	181	2	15	17	42	17	274

Table 2. Sherd Counts of unearthed Khmer glazed ware

Ware	Chinese Celadon	White Porcelain	Bluish-white Porcelain	Chinese Stoneware	Thai Ceramics	Total
Upper Platform	0	6	3	1	2	12
Middle Platform	3	15	9	0	0	27
Lower Platform	2	9	8	1	1	21
Total	5	30	20	2	3	60

Table 3. Sherd Counts of unearthed trade ceramics